

CASE 3050: Application of SOHIO
PETROLEUM CO. for a waterflood
project, Lea County, N. Mex.

8402
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Nursing in Day Care

CASE NO.

3056

Application,

TRANSCRIPTS,

SMALL Exhibits

ETC.

MAIN OFFICE OCC

1961 MAY

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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION)
OF SOHIO PETROLEUM COMPANY FOR)
APPROVAL OF THE UNIT AGREEMENT)
FOR THE DEVELOPMENT AND OPERATION)
OF THE LITTMAN SAN ANDRES UNIT IN)
TOWNSHIP 21 SOUTH, RANGE 38 EAST,)
N.M.P.M., LEA COUNTY, NEW MEXICO)
(and Andrews County, Texas) AND FOR ORI-)
GINAL AUTHORITY FOR THE INJECTION OF)
WATER THEREIN FOR THE SECONDARY RE-)
COVERY THEREFROM AND THE PRESSURE)
MAINTENANCE THEREOF.)

Secondary Recovery

NO. 3050

APPLICATION

Sohio Petroleum Company hereby applies for approval of the Unit Agreement for the development and operation of the Littman San Andres Unit which includes 1941.38 acres of land, more or less, in Lea County, New Mexico, and Andrews County, Texas, and more fully described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 8:	SE $\frac{1}{4}$
Section 9:	SW $\frac{1}{4}$
Section 16:	NW $\frac{1}{4}$
Section 17:	NE $\frac{1}{4}$

Andrews County, Texas

Block A-29, PSL

Section 5:	East 40 acres of South 71.25 acres of SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$ and West 40 acres of North 71.25 acres of SE $\frac{1}{4}$
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Section 6:	$N\frac{1}{2}$ and $S\frac{1}{2}$
Section 7:	$SW\frac{1}{4}$
Section 14:	$NW\frac{1}{4}$
Section 15:	$NE\frac{1}{4}$

Designation of the Littman San Andres Unit as heretofore described has been approved by the United States Geological Survey and the form of the Unit Agreement has been approved by the Commissioner of Public Lands of the State of New Mexico. The Unit area includes 490.69 acres, more or less, of Federal land and 170.69 acres of State of New Mexico land.

The Federal and State of New Mexico lands comprise all of the unit area within the State of New Mexico. The unit area also includes 1280 acres of fee land, situate in Andrews County, Texas. The Federal land so included is described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 8:	$SE\frac{1}{4}$
Section 9:	$SW\frac{1}{4}$
Section 17:	$NE\frac{1}{4}$

The State of New Mexico land so included is described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 16:	$NW\frac{1}{4}$
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The Unit Agreement has been executed by 100 % of the working interest owners and by more than 75% of the royalty, overriding royalty and production payment owners. A list of all interested parties known to applicant is attached hereto.

In addition to the approval of the Unit Agreement, applicant also requests original authority for the injection of water into the unit formation for the secondary recovery therefrom and the pressure maintenance thereof, and, in support thereof, attaches hereto as Exhibits:

- Exhibit "1": Index map of the Littman San Andres Unit within Lea County, New Mexico and Andrews County, Texas.
- Exhibit "2": Log of proposed injection well No. 1 Sims.
- Exhibit "3": Diagrammatic sketches of the proposed injection wells.

The water injection will be into the San Andres formation at an average depth of 4300 feet. The water source for this program will be the Santa Rosa formation which occurs at an average depth of 1200 feet in the vicinity of the Littman Pool. The injection rate is estimated to be 800 barrels per day per injection well which, under full scale operations, would require a supply of 12000 barrels per day.

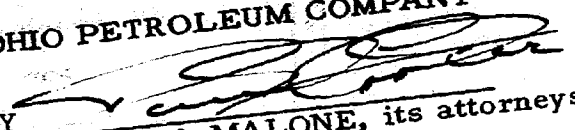
A copy of this application is likewise forwarded to the office of the State Engineer, P.O.Box 1079, Santa Fe, New Mexico, marked for the attention of Frank Irby.

Applicant respectfully submits that the creation of the Littman San Andres Unit would be in the best interest of conservation of natural resources and would prevent waste and increase the ultimate recovery of oil from the Littman San Andres field, at the same time protecting the correlative rights of all owners of interest. The agreement provides for the separate handling and accounting of production from the New Mexico portion of the unit area.

WHEREFORE, Applicant respectfully requests that this Application be set for a hearing before a duly appointed examiner of the Commission at the earliest possible date, that notice be given as required by law and the regulations and that the Littman San Andres Unit be approved and authority given for the injection of water therein for the secondary recovery therefrom and the pressure maintenance thereof.

Respectfully submitted,

SOHIO PETROLEUM COMPANY

BY 
of ATWOOD & MALONE, its attorneys
P.O. Drawer 700
Roswell, New Mexico

APPLICATION FOR SECONDARY RECOVERY AND PRESSURE MAINTENANCE

Exhibit 3 —

Diagrammatic Sketches of Proposed Injection Wells

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Case 3050

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Southland WELL 2
LOCATION 880' FSL & 810' FEL, Sec. 5, Blk. A-29, FSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1635' with 150 Sacks

Production Tubing:

2" @ 4350'

7" Csg. @ 4338' with 50 Sacks

Open Hole 4338'-60'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Southland WELL 4
LOCATION 1760' FSL & 2060' FEL, Sec. 5, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1630' with 450 Sacks

Production Tubing:

2" @ 4345'

5-1/2" Liner @ 1558'-4325' with 675 Sacks

Open Hole 4325'-50'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Monarch WELL 1
LOCATION 330' FSL & 1691' FWL, Sec. 5, Elk. A-29, FSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1630' with 75 Sacks

Production Tubing:

2" @ 4360'

7" Csg. @ 4338' with 250 sacks

Open Hole 4338'-67'

LITTMAN SAN ANDRES FIELD

LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Schio Petroleum Company LEASE Littman WELL 2

LOCATION 2173⁺ FSL & 2027⁺ FEL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1636' with 450 Sacks

Production Tubing:

2" @ 4358'

5-1/2" Csg. @ 4321' with 150 Sacks

Open Hole 4321'-58'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO — ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman WELL 3
LOCATION 811' FEL & 880' FSL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1628' with 200 Sacks

5-1/2" Liner 1567' - 4306' with 575 Sacks

Production Tubing:

2" @ 4347'

Open Hole 4306' - 49'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman WELL 6

LOCATION 440' FWL & 2200' FSL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1625' with 500 sacks

Production Tubing:

2" @ 4350'

5-1/2" Csg. @ 4323' with 100 sacks

Open Hole 4323'-53'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Schio Petroleum Company LEASE Littman "A" WELL 1
LOCATION 467' FNL & 467' FWL, SE/4 NE/4 of Sec. 6, Blk. A-29, PSL Sur.,
Andrews County, Texas

Surface

8-5/8" Csg. @ 1628' with 300 Sacks

Production Tubing:

2" @ 4330'

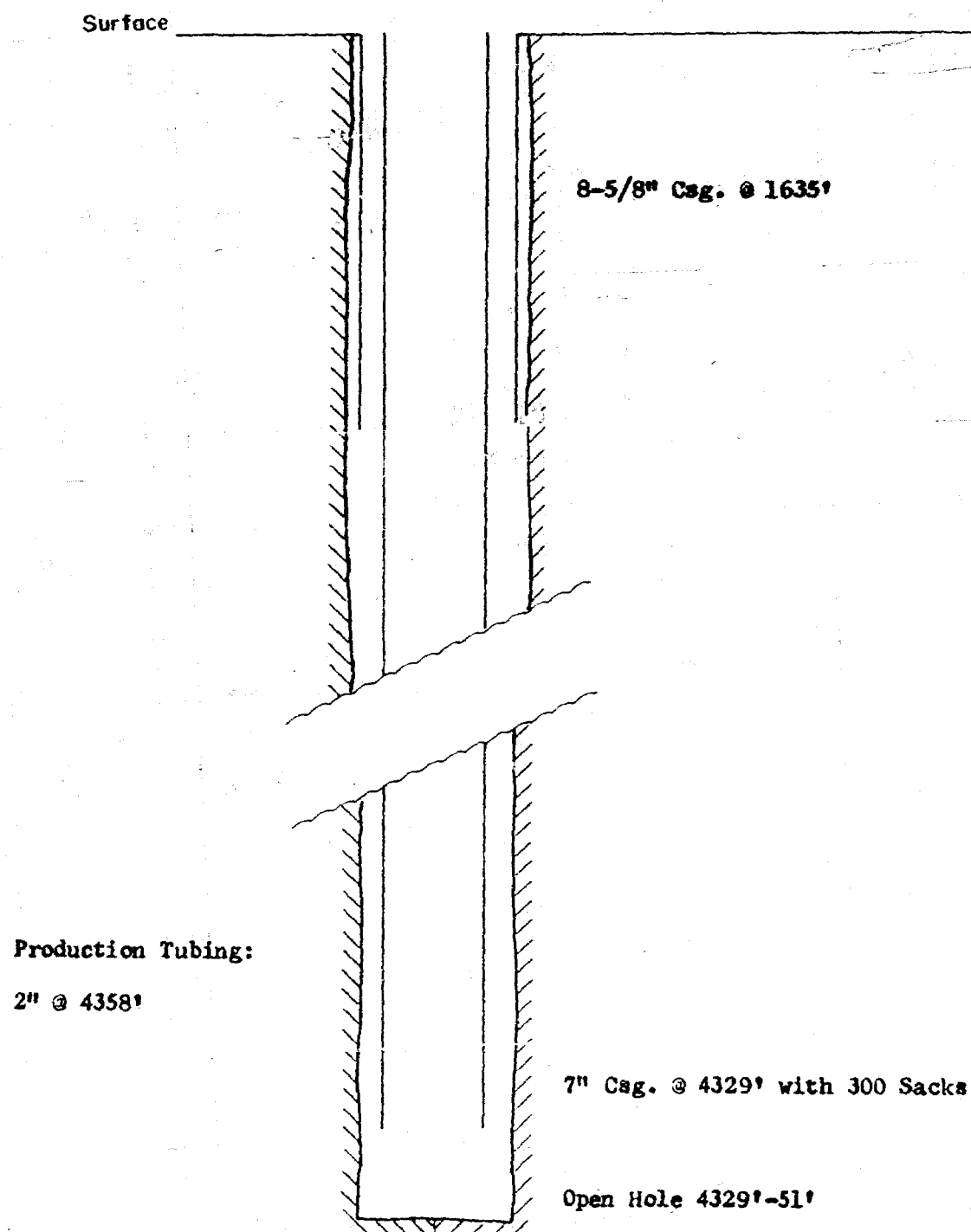
7" Csg. @ 4301' with 100 Sacks

Open Hole 4301'-40'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman "A" WELL 4

LOCATION 2062' FEL & 440' FNL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman "A" WELL 5
LOCATION 1760' FNL & 1691' FWL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1622'

Production Tubing:
2" @ 4353'

7" Csg. @ 4323' with 125 Sacks

Open Hole 4323'-56'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company

LEASE Littman "B"

WELL 1

LOCATION 467' FNL & 467' FNL of S/2 Sec. 7, Blk. A-29, PSL Sur., Andrews County,
Texas

Surface

13-3/8" Csg. @ 160' with 150 Sacks

8-5/8" Csg. @ 1630' with 40 Sacks

Production Tubing:

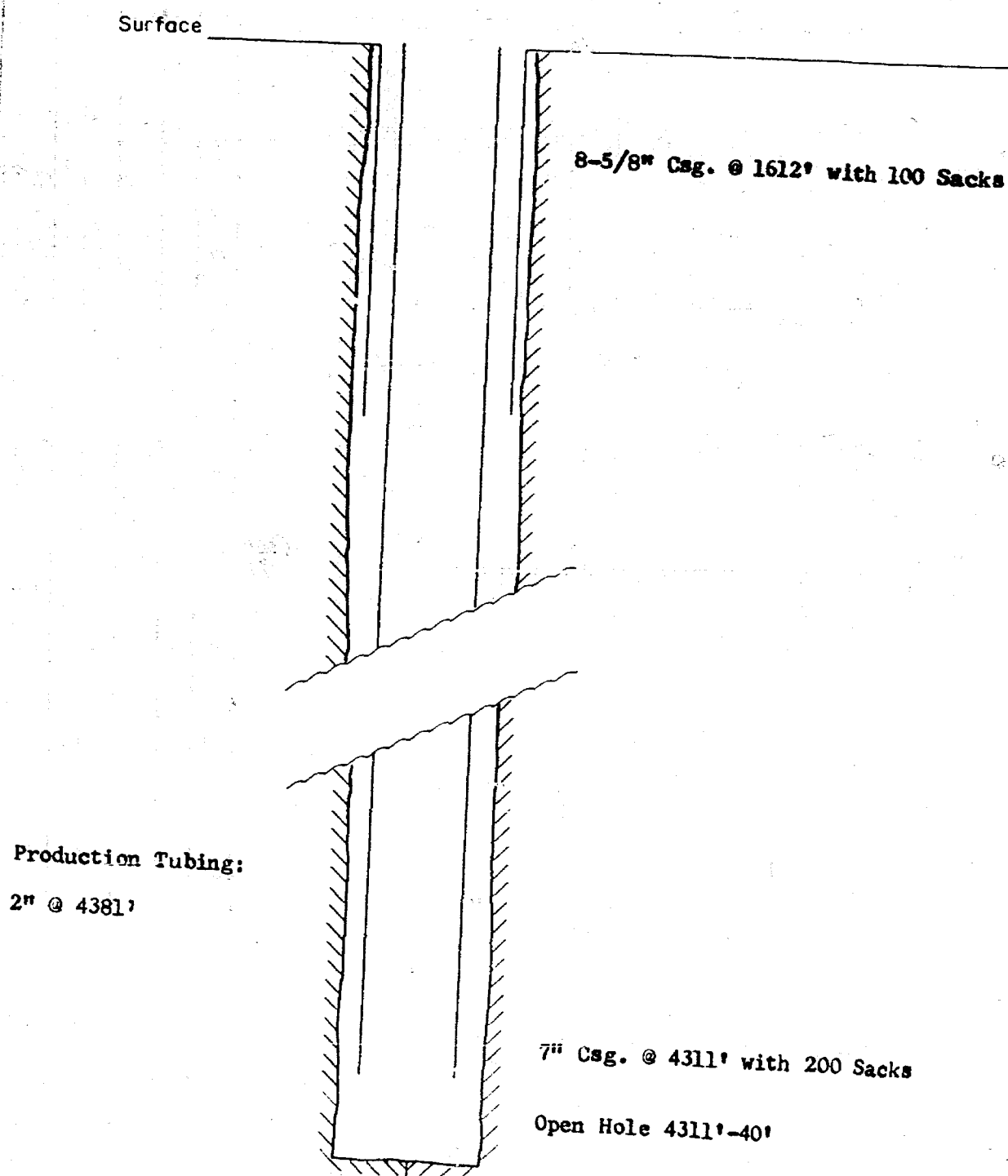
2" @ 4347'

5-1/2" Csg. @ 4315' with 60 Sacks

Open Hole 4315'-51'

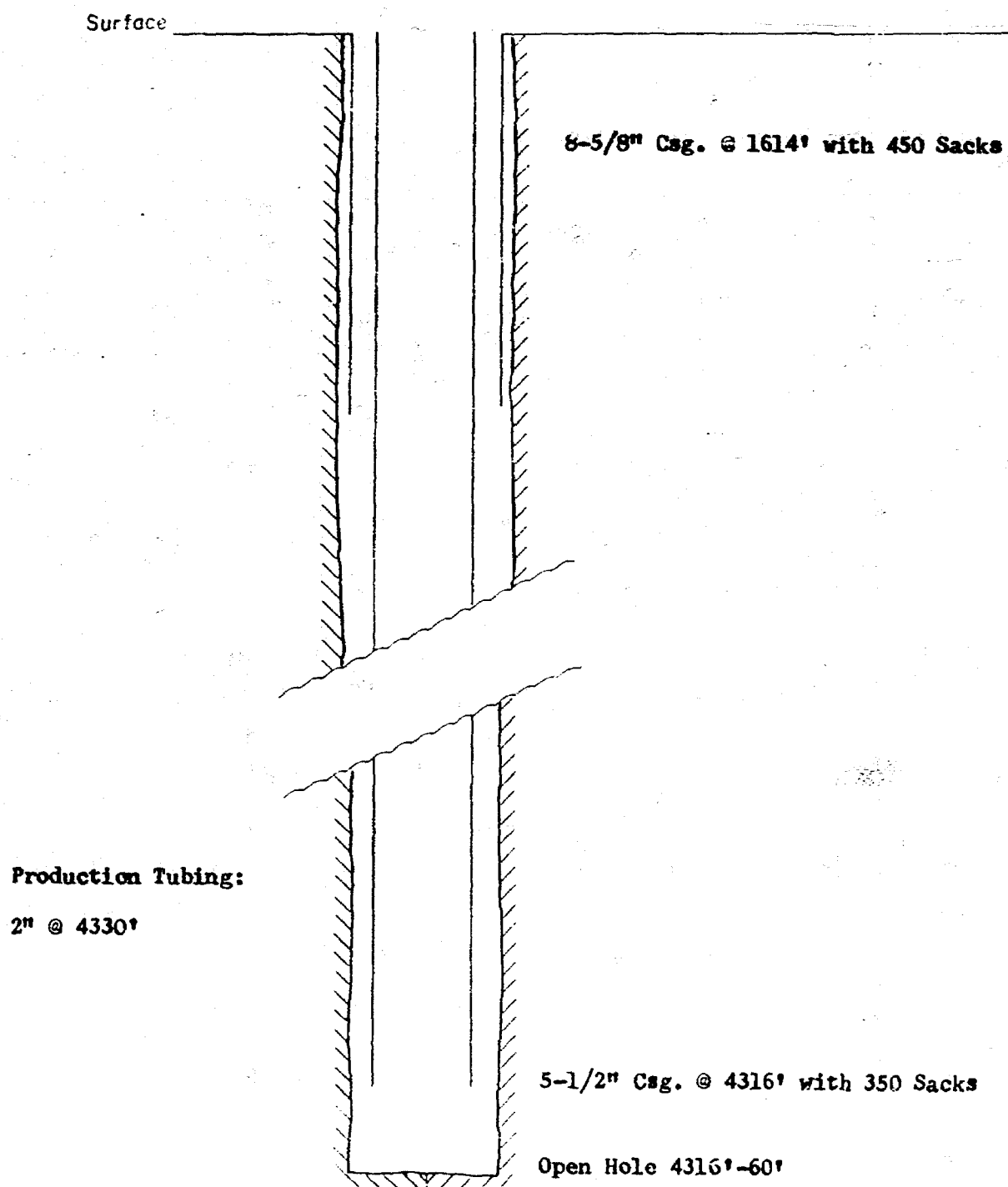
LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Sims WELL 1
LOCATION 467' FNL & 467' FWL, Sec. 14, Blk. A-29, PSL Sur., Andrews County, Texas



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

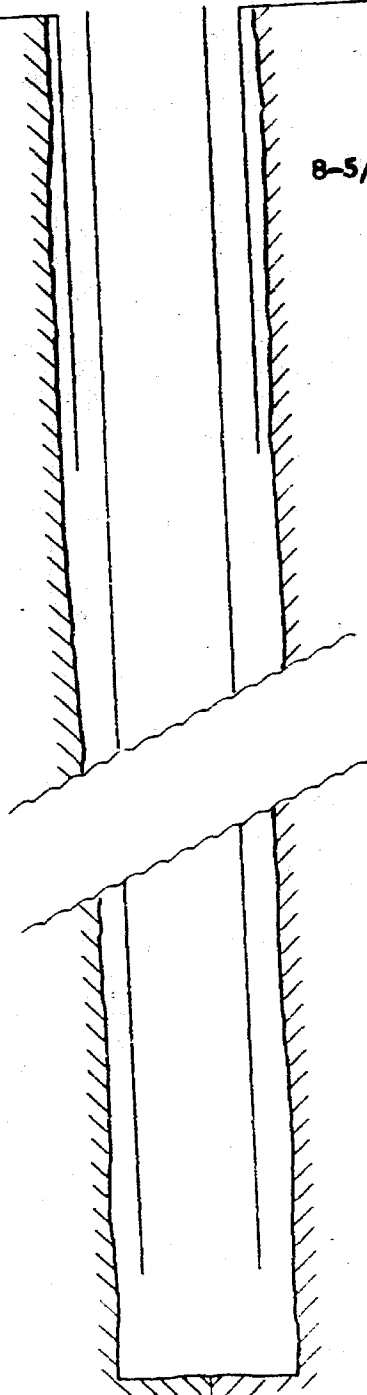
OPERATOR Elliott, Inc. LEASE Parcell WELL 2
LOCATION 990' FSL & 330' FEL, Sec. 8-T21S-R38E, Lea County, New Mexico



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Elliott, Inc. LEASE Wylie WELL 1
LOCATION 990' FSL & 330' FEL, Sec. 9-T21S-R36E, Lea County, New Mexico

Surface



8-5/8" Csg. @ 1616' with 150 Sacks

7" Csg. @ 4321' with 200 Sacks

Open Hole 4321'-60'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO — ANDREWS COUNTY, TEXAS

OPERATOR Elliott, Inc. LEASE Wylie WELL 3

LOCATION 1650' FSL & 1650' FEL, Sec. 9-T21S-R38E, Lea County, New Mexico

Surface

8-5/8" Csg. @ 1625' with 600 Sacks

5-1/2" Csg. @ 4327' with 350 Sacks

Production Tubing:

2" @ 4337'

Open Hole 4327'-59'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE NuMex WELL 2
LOCATION 1650' FEL, 330' FNL, Sec. 16-T21S-R32E, Lea County, New Mexico

Surface

13-3/8" Csg. @ 150' with 160 sacks

8-5/8" Csg. @ 1620' with 25 sacks

Production Tubing:

2" @ 4339'

5-1/2" Csg. @ 4330' with 450 sacks

Open Hole 4330'-58'

PRODUCTION HISTORY - SAN ANDRES FORMATION

LITTMAN (SAN ANDRES) UNIT

MONTHLY OIL PRODUCTION - BBLS

	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1951</u>			
June	-	580	580
July	-	272	272
August	-	670	670
September	-	114	114
October	-	333	333
November	-	104	104
December	-	2,672	2,672
Total	-	4,745	4,745
Cum	-	4,745	4,745
<u>1952</u>			
January	-	2,278	2,278
February	-	3,633	3,633
March	-	4,673	4,673
April	-	4,407	4,407
May	-	3,267	3,267
June	-	2,323	2,323
July	-	8,044	8,044
August	-	12,922	12,922
September	-	12,485	12,485
October	-	12,772	12,772
November	-	12,365	12,365
December	-	13,066	13,066
Total	-	92,235	92,235
Cum	-	96,980	96,980
<u>1953</u>			
January	-	12,341	12,341
February	-	12,795	12,795
March	-	14,347	14,347
April	408	12,459	12,867
May	1,069	12,542	13,611
June	1,197	12,196	13,393
July	1,137	12,729	13,866
August	1,021	12,208	13,229
September	1,471	12,288	13,759
October	2,399	12,428	14,827
November	1,651	10,860	12,531
December	1,566	10,267	11,833
Total	11,919	147,480	159,399
Cum	11,919	244,460	256,379

Production History - San Andres Formation
Littman (San Andres) Unit
Monthly Oil Production - Bbls

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	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1954</u>			
January	1,817	10,652	12,469
February	1,557	9,177	10,734
March	1,535	9,403	10,938
April	1,385	8,747	10,132
May	1,356	10,495	11,851
June	2,117	9,613	11,730
July	2,931	9,750	12,681
August	2,509	9,994	12,503
September	2,605	10,885	13,490
October	2,793	11,799	14,592
November	2,431	11,714	14,145
December	2,392	10,289	12,681
Total	<u>25,428</u>	<u>122,518</u>	<u>147,946</u>
Cum	37,347	366,978	404,325
<u>1955</u>			
January	2,367	10,203	12,570
February	2,870	8,476	11,346
March	4,272	8,712	12,984
April	5,413	7,455	12,868
May	5,947	8,365	14,312
June	6,879	7,867	14,746
July	6,138	7,976	14,114
August	6,107	7,664	13,771
September	4,921	7,063	11,984
October	4,904	6,980	11,884
November	4,429	6,487	10,916
December	4,549	6,682	11,231
Total	<u>58,796</u>	<u>93,930</u>	<u>152,726</u>
Cum	96,143	460,908	557,051
<u>1956</u>			
January	3,910	7,755	11,665
February	5,322	6,642	11,964
March	4,518	9,205	13,723
April	4,158	8,125	12,283
May	4,115	7,826	11,941
June	3,945	7,289	11,234
July	3,610	7,274	10,884
August	3,360	6,992	10,352
September	2,971	6,995	9,966
October	3,379	6,897	10,276
November	3,104	6,380	9,484
December	3,099	6,159	9,258
Total	<u>45,491</u>	<u>87,539</u>	<u>133,030</u>
Cum	141,634	548,447	690,081

Production History - San Andres Formation
Littman (San Andres) Unit
Monthly Oil Production - Bbls

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	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1957</u>			
January	3,283	5,481	8,764
February	2,991	5,811	8,802
March	2,984	6,046	9,030
April	2,761	6,787	9,548
May	2,885	6,859	9,744
June	2,891	6,185	9,076
July	2,618	6,058	8,676
August	2,653	5,855	8,508
September	2,291	5,468	7,759
October	2,324	5,513	7,837
November	2,330	5,692	8,022
December	2,425	5,465	7,890
Total	<u>32,436</u>	<u>71,220</u>	<u>103,656</u>
Cum	174,070	619,667	793,737
<u>1958</u>			
January	2,558	5,504	8,062
February	2,200	4,860	7,060
March	2,299	5,254	7,553
April	2,252	5,045	7,297
May	2,271	5,222	7,493
June	2,107	4,776	6,883
July	2,375	5,138	7,513
August	2,216	4,889	7,105
September	1,892	4,357	6,249
October	2,116	4,426	6,542
November	1,864	4,074	5,938
December	1,884	4,226	6,110
Total	<u>26,034</u>	<u>57,771</u>	<u>83,805</u>
Cum	200,104	677,438	877,542
<u>1959</u>			
January	1,731	4,645	6,376
February	2,079	3,817	5,896
March	1,983	4,145	6,128
April	1,877	3,989	5,866
May	2,000	4,097	6,097
June	1,893	3,929	5,822
July	1,798	3,708	5,506
August	1,912	4,003	5,915
September	1,498	3,443	4,941
October	2,189	4,035	6,224
November	2,075	3,773	5,848
December	2,236	3,495	5,731
Total	<u>23,271</u>	<u>47,079</u>	<u>70,350</u>
Cum	223,375	724,517	947,892

Production History - San Andres Formation
 Littman (San Andres) Unit
Monthly Oil Production - Bbls

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	New Mexico Subdivision	Texas Subdivision	Unit Total
<u>1960</u>			
January	2,038	3,681	5,719
February	1,830	3,194	5,024
March	2,255	3,452	5,707
April	2,131	3,414	5,545
May	2,177	4,813	6,990
June	1,949	4,006	5,955
July	2,129	3,936	6,065
August	2,062	4,107	6,169
September	1,912	3,415	5,327
October	2,143	3,440	5,583
November	1,903	3,612	5,515
December	1,943	3,353	5,296
Total	<u>24,472</u>	<u>44,423</u>	<u>68,895</u>
Cum	247,847	768,940	1,016,787
<u>1961</u>			
January	1,856	3,007	4,863
February	1,897	4,026	5,923
March	1,571	4,294	5,865
April	1,804	4,052	5,856
May	1,732	4,063	5,795
June	1,732	4,284	6,016
July	1,646	4,225	5,873
August	1,722	4,330	6,052
September	1,562	4,155	5,717
October	1,763	4,546	6,309
November	1,459	3,628	5,087
December	1,579	4,105	5,684
Total	<u>20,325</u>	<u>48,715</u>	<u>69,040</u>
Cum	268,172	817,655	1,085,827
<u>1962</u>			
January	1,541	4,263	5,804
February	1,443	3,759	5,202
March	1,554	3,709	5,263
April	1,620	3,454	5,074
May	1,124	3,427	4,551
June	1,349	3,072	4,421
July	1,977	2,977	4,954
August	1,676	3,453	5,131
September	1,701	3,009	4,710
October	1,492	3,192	4,684
November	1,601	2,853	4,454
December	1,262	2,965	4,227
Total	<u>18,342</u>	<u>40,133</u>	<u>58,475</u>
Cum	286,514	857,788	1,144,302

Production History - San Andres Formation
 Littman (San Andres) Unit
 Monthly Oil Production - Bbls

	New Mexico Subdivision	Texas Subdivision	Total
<u>1963</u>			4,317
		2,777	4,369
	1,540	2,979	4,668
January	1,390	2,979	4,223
February	1,689	2,863	3,911
March	1,360	2,690	3,951
April	1,221	2,648	3,877
May	1,303	2,516	3,930
June	1,361	2,482	3,832
July	1,448	2,391	4,159
August	1,441	2,476	4,067
September	1,683	2,662	4,008
October	1,405	2,590	49,312
November	1,418	32,053	1,193,614
December	17,259	889,841	
Total	303,773		
<u>1964</u>			3,874
		2,441	4,196
January	1,432	2,811	
February	1,385		

adm/bn
 5/15/64

- CASE 3050:** Application of Sohio Petroleum Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Littman-San Andres Pool by the injection of water into the San Andres formation through 4 wells in Sections 8, 9 and 16, Township 21 South, Range 38 East, Lea County, New Mexico. Said project is to be operated in Lea County, New Mexico. Said project is to be operated in conjunction with applicant's proposed waterflood project in the Littman San Andres Unit in Andrews County, Texas.
- CASE 3051:** Application of Pan American Petroleum Corporation to amend Order No. R-2026, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks amendment of Rules 7 and 10 of Order No. R-2026 to permit the production of more than two times top allowable from wells in its Northeast Hogback Unit Pressure Maintenance Project even though they offset wells outside the project area.
- CASE 3052:** Application of The Atlantic Refining Company to amend Order No. R-2210, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks amendment of Rules 7 and 10 of Order No. R-2210 to permit the production of more than two times top allowable from wells in its Horseshoe Gallup Unit Pressure Maintenance Project even though they offset wells outside the project area.
- CASE 3053:** Application of Texaco Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Maljamar Pool by the injection of water into the Grayburg-San Andres formation through two wells located in Section 12, Township 17 South, Range 32 East, Lea County, New Mexico.
- CASE 3055:** Application of Texas Pacific Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its J. P. Collier Well No. 1 located in Unit F of Section 10, Township 11 South, Range 33 East, Lea County, New Mexico, to produce oil from the North Bagley Upper and Lower Pennsylvanian Pools through parallel strings of tubing.
- CASE 3056:** Application of Texas Pacific Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its State "AP" Well No. 3, located in Unit L of Section 8, Township 18 South, Range 35 East, Lea County, New Mexico, to produce oil from the Abo and Wolfcamp formations, Vacuum Field, through parallel strings of tubing.
- CASE 3057:** Application of Charles O. Trimble for an oil treating plant permit, Lea County, New Mexico. Charles O. Trimble, dba Trimble Mud Service, in the above-styled cause, seeks authority pursuant to Rule 312 to install and operate an oil treating plant approximately one mile South and West of Eunice, New Mexico, for the purpose of processing and treating sediment oil.
- CASE 3058:** Application of Cities Service Oil Company to establish a special GOR limit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of a special gas-oil ratio limit of 6000 cubic feet of gas for each barrel of oil produced in the Reeves-Pennsylvanian Pool, Lea County, New Mexico.

Docket No. 15-64

DOCKET: EXAMINER HEARING - WEDNESDAY - MAY 27, 1964

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Mutter, Alternate Examiner:

- CASE 3033: (Continued from April 29, 1964 Examiner Hearing)
Application of Cherry Brothers and Cabot Corporation for the creation of a new oil pool and for special temporary pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Lower Wolfcamp production for its Austin State Well No. 1, located in Unit F of Section 19, Township 14 South, Range 36 East, Lea County, New Mexico, and for the establishment of temporary pool rules therefor, including a provision for 80-acre oil proration units.
- CASE 3046: Application of Marathon Oil Company for a triple completion and a non-standard oil proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (tubingless) of its State Warn A/c 1 Well No. 3, located in Unit F of Section 31, Township 17 South, Range 35 East, to produce oil from the Glorieta, Wolfcamp, and Abo formations, Vacuum Field, Lea County, New Mexico. Applicant further seeks the approval of a non-standard 80-acre proration unit comprising the SE/4 NW/4 and NE/4 SW/4 of said Section 31 to be dedicated to the aforesaid Wolfcamp and Abo zones in said well.
- CASE 3047: Application of El Paso Natural Gas Company for three non-standard gas proration units and one unorthodox well location, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the approval of the following three non-standard gas proration units:
A 376.88-acre unit comprising the SE/4 and E/2 SW/4 and Lots 1, 2 and 3 of Section 9 and Lots 3 and 4 and the NW/4 SW/4 of Section 10;
A 357.84-acre unit comprising the SE/4, S/2 SW/4, and NE/4 SW/4 and Lots 1 and 2 of Section 10 and Lots 3 and 4 of Section 11;
A 359.20-acre unit comprising the S/2 and Lots 1 and 2 of Section 11, all in Township 32 North, Range 7 West, Blanco Mesaverde Pool, San Juan County, New Mexico. Applicant further seeks the approval of an unorthodox location for a well to be dually completed in the Mesaverde and Dakota formations at a point 1650 feet from the South line and 825 feet from the East line of said Section 9.
- CASE 3048: Application of E. L. Fundginsland for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order force-pooling all mineral interests in the Basin Dakota Gas Pool underlying the S/2 of Section 3, Township 29 North, Range 13 West, San Juan County, New Mexico.
- CASE 3049: Application of Sohio Petroleum Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Littman San Andres Unit Area comprising 661 acres, more or less, of State and Federal lands in Sections 8, 9, 16, and 17, Township 21 South, Range 38 East, Lea County, New Mexico. The Unit Area also includes 1280 acres of fee land in Sections 5, 6, 7, 14, and 15, Block A-29, PSL, Andrews County, Texas.

- 3 - Wednesday, May 27 Examiner Hearing

CASE 3059: Application of Frank Darden for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Cowntown Unit Area comprising 280 acres, more or less, of State land in Sections 13 and 24, Township 18 South, Range 23 East, Eddy County, New Mexico.

CASE 3060: Application of Frank Darden for a waterflood, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Artesia Pool in his Cowntown Unit Area, by the injection of water into the Grayburg formation through two injection wells in Sections 13 and 24, Township 18 South, Range 28 East, Eddy County, New Mexico.

CASE 3061: Application of Kewanee Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Dayton Grayburg Pool by the injection of water into the Grayburg formation through one well in Section 25, Township 18 South, Range 26 East, Eddy County, New Mexico.

CASE 3062: Application of Kewanee Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Atoka Grayburg Pool by the injection of water into the Grayburg formation through one well in Section 13, Township 18 South, Range 26 East, Eddy County, New Mexico.

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

Case 3050

May 5, 1964

Mr. Paul A. Scoter
Attorney at Law
P. O. Box 700
Roswell, New Mexico

Dear Paul:

Your application for approval of the Littman-San Andres Unit Agreement and Waterflood Project contains all required information. We will advertise the unit and waterflood as separate cases on the May 27, 1964, Examiner Hearing Docket, and issue a separate order in each case. If you desire, you may move to consolidate the cases for the purpose of testimony at the hearing. The docket will be printed and a copy mailed to you approximately ten days prior to the hearing.

Please contact me if you need additional information or assistance.

Very truly yours,

J. N. DURRETT, Jr.
Attorney

JND/esr

DOCKET MAILED

Date 5-15-64

APPLICATION FOR SECONDARY RECOVERY AND PRESSURE MAINTENANCE

Exhibit 1 —

Index Map of Littman (San Andres) Unit,
Lea County, New Mexico and Andrews County, Texas.

1964 MAY 4 AM 8:28

MAIN OFFICE CCC

Case 3050

APPLICATION FOR SECONDARY RECOVERY AND PRESSURE MAINTENANCE

Exhibit 2 —

Log of Proposed Injection Well No. 1 Sims

28 MAY 4 PM 8 28

OFFICE 100

Case 3058

LANE RADIOACTIVITY LOG WELLS

COMPANY

FILE NO.

Location of Well	COMPANY: N. G. PENROSE ETAL WELL: SIMS NO. 1 FIELD: LITTMAN COUNTY: ANDREWS STATE: TEXAS LOCATION: 140° FN & WL SEC. 14 ~ BLK. A - 29	COMPANY: N. G. PENROSE ETAL WELL: SIMS NO. 1 FIELD: LITTMAN COUNTY: ANDREWS LOCATION: STATE: TEXAS
------------------	--	--

LOG MEAS. FROM	CABLE TOOL FLOOR	ELEV. 3513'
DRLG. MEAS. FROM	CABLE TOOL FLOOR	ELEV. 3513'
PERM. DATUM	7" BRADEN HEAD	ELEV. 3509.5'

TYPE OF LOG	GAMMA RAY	NEUTRON		
RUN NO.	1 N.W.	1 N.W.		
DATE	4-17-52	4-17-52		
TOTAL DEPTH (DRILLER) WIRE LINE	4350'	4350'		
EFFECTIVE DEPTH (DRILLER)	4350'	4350'		
TOP OF LOGGED INTERVAL	SURFACE	SURFACE		
BOTTOM OF LOGGED INTERVAL	4347'	4347'		
TYPE OF FLUID IN HOLE	OIL	OIL		
FLUID LEVEL	4268'	4268'		
MAXIMUM RECORDED TEMP.				
NEUTRON SOURCE STRENGTH & TYPE		600N		
SOURCE SPACING — IN.		8.25"		
LENGTH OF MEASURING DEVICE — IN.	36"	9"		
O.D. OF INSTRUMENT — IN.	3 5/8"	3 5/8"		
TIME CONSTANT — SECONDS	4	2.5		
LOGGING SPEED FT. MIN.	40	40		
STATISTICAL VARIATION — IN.				
SENSITIVITY REFERENCE	274	275		
RECORDED BY	RUNION	RUNION		
WITNESSED BY	ANDERSON	ANDERSON		

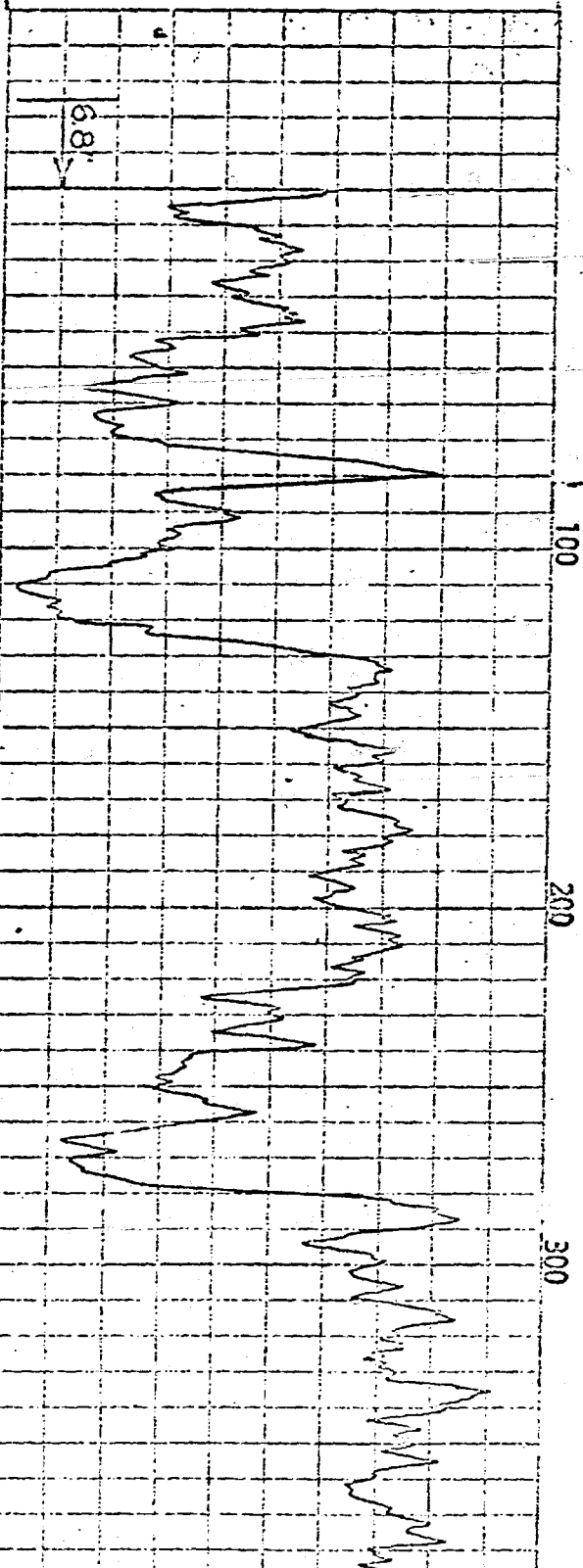
CASING RECORD				INTERVAL	
RUN NO.	BIT SIZE	CASING WT.—LB.	FROM WELL RECORD	FROM R.A. LOG	TO
1	12 1/4"	9 5/8"	SURF. TO 1610'	SURF. TO 1610'	
1	8 3/4"	7"	SURF. TO 4311'	SURF. TO 4310'	
1	6 1/4"		4311' TO 4350'	4310' TO 4349'	
			TO	TO	
			TO	TO	

REMARKS OR OTHER DATA



GAMMA RAY

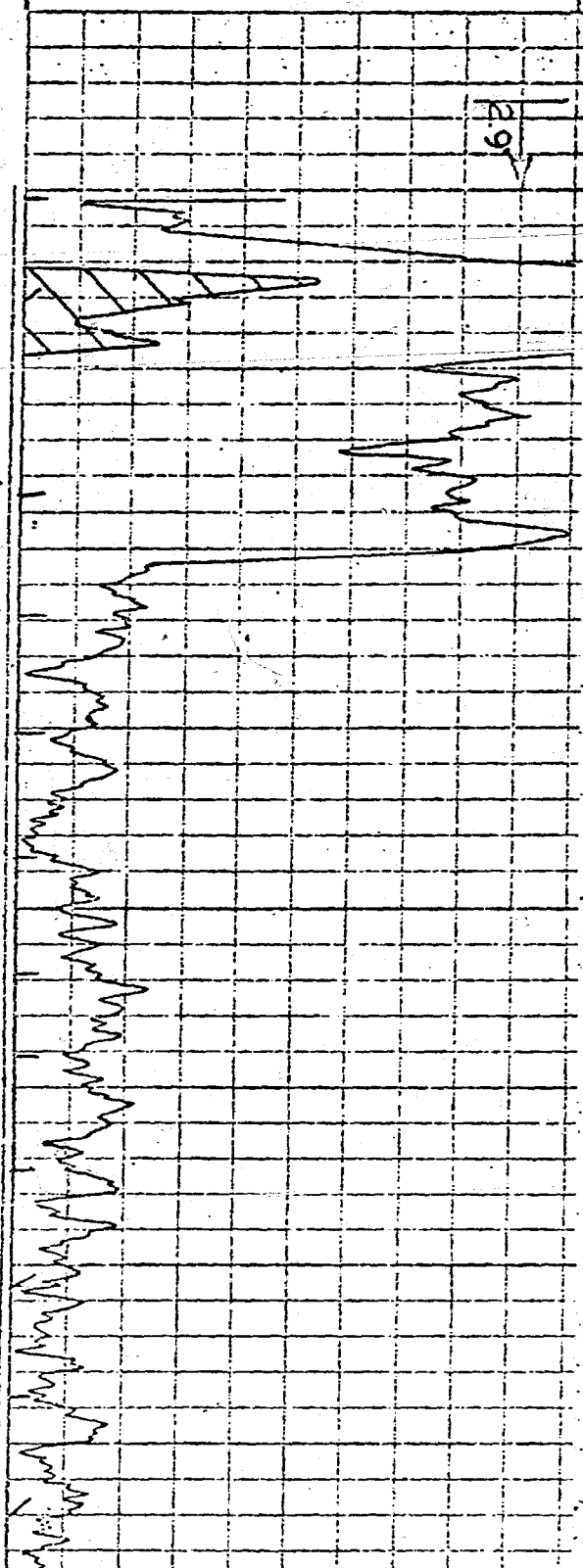
RADIATION INTENSITY INCREASES

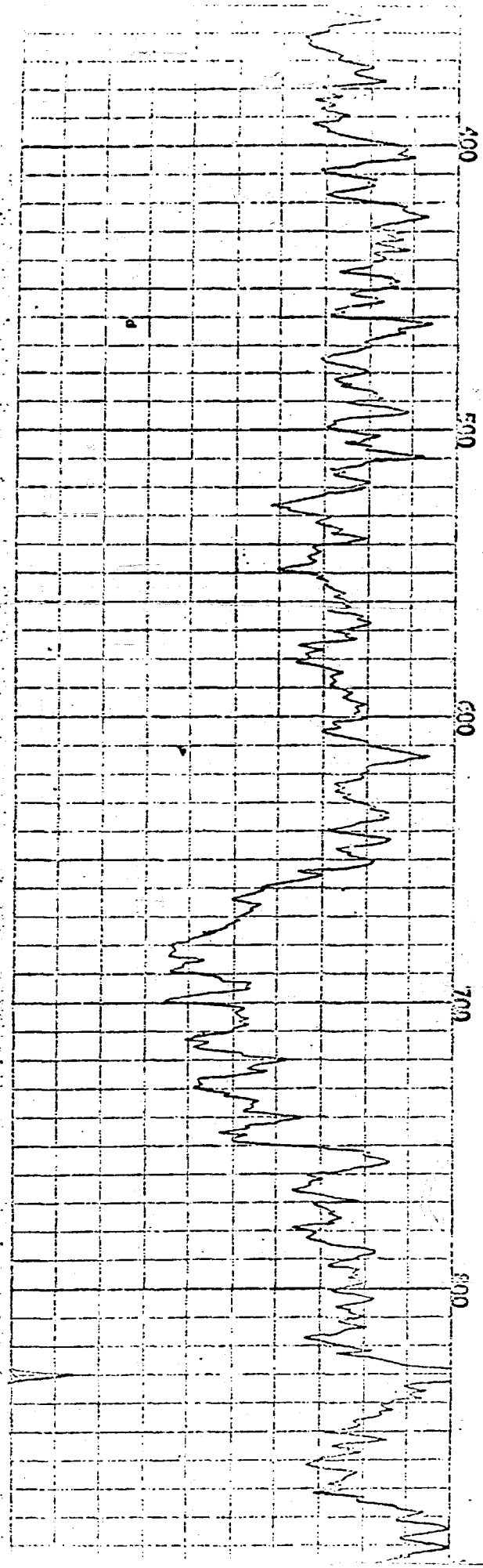
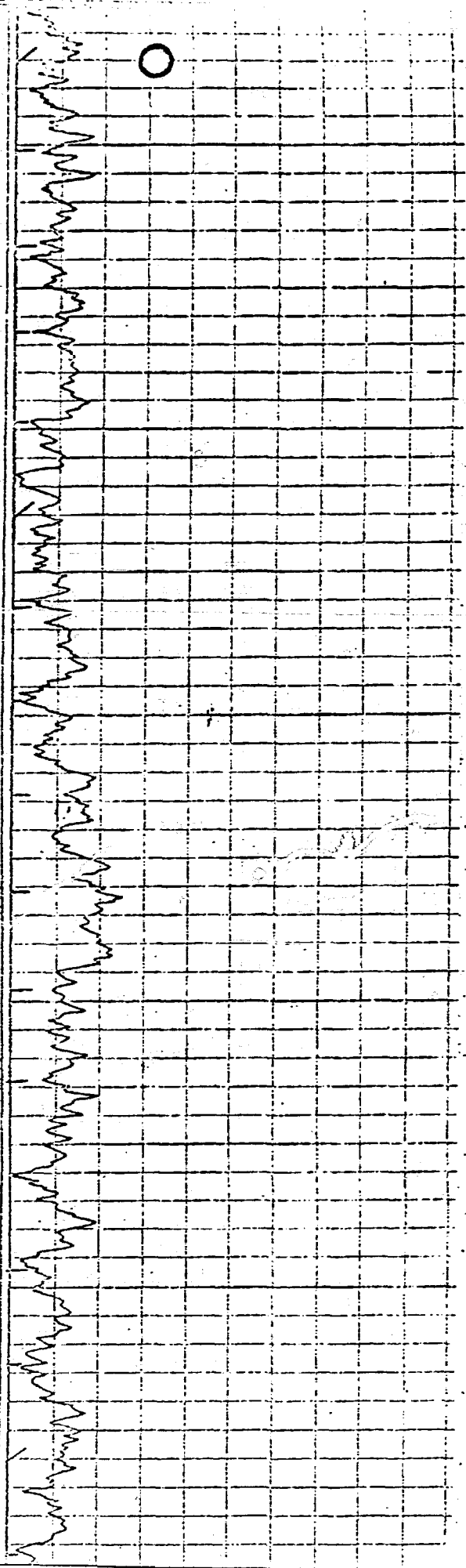


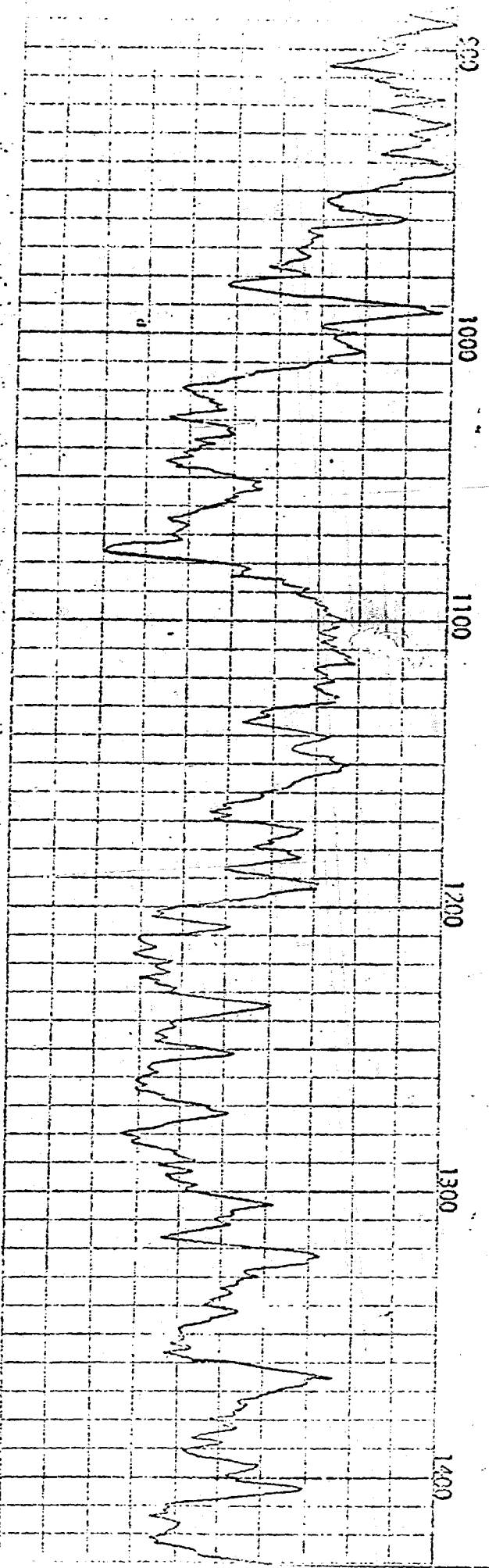
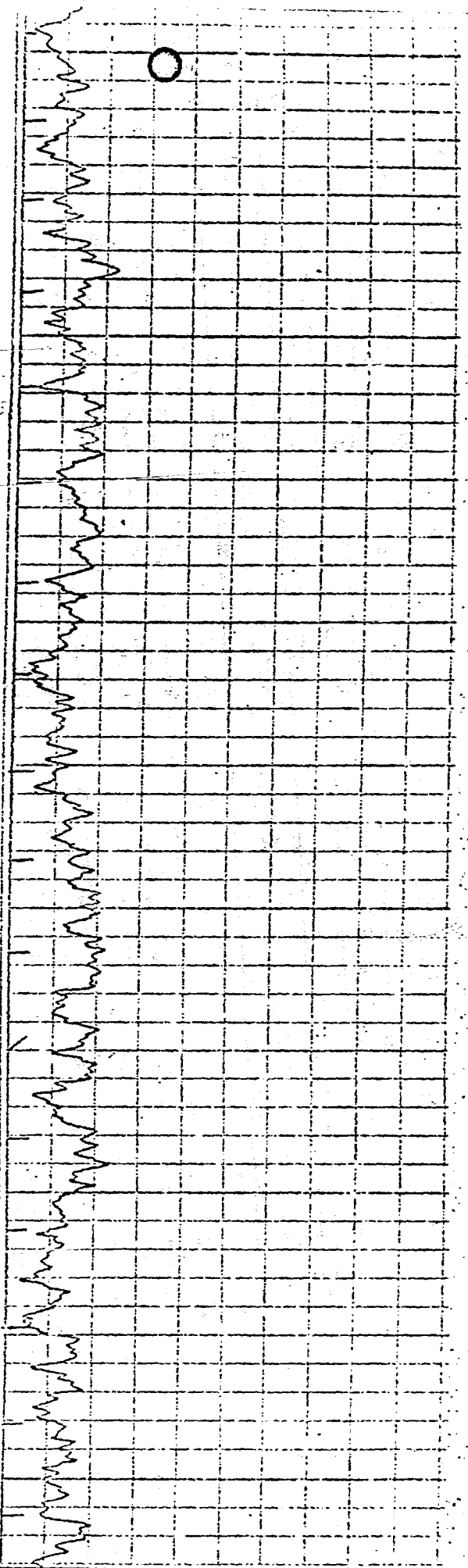
NEUTRON

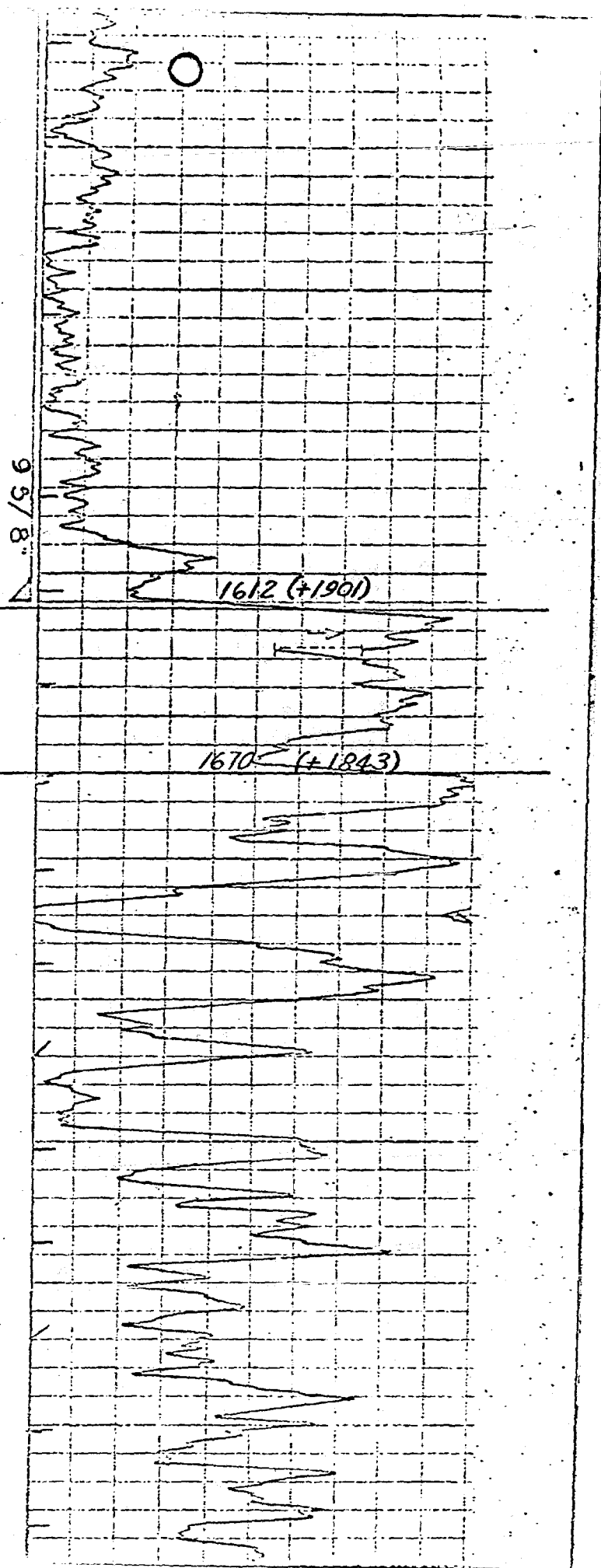
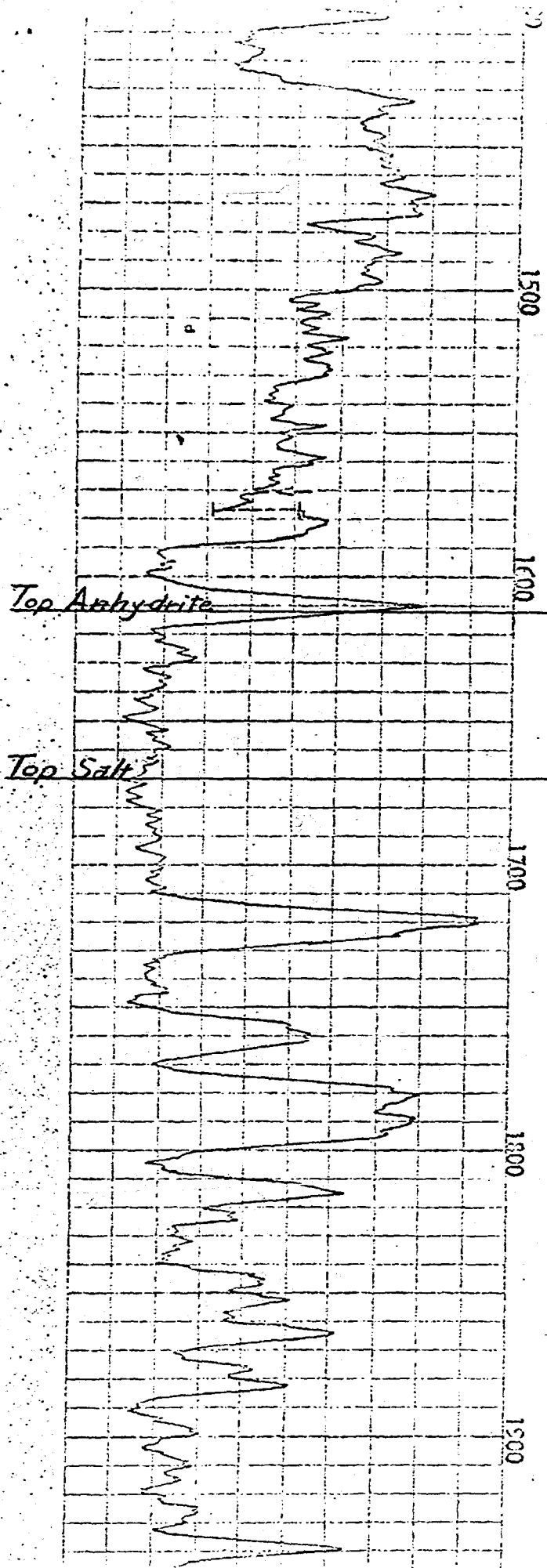
RADIATION INTENSITY INCREASES

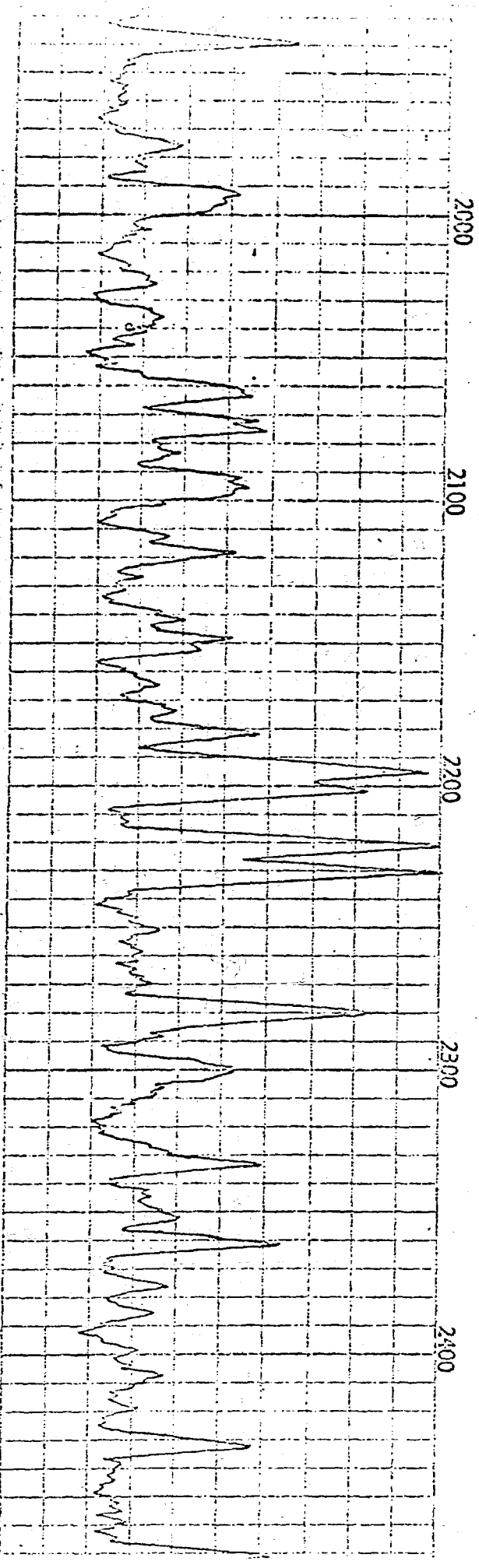
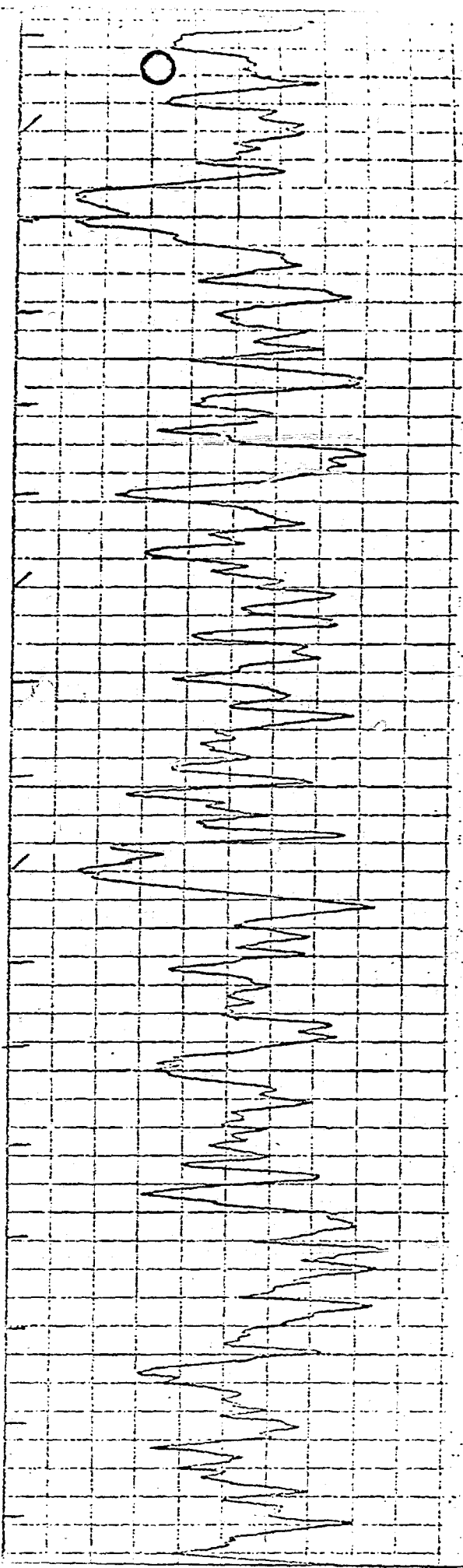
CASING &
COLLAR LOG
DEPTH

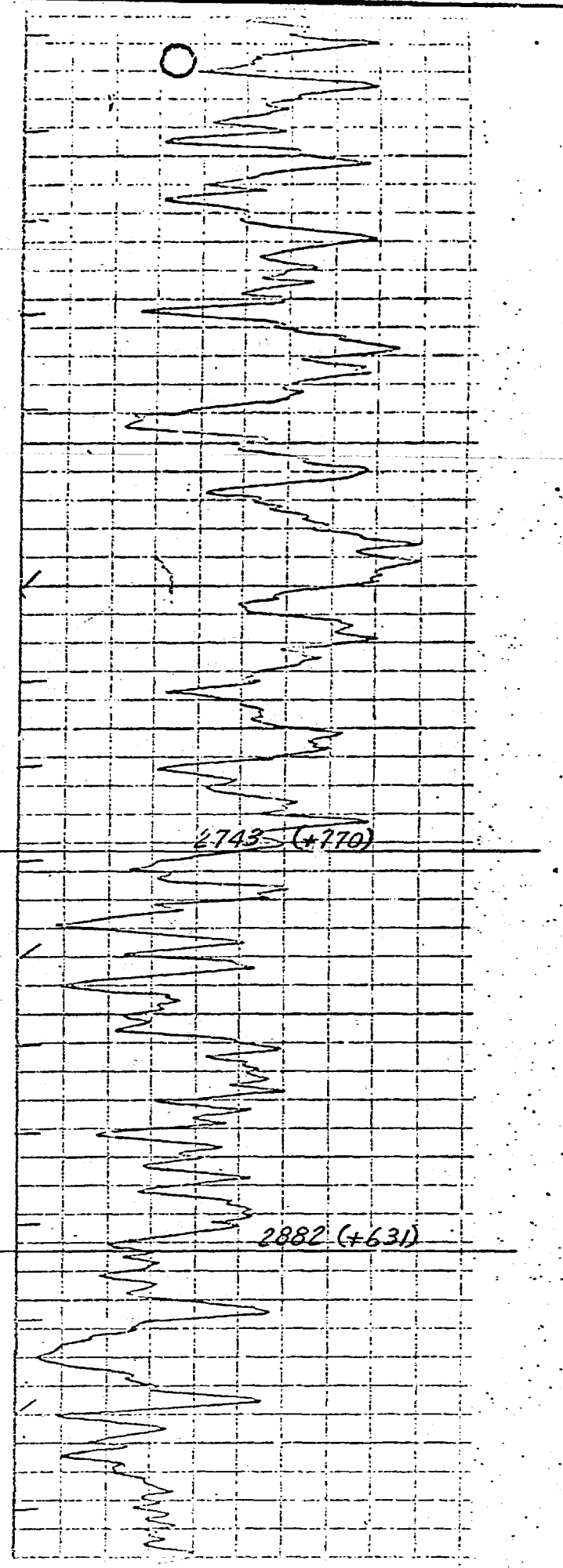
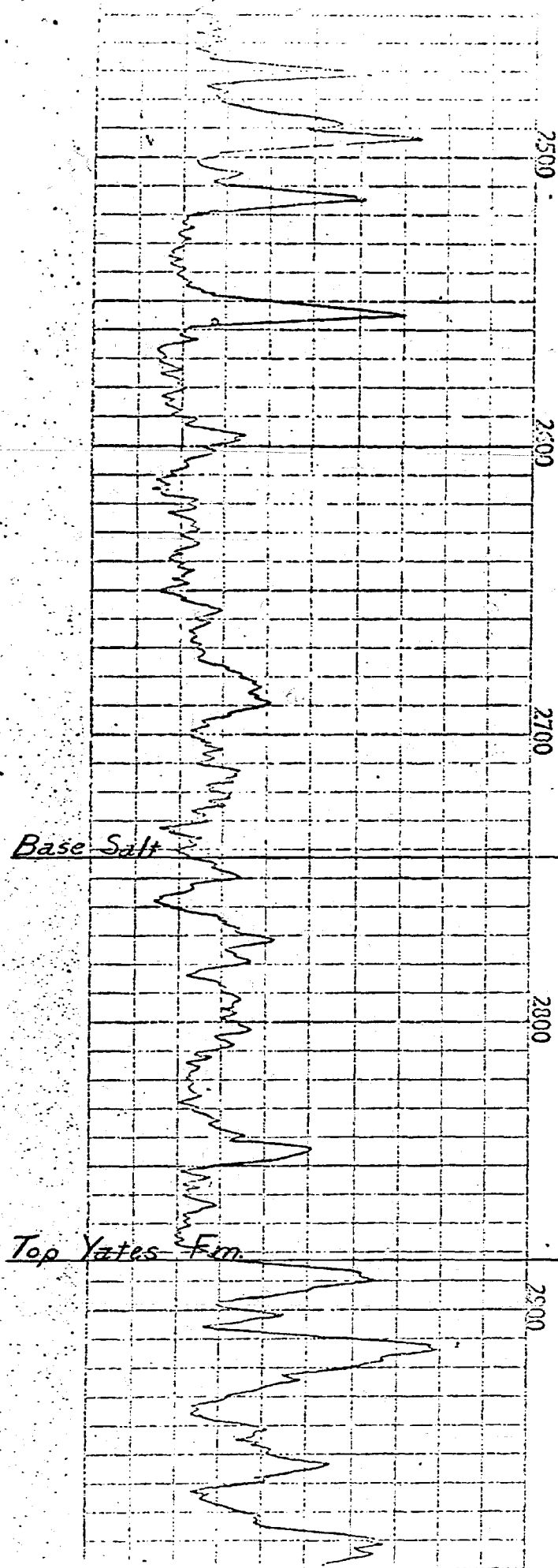


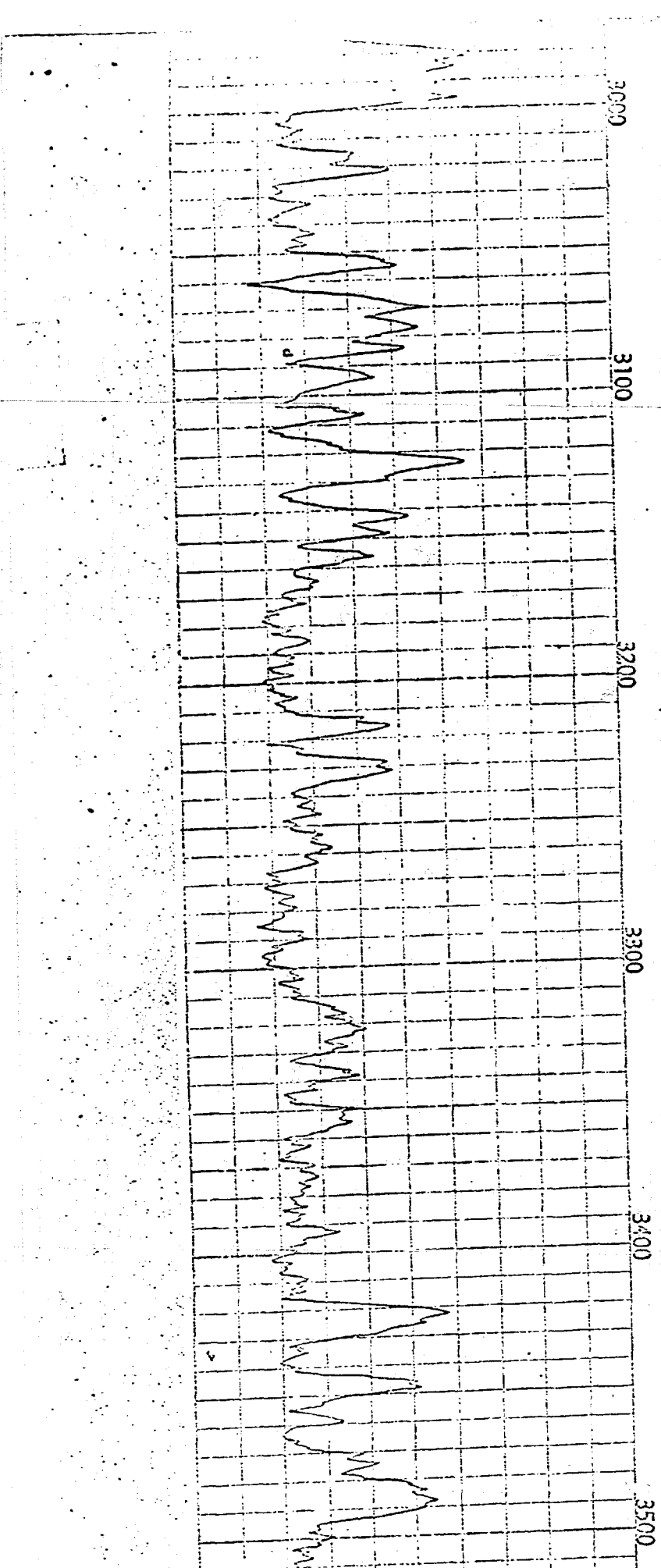
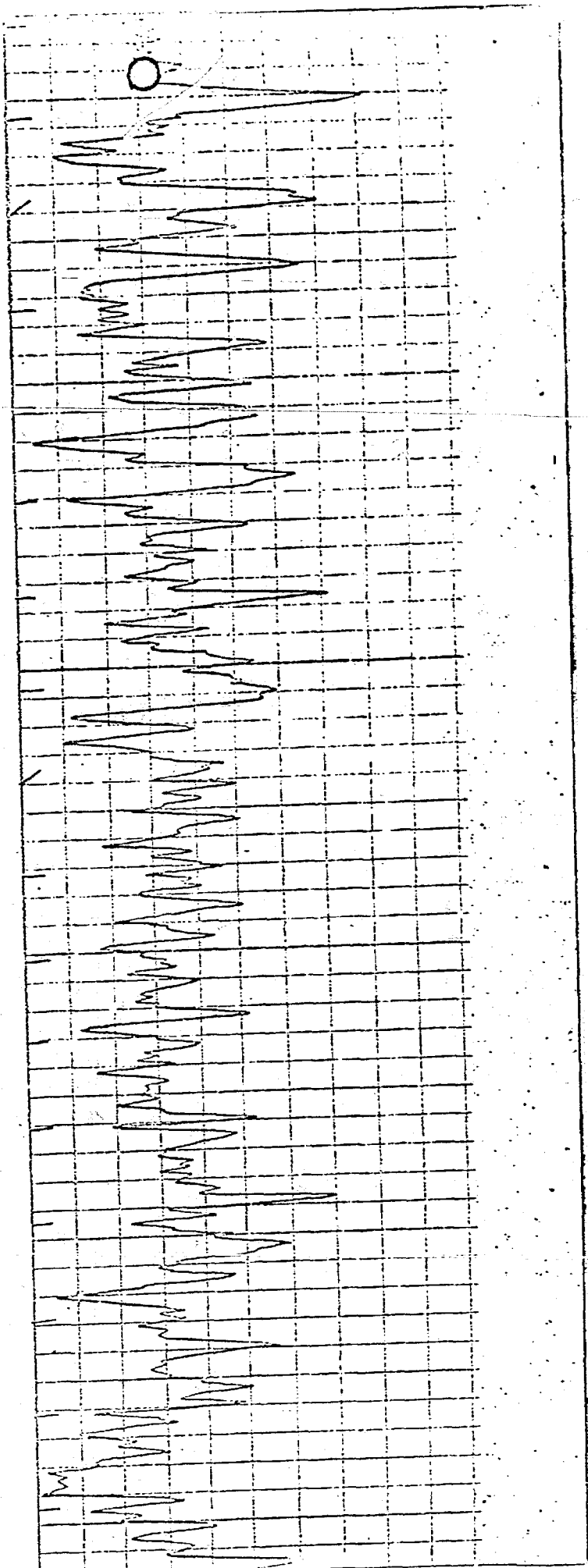


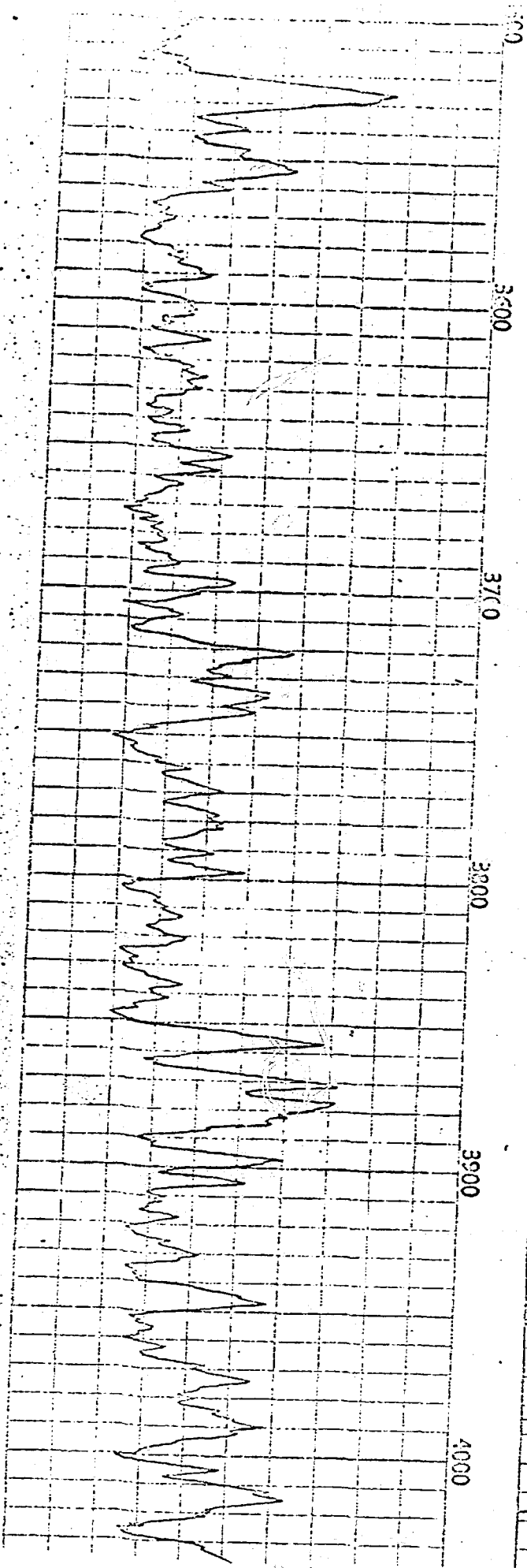
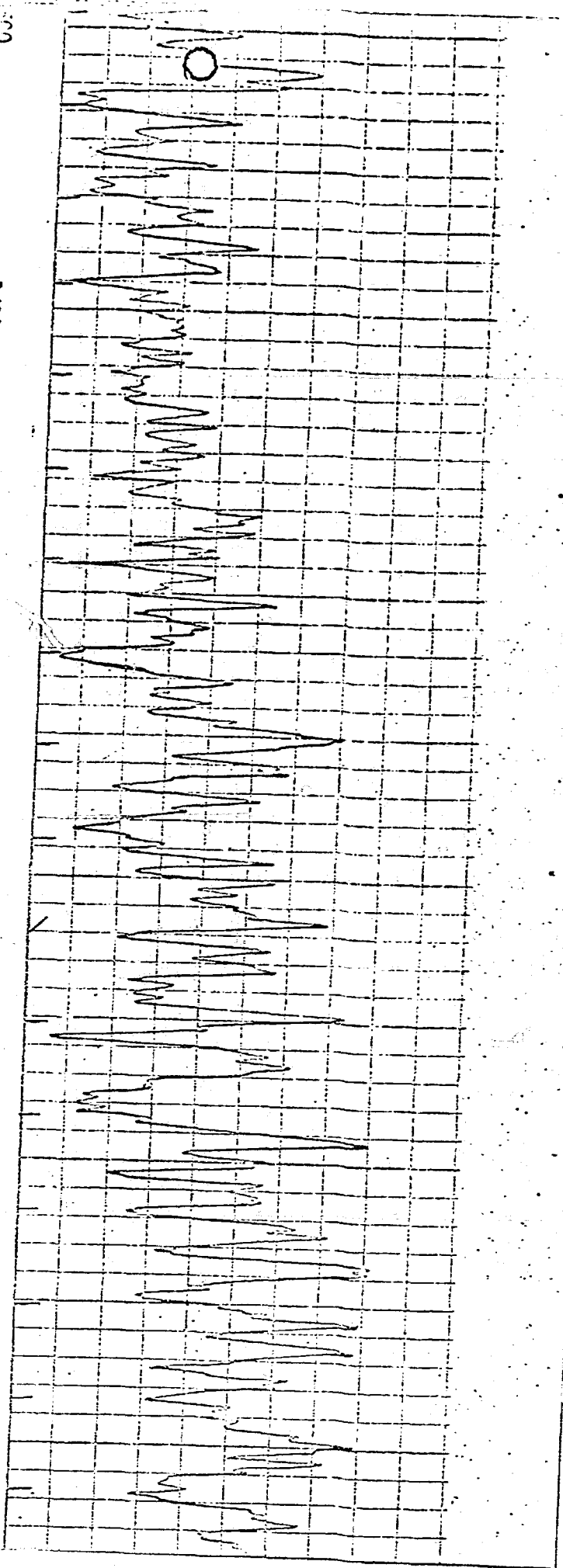


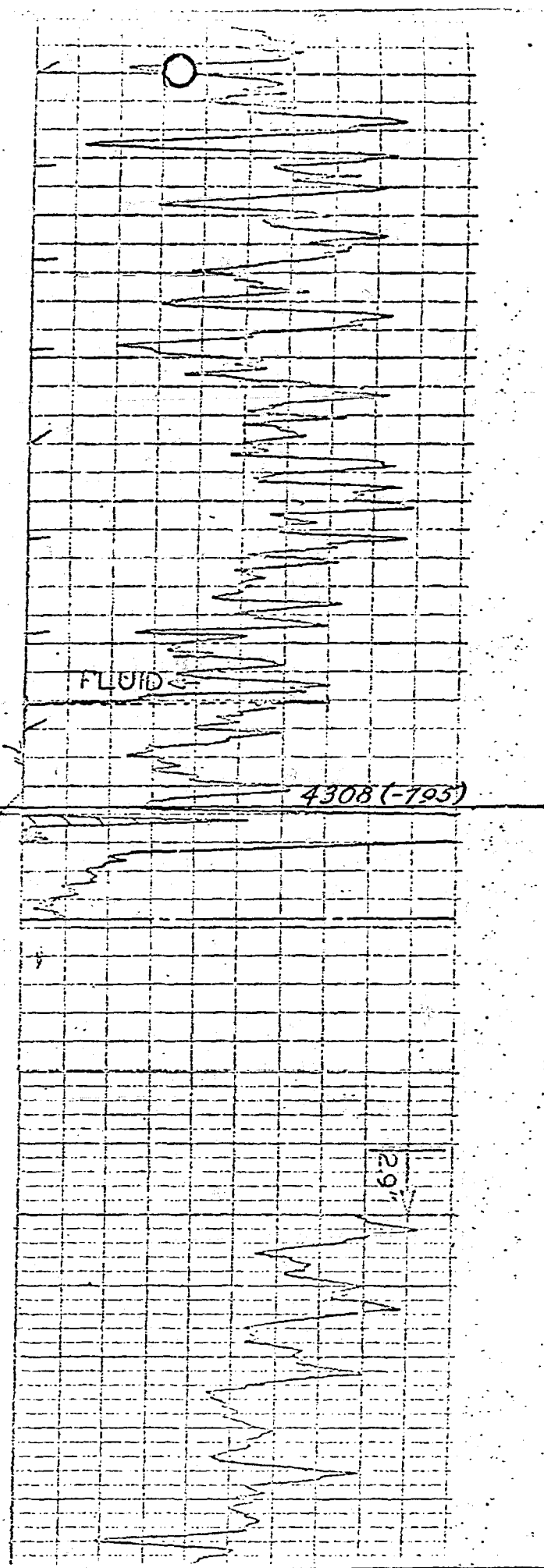
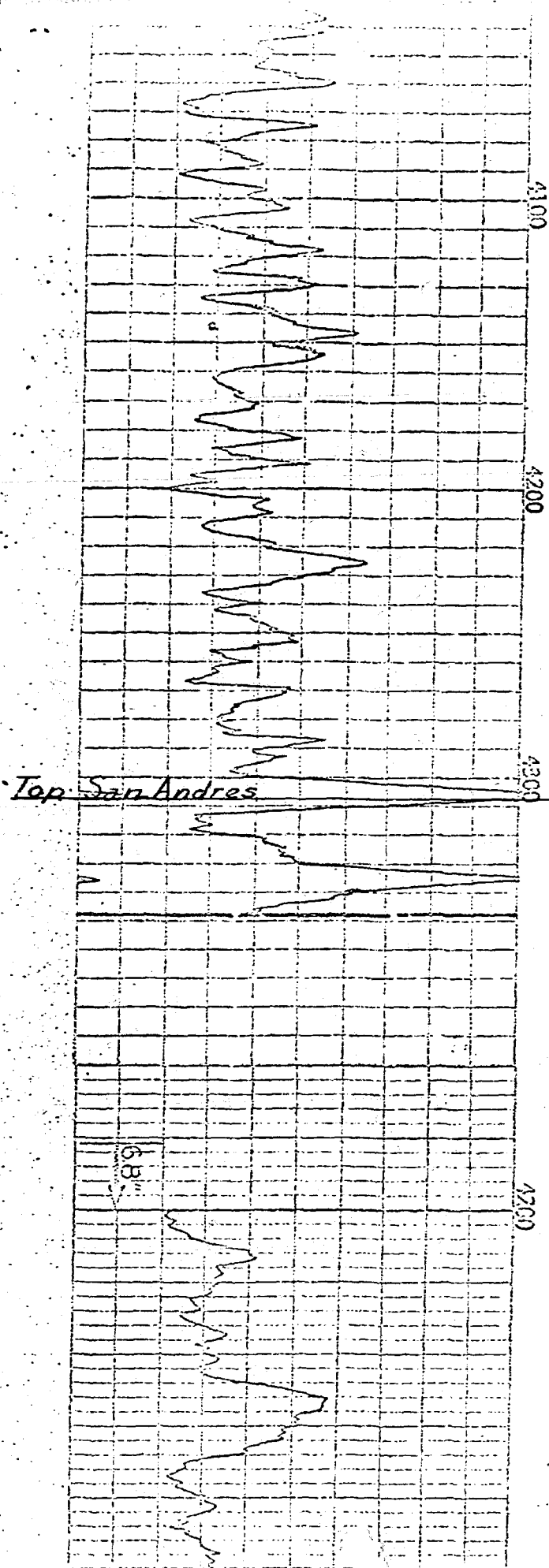


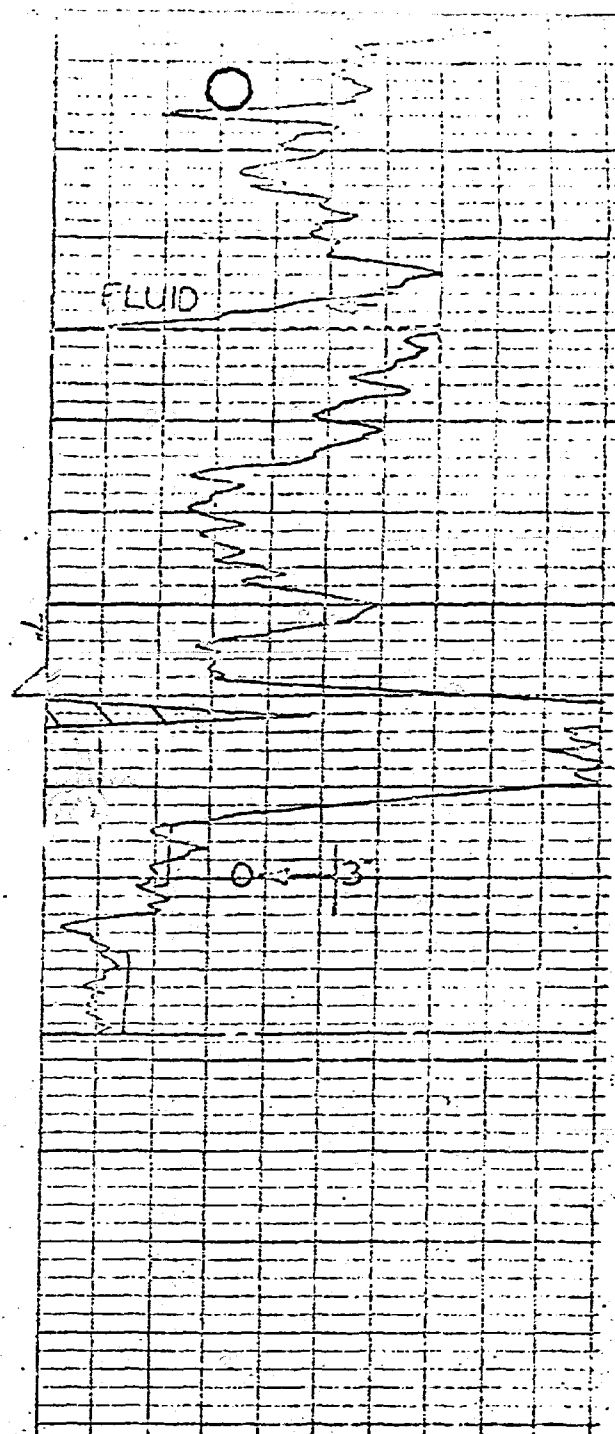
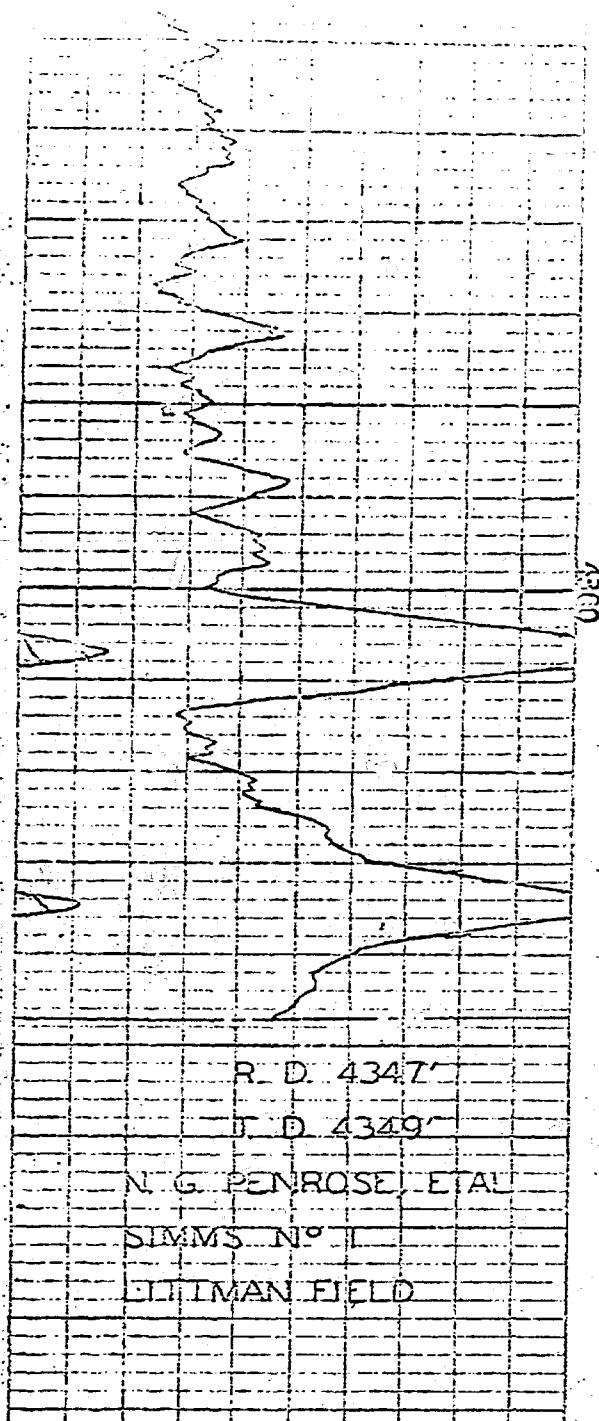












MAIN OFFICE OCC

BEFORE THE OIL CONSERVATION COMMISSION

1964 MAY 4 AM 8:29

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION)
OF SOHIO PETROLEUM COMPANY FOR)
APPROVAL OF THE UNIT AGREEMENT)
FOR THE DEVELOPMENT AND OPERATION)
OF THE LITTMAN SAN ANDRES UNIT IN)
TOWNSHIP 21 SOUTH, RANGE 38 EAST,)
N.M.P.M., LEA COUNTY, NEW MEXICO)
(and Andrews County, Texas) AND FOR ORI-)
GINAL AUTHORITY FOR THE INJECTION OF)
WATER THEREIN FOR THE SECONDARY RE-)
COVERY THEREFROM AND THE PRESSURE)
MAINTENANCE THEREOF.)
)
)
)

NO.

3050

APPLICATION

Sohio Petroleum Company hereby applies for approval of the
Unit Agreement for the development and operation of the Littman San Andres
Unit which includes 1941.38 acres of land, more or less, in Lea County, New
Mexico, and Andrews County, Texas, and more fully described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 8:	SE $\frac{1}{4}$
Section 9:	SW $\frac{1}{4}$
Section 16:	NW $\frac{1}{4}$
Section 17:	NE $\frac{1}{4}$

Andrews County, Texas

Block A-29, PSL

Section 5:	East 40 acres of South 71.25 acres of SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$ and West 40 acres of North 71.25 acres of SE $\frac{1}{4}$
------------	---

Section 6:	$N\frac{1}{2}$ and $S\frac{1}{2}$
Section 7:	$SW\frac{1}{4}$
Section 14:	$NW\frac{1}{4}$
Section 15:	$NE\frac{1}{4}$

Designation of the Littman San Andres Unit as heretofore described has been approved by the United States Geological Survey and the form of the Unit Agreement has been approved by the Commissioner of Public Lands of the State of New Mexico. The Unit area includes 490.69 acres, more or less, of Federal land and 170.69 acres of State of New Mexico land.

The Federal and State of New Mexico lands comprise all of the unit area within the State of New Mexico. The unit area also includes 1280 acres of fee land, situate in Andrews County, Texas. The Federal land so included is described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 8:	$SE\frac{1}{4}$
Section 9:	$SW\frac{1}{4}$
Section 17:	$NE\frac{1}{4}$

The State of New Mexico land so included is described as follows:

Lea County, New Mexico

Township 21 South, Range 38 East

Section 16:	$NW\frac{1}{4}$
-------------	-----------------

The Unit Agreement has been executed by 100 % of the working interest owners and by more than 75% of the royalty, overriding royalty and production payment owners. A list of all interested parties known to applicant is attached hereto.

In addition to the approval of the Unit Agreement, applicant also requests original authority for the injection of water into the unit formation for the secondary recovery therefrom and the pressure maintenance thereof, and, in support thereof, attaches hereto as Exhibits:

- Exhibit "1": Index map of the Littman San Andres Unit within Lea County, New Mexico and Andrews County, Texas.
- Exhibit "2": Log of proposed injection well No. 1 Sims.
- Exhibit "3": Diagrammatic sketches of the proposed injection wells.

The water injection will be into the San Andres formation at an average depth of 4300 feet. The water source for this program will be the Santa Rosa formation which occurs at an average depth of 1200 feet in the vicinity of the Littman Pool. The injection rate is estimated to be 800 barrels per day per injection well which, under full scale operations, would require a supply of 12000 barrels per day.

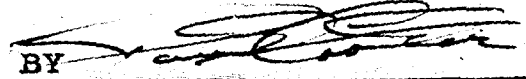
A copy of this application is likewise forwarded to the office of the State Engineer, P.O. Box 1079, Santa Fe, New Mexico, marked for the attention of Frank Irby.

Applicant respectfully submits that the creation of the Littman San Andres Unit would be in the best interest of conservation of natural resources and would prevent waste and increase the ultimate recovery of oil from the Littman San Andres field, at the same time protecting the correlative rights of all owners of interest. The agreement provides for the separate handling and accounting of production from the New Mexico portion of the unit area.

WHEREFORE, Applicant respectfully requests that this Application be set for a hearing before a duly appointed examiner of the Commission at the earliest possible date, that notice be given as required by law and the regulations and that the Littman San Andres Unit be approved and authority given for the injection of water therein for the secondary recovery therefrom and the pressure maintenance thereof.

Respectfully submitted,

SOHIO PETROLEUM COMPANY

BY 

of ATWOOD & MALONE, its attorneys
P.O. Drawer 700
Roswell, New Mexico

Case 3050

Heard 5-27-64

Rec. 5-28-64

1. Grant Sohio the Waterflood project requested for the N. W. corner of the Lettman unit.
2. Approve 4 injection wells as follows

(a) ~~Sohio - Southland #2, 880/S, 810/E 5~~

Elliott - Parcell #2, 980/S, 330/E 8-215-38E

(b) Elliott - Wylie #1, 980/S, 330/E 9-215-38E

(c) " " #3, 1650/S, 1650/E 9-215-38E

(d) Sohio - Muther #2, 330/N, 1650/E 16-215-38E

3. Injection shall be made thru tubing & under a packer set as near the casing shoe as practical.

Shurtliff

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER



STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 871
SANTA FE

Mr. Paul Cooter
Atwood & Malone
Post Office Box 700
Roswell, New Mexico

*Injection in new Mexico this state is to
in open spec. well equipped with
1 1/2" through the face with packers set
tubing and with casing shoes.
immediately above the casing shoes.*

Dear Mr. Cooter

Gentlemen:

Enclosed herewith is Commission Order No. R- 2715, entered in Case
No. 3050, approving the Litman - San Andres Unit
Water Flood Project in New Mexico

According to our calculations, when all of the authorized injection
wells have been placed on active injection, the maximum allowable which this
project will be eligible to receive under the provisions of Rule 701-E-3
is 336 barrels per day.

Please report any error in this calculated maximum allowable immediately,
both to the Santa Fe office of the Commission and the appropriate District
proration office.

In order that the allowable assigned to the project may be kept current,
and in order that the operator may fully benefit from the allowable provisions
of Rule 701, it behooves him to promptly notify both of the aforementioned
Commission offices by letter of any change in the status of wells in the project
area, i.e., when active injection commences, when additional injection or
producing wells are drilled, when additional wells are acquired through purchase
or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status
of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

cc: OOP. Hobbins

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 3, 1964

C
O
P
Y
Mr. Paul Coeter
Atwood & Malone
Post Office Box 700
Roswell, New Mexico

Dear Sir:

Enclosed herewith is Commission Order No. R-2715, entered in Case No. 3039, approving the Littman-San Andres Unit Water-flood Project in New Mexico.

Injection in this state is to be in open hole through four wells equipped with tubing and with packers set immediately above the casing shoes.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 336 barrels per day.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe Office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

-2-

Mr. Coater

C
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Y
of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. FOWLER, Jr.
Secretary-Director

ALF/12

Enclosures

cc: Oil Conservation Commission
Hobbs, New Mexico

**BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO**

**IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:**

**CASE No. 3050
Order No. R-2715**

**APPLICATION OF SOHIO PETROLEUM
COMPANY FOR A WATERFLOOD PROJ-
ECT, LEA COUNTY, NEW MEXICO.**

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 27, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 3rd day of June, 1964, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the Littman-San Andres Unit Agreement has been approved by the Commission by Order No. R-2714; that the New Mexico Subdivision of the Littman-San Andres Unit Area comprises 661 acres, more or less, of State and Federal lands in Sections 8, 9, 16, and 17, Township 21 South, Range 38 East, NMPM, Lea County, New Mexico, as more fully described in said order.

(3) That the applicant, Sohio Petroleum Company, seeks permission to institute a waterflood project in the Littman-San Andres Pool by the injection of water into the San Andres formation through four wells located within said unit subdivision, that said project is to be operated in conjunction with applicant's proposed waterflood project in the Texas Subdivision of the Littman-San Andres Unit Area in Andrews County, Texas.

CASE No. 3050
Order No. R-2715

(4) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the subject application should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sohio Petroleum Company, is hereby authorized to institute a waterflood project in the Littman-San Andres Pool by the injection of water into the San Andres formation through the following-described four wells in Township 21 South, Range 38 East, NEEN, Lea County, New Mexico:

- (a) Elliott Inc. Parcell Well No. 2 located 990 feet from the South line and 330 feet from the East line of Section 8.
- (b) Elliott Inc. Wylie Well No. 1 located 990 feet from the South line and 330 feet from the East line of Section 9.
- (c) Elliott Inc. Wylie Well No. 3 located 1650 feet from the South line and 1650 feet from the East line of Section 9.
- (d) Sohio Petroleum Company NuMex Well No. 2 located 330 feet from the North line and 1650 feet from the East line of Section 16.

(2) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

-3-

CASE No. 3050
Order No. R-2715

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell

JACK M. CAMPBELL, Chairman


E. S. Walker

E. S. WALKER, Member

A. L. Porter, Jr.

A. L. PORTER, Jr., Member & Secretary

esr/

Regular Case files
not Unit 

3050

SOHIO PETROLEUM COMPANY

PRODUCTION AND EXPLORATION DIVISION

November 18, 1966

MIDLAND DISTRICT

BOX 3167
MIDLAND, TEXAS 79704

Mr. Arthur Barbeck
Chief Engineer
Railroad Commission of Texas
Tribune Building
Austin, Texas

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

Railroad Commission of Texas
District 8
P. O. Box 1110
Midland, Texas

Oil Conservation Commission
P. O. Box 1980
Hobbs, New Mexico

United States Department of the
Interior
Geological Survey
Drawer 1857
Roswell, New Mexico

Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico
Attn: Mrs. Marion Rhea

66 NOV 21 AM 8 09

Re: Littman San Andres Unit
Andrews County, Texas
Lea County, New Mexico

Gentlemen:

This letter is to advise you of change of status of wells in the expansion from the five-spot in the above unit.

Water injection into Well 6-3 was commenced November 15, 1966, making a current total of five injection wells in the unit. All injection wells thus far are in Texas.

Wells No. 6-6 in Texas and No. 2-2, 3-3 and 4-2 in New Mexico are currently being prepared for injection. As requested in previous letters, the allowables have been cancelled on these wells.

You will be notified when injection is commenced in the four wells.

OCC Order No. R-2715 entered in Case No. 3050 and RRC Order No. 8-53, 821 approved this unit in New Mexico and Texas.

Yours very truly,

SOHIO PETROLEUM COMPANY

A. K. Hood
District Superintendent
Midland District

DWR:ee

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION

EXHIBIT NO. 11

PRODUCTION HISTORY - SAN ANDRES

CASE NO. 3049 + 3050

LITTMAN (SAN ANDRES) UNIT

MONTHLY OIL PRODUCTION - BBLs

	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1951</u>			
June	-	580	580
July	-	272	272
August	-	670	670
September	-	114	114
October	-	333	333
November	-	104	104
December	-	2,672	2,672
Total	-	4,745	4,745
Cum	-	4,745	4,745
<u>1952</u>			
January	-	2,278	2,278
February	-	3,633	3,633
March	-	4,673	4,673
April	-	4,407	4,407
May	-	3,267	3,267
June	-	2,323	2,323
July	-	8,044	8,044
August	-	12,922	12,922
September	-	12,485	12,485
October	-	12,772	12,772
November	-	12,365	12,365
December	-	13,066	13,066
Total	-	92,235	92,235
Cum	-	96,980	96,980
<u>1953</u>			
January	-	12,341	12,341
February	-	12,795	12,795
March	-	14,347	14,347
April	408	12,459	12,867
May	1,069	12,542	13,611
June	1,197	12,196	13,393
July	1,137	12,729	13,866
August	1,021	12,208	13,229
September	1,471	12,288	13,759
October	2,399	12,428	14,827
November	1,651	10,880	12,531
December	1,566	10,267	11,833
Total	11,919	147,460	159,379
Cum	11,919	244,460	256,379

Production History - San Andres Formation
Littman (San Andres) Unit
Monthly Oil Production - Bbls

Page 2

	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1954</u>			
January	1,817	10,652	12,469
February	1,557	9,177	10,734
March	1,535	9,403	10,938
April	1,385	8,747	10,132
May	1,356	10,495	11,851
June	2,117	9,613	11,730
July	2,931	9,750	12,681
August	2,509	9,994	12,503
September	2,605	10,885	13,490
October	2,793	11,799	14,592
November	2,431	11,714	14,145
December	2,392	10,289	12,681
Total	<u>25,428</u>	<u>122,518</u>	<u>147,946</u>
Cum	37,347	366,978	404,325
<u>1955</u>			
January	2,367	10,203	12,570
February	2,870	8,476	11,346
March	4,272	8,712	12,984
April	5,413	7,455	12,868
May	5,947	8,365	14,312
June	6,879	7,867	14,746
July	6,138	7,976	14,114
August	6,107	7,664	13,771
September	4,921	7,063	11,984
October	4,904	6,980	11,884
November	4,429	6,487	10,916
December	4,549	6,682	11,231
Total	<u>58,796</u>	<u>93,930</u>	<u>152,726</u>
Cum	96,143	460,908	557,051
<u>1956</u>			
January	3,910	7,755	11,665
February	5,322	6,642	11,964
March	4,518	9,205	13,723
April	4,158	8,125	12,283
May	4,115	7,826	11,941
June	3,945	7,289	11,234
July	3,610	7,274	10,884
August	3,360	6,992	10,352
September	2,971	6,995	9,966
October	3,379	6,897	10,276
November	3,104	6,380	9,484
December	3,099	6,159	9,258
Total	<u>45,491</u>	<u>87,539</u>	<u>133,030</u>
Cum	141,634	548,447	690,081

Production History - San Andres Formation
 Littman (San Andres) Unit
 Monthly Oil Production - Bbls

Page 3

	New Mexico Subdivision	Texas Subdivision	Unit Total
<u>1957</u>			
January	3,283		
February	2,991	5,481	8,764
March	2,984	5,811	8,802
April	2,761	6,046	9,030
May	2,885	6,787	9,548
June	2,891	6,859	9,744
July	2,618	6,185	9,076
August	2,653	6,058	8,676
September	2,291	5,855	8,508
October	2,324	5,468	7,759
November	2,330	5,513	7,837
December	2,425	5,692	8,022
Total	<u>32,436</u>	<u>71,220</u>	<u>103,656</u>
Cum	174,070	619,667	793,737
<u>1958</u>			
January	2,558		
February	2,200	5,504	8,062
March	2,299	4,860	7,060
April	2,252	5,254	7,553
May	2,271	5,045	7,297
June	2,107	5,222	7,493
July	2,375	4,776	6,883
August	2,216	5,138	7,513
September	1,892	4,889	7,105
October	2,116	4,357	6,249
November	1,864	4,426	6,542
December	1,884	4,074	5,938
Total	<u>26,034</u>	<u>57,771</u>	<u>83,805</u>
Cum	200,104	677,438	877,542
<u>1959</u>			
January	1,731		
February	2,079	4,645	6,376
March	1,983	3,817	5,896
April	1,877	4,145	6,128
May	2,000	3,989	5,866
June	1,893	4,097	6,097
July	1,798	3,929	5,822
August	1,912	3,708	5,506
September	1,498	4,003	5,915
October	2,189	3,443	5,941
November	2,075	4,035	6,224
December	2,236	3,773	5,848
Total	<u>23,271</u>	<u>47,079</u>	<u>70,350</u>
Cum	223,375	724,517	947,892

Production History - San Andres Formation
Littman (San Andres) Unit
Monthly Oil Production - Bbls

Page 4

	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Unit</u> <u>Total</u>
<u>1960</u>			
January	2,038	3,681	5,719
February	1,830	3,194	5,024
March	2,255	3,452	5,707
April	2,131	3,414	5,545
May	2,177	4,813	6,990
June	1,949	4,006	5,955
July	2,129	3,936	6,065
August	2,062	4,107	6,169
September	1,912	3,415	5,327
October	2,143	3,440	5,583
November	1,903	3,612	5,515
December	1,943	3,353	5,296
Total	<u>24,472</u>	<u>44,423</u>	<u>68,895</u>
Cum	247,847	768,940	1,016,787
<u>1961</u>			
January	1,856	3,007	4,863
February	1,897	4,026	5,923
March	1,571	4,294	5,865
April	1,804	4,052	5,856
May	1,732	4,063	5,795
June	1,732	4,284	6,016
July	1,648	4,225	5,873
August	1,722	4,330	6,052
September	1,562	4,155	5,717
October	1,763	4,546	6,309
November	1,459	3,628	5,087
December	1,579	4,105	5,684
Total	<u>20,325</u>	<u>48,715</u>	<u>69,040</u>
Cum	268,172	817,655	1,085,827
<u>1962</u>			
January	1,541	4,263	5,804
February	1,443	3,759	5,202
March	1,554	3,709	5,263
April	1,620	3,454	5,074
May	1,124	3,427	4,551
June	1,349	3,072	4,421
July	1,977	2,977	4,954
August	1,678	3,453	5,131
September	1,701	3,009	4,710
October	1,492	3,192	4,684
November	1,601	2,853	4,454
December	1,262	2,965	4,227
Total	<u>18,342</u>	<u>40,133</u>	<u>58,475</u>
Cum	286,514	857,788	1,144,302

Production History - San Andres Formation
 Littman (San Andres) Unit
Monthly Oil Production - Bbls

Page 5

	<u>New Mexico</u> <u>Subdivision</u>	<u>Texas</u> <u>Subdivision</u>	<u>Total</u>
<u>1963</u>			
January	1,540	2,777	4,317
February	1,390	2,979	4,369
March	1,689	2,979	4,668
April	1,360	2,863	4,223
May	1,221	2,690	3,911
June	1,303	2,648	3,951
July	1,361	2,516	3,877
August	1,448	2,482	3,930
September	1,441	2,391	3,832
October	1,683	2,476	4,159
November	1,405	2,662	4,067
December	1,418	2,590	4,008
Total	<u>17,259</u>	<u>32,053</u>	<u>49,312</u>
Cum	303,773	889,841	1,193,614
<u>1964</u>			
January	1,431	2,441	3,872
February	1,385	2,811	4,196

6 1400

ddm/bn
 5/15/64

LANE

RADIOACTIVE LOG

COMPANY

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Subs EXHIBIT NO. *1*
CASE NO. *3049 + 3050*

Location of Well

COMPANY: N. G. PENROSE ETAL.

WELL: SIMS NO. 1

FIELD: LITTMAN

COUNTY: ANDREWS STATE: TEXAS

LOCATION: 140° FN & WL

SEC. 14 BLK. A - 29

3513' D.F.

COMPANY: N. G. PENROSE ETAL.
WELL: SIMS NO. 1
FIELD: LITTMAN
COUNTY: ANDREWS
LOCATION: STATE: TEXAS

LOG MEAS. FROM CABLE TOOL FLOOR ELEV. 3513'

DRLG. MEAS. FROM CABLE TOOL FLOOR ELEV. 3513'

PERM. DATUM 7" BRADEN HEAD ELEV. 3509.5'

TYPE OF LOG

RUN NO.

DATE

TOTAL DEPTH (DRILLER) WIRE LINE

EFFECTIVE DEPTH (DRILLER)

TOP OF LOGGED INTERVAL

BOTTOM OF LOGGED INTERVAL

TYPE OF FLUID IN HOLE

FLUID LEVEL

MAXIMUM RECORDED TEMP.

NEUTRON SOURCE STRENGTH & TYPE

SOURCE SPACING — IN.

LENGTH OF MEASURING DEVICE — IN.

O.D. OF INSTRUMENT — IN.

TIME CONSTANT — SECONDS

LOGGING SPEED FT. MIN.

STATISTICAL VARIATION — IN.

SENSITIVITY REFERENCE

RECORDED BY

WITNESSED BY

GAMMA RAY

1 N.W.

4-17-52

4350'

4350'

SURFACE

4347'

OIL

4268'

NEUTRON

1 N.W.

4-17-52

4350'

4350'

SURFACE

4347'

OIL

4268'

CASING RECORD

INTERVAL

RUN NO.

BIT SIZE

CASING

WT.—LB.

FROM WELL RECORD

FROM R/A LOG

1

12 1/4"

9 5/8"

SURF.

TO 1610'

SURF.

TO 1610'

1

8 3/4"

7"

SURF.

TO 4311'

SURF.

TO 4310'

1

6 1/4"

4311'

TO 4350'

4310'

TO 4349'

TO

TO

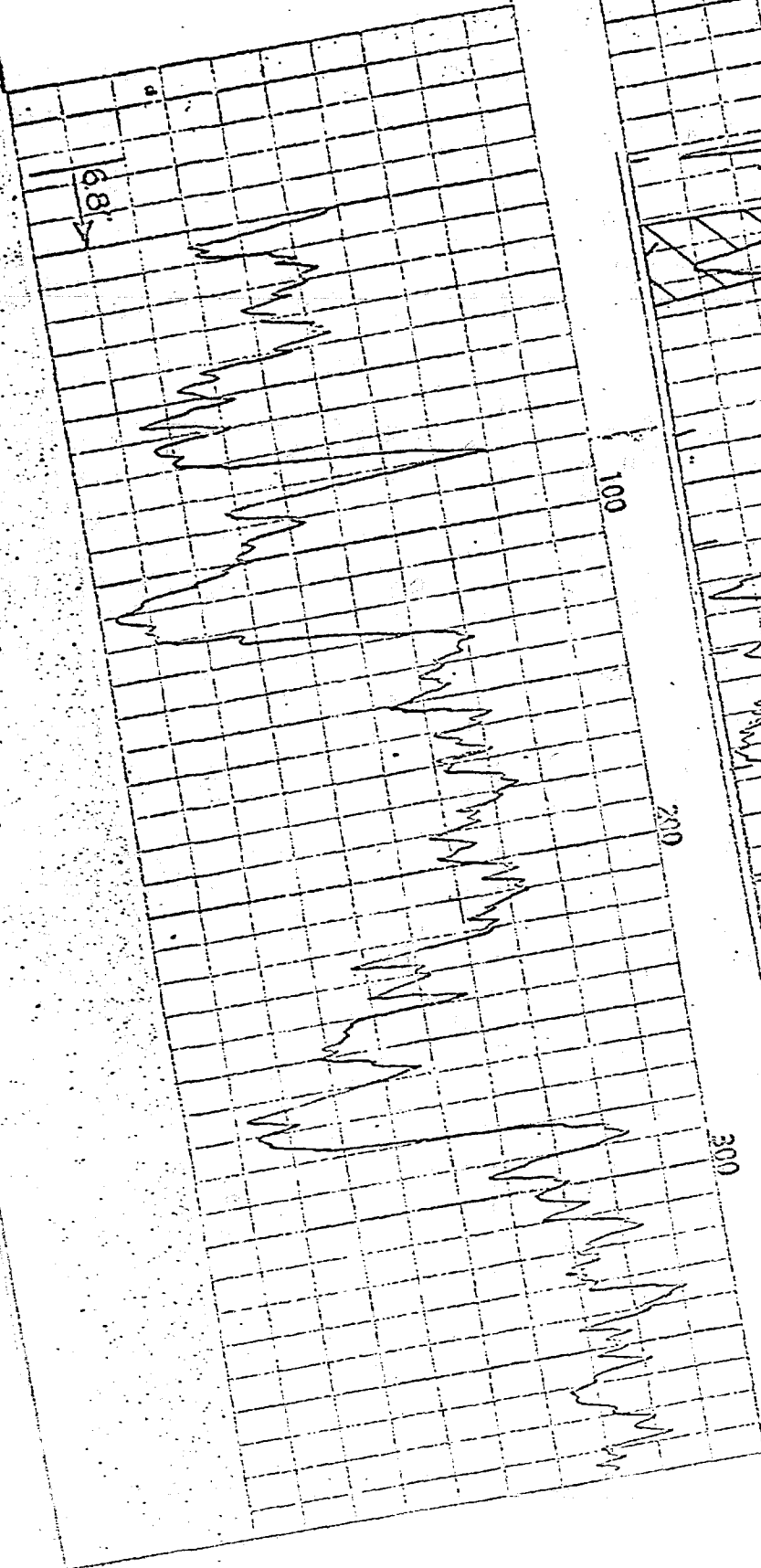
TO

TO

REMARKS OR OTHER DATA

GAMMA RAY

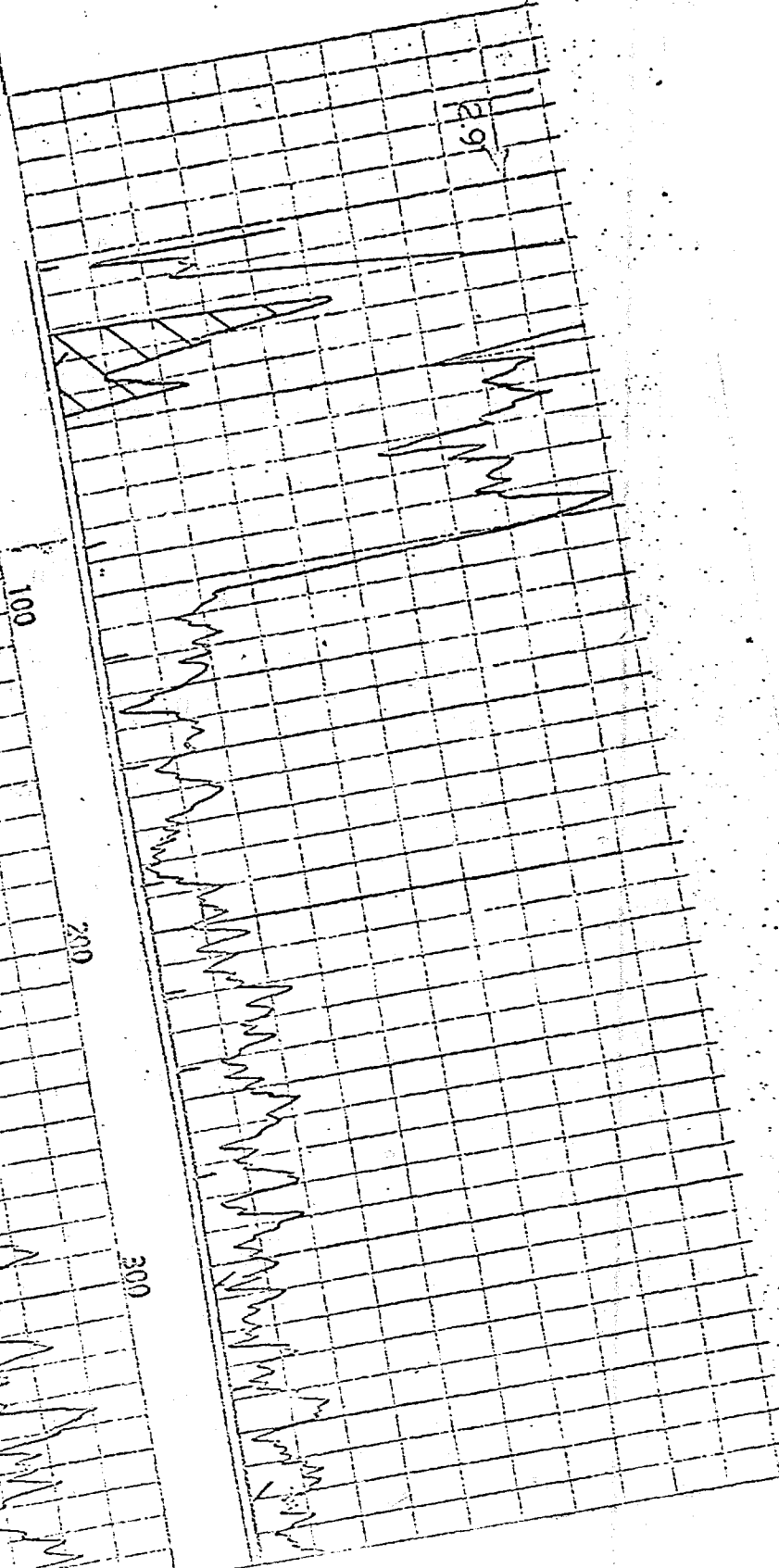
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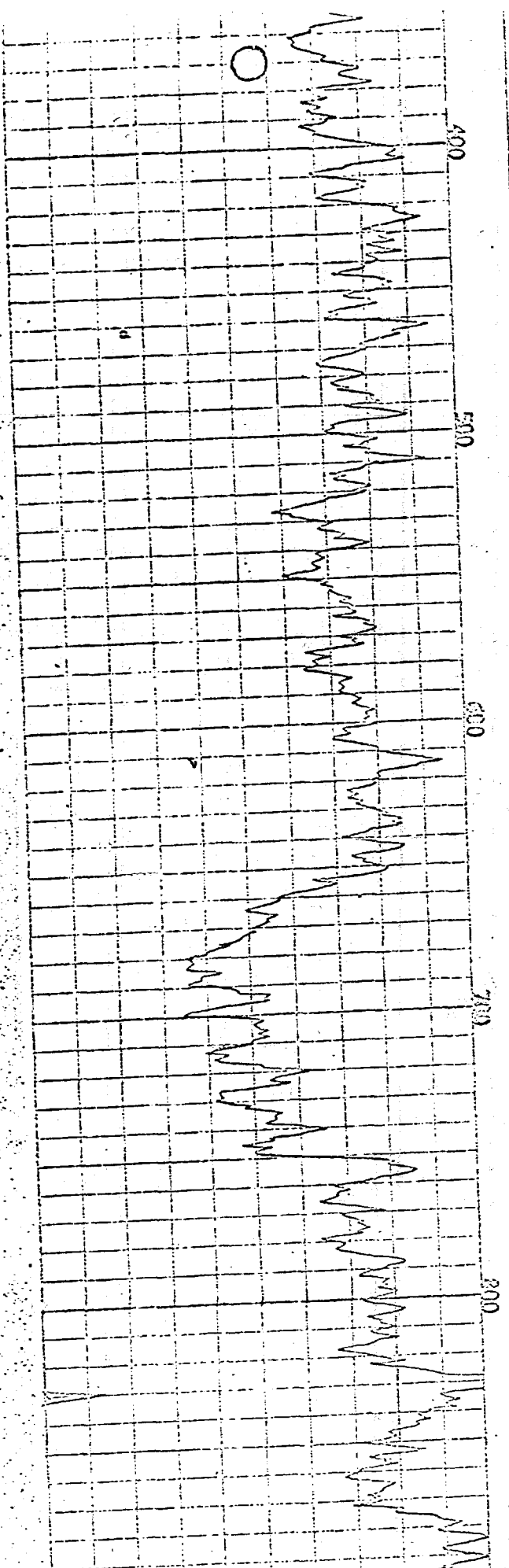
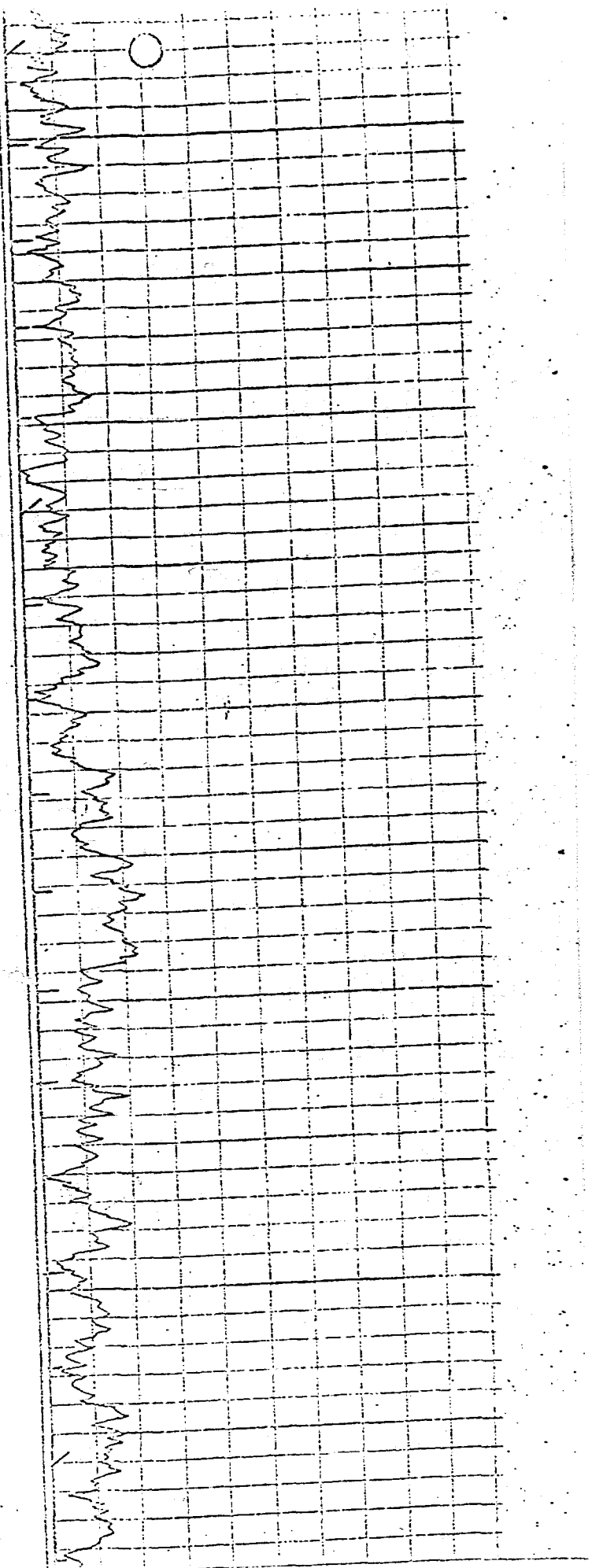


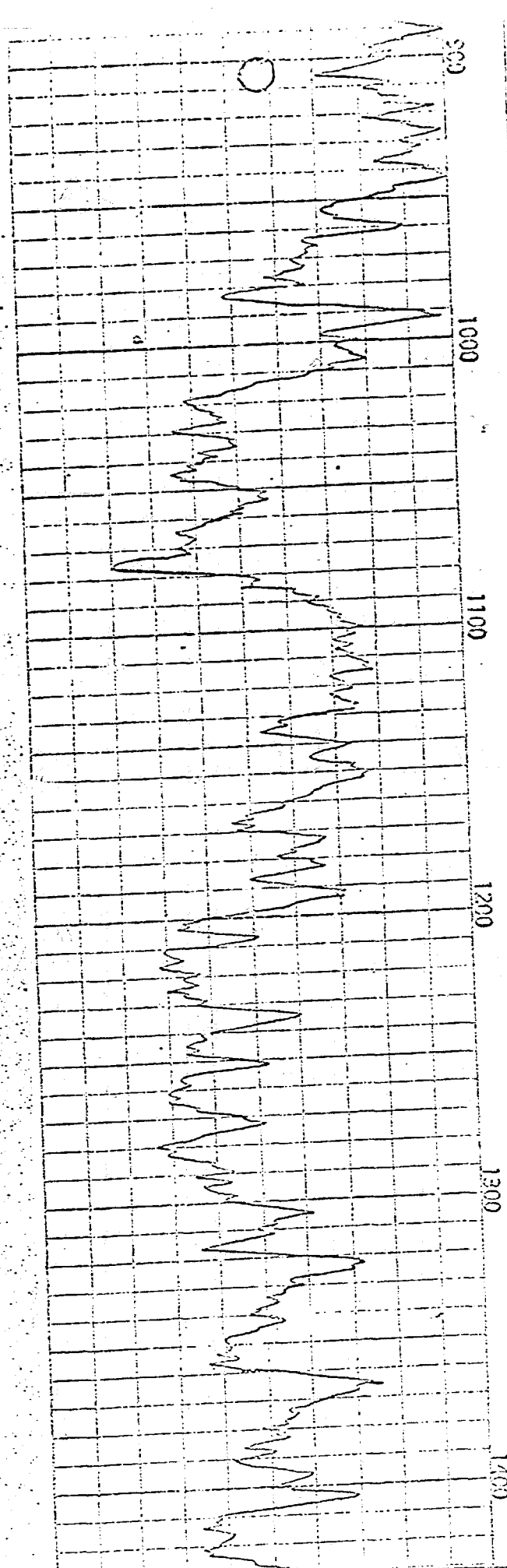
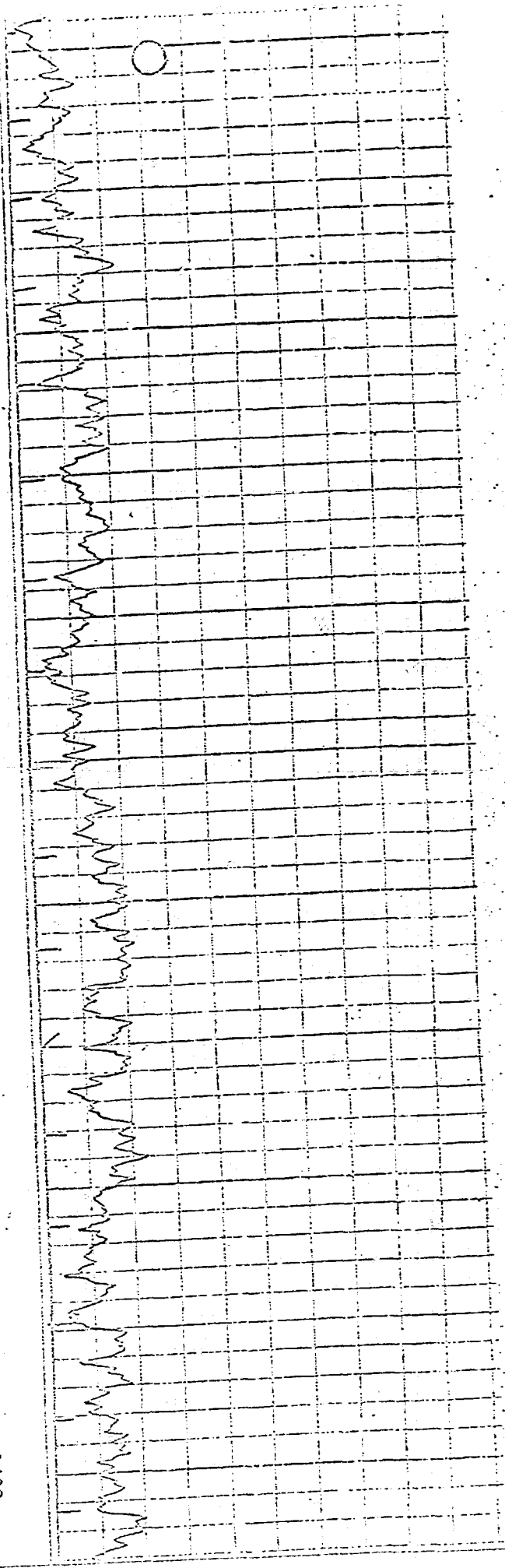
CASING &
COLLAR 106
DEPTH

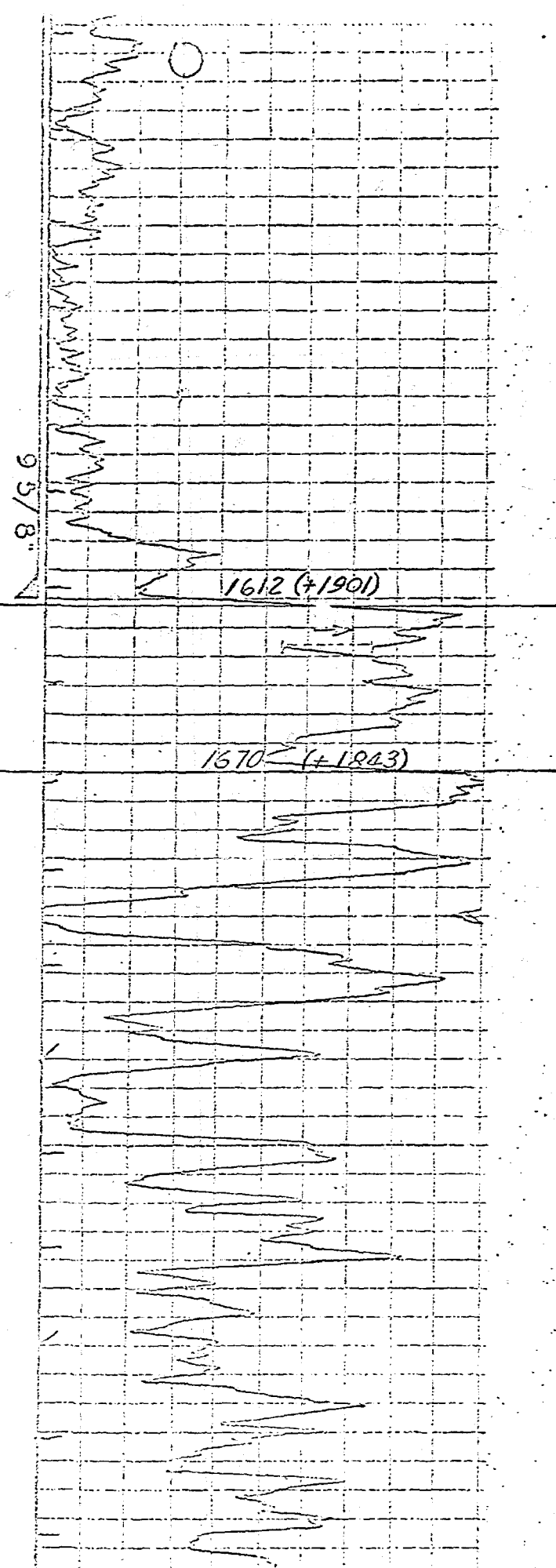
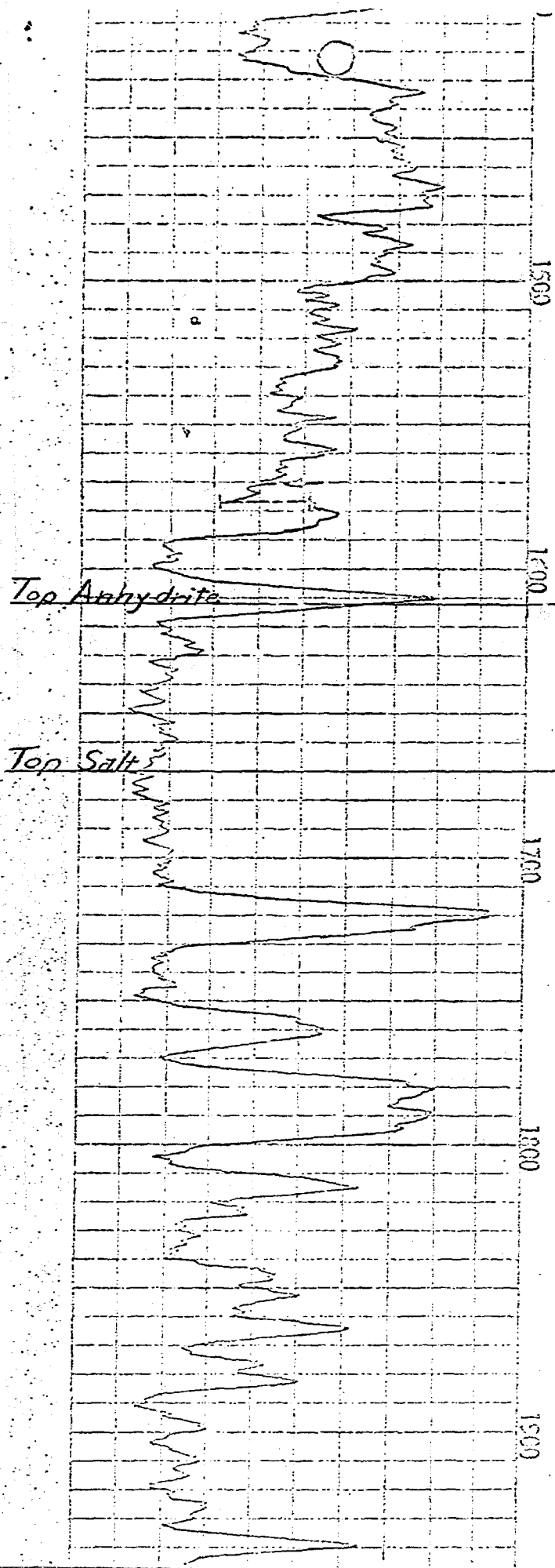
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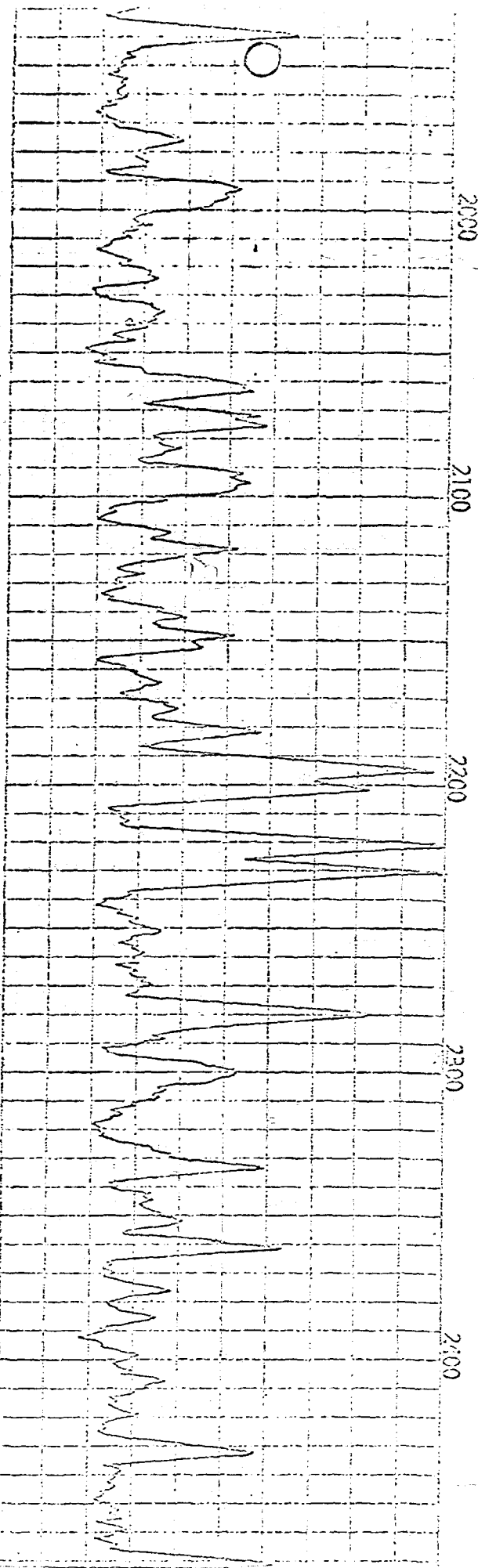
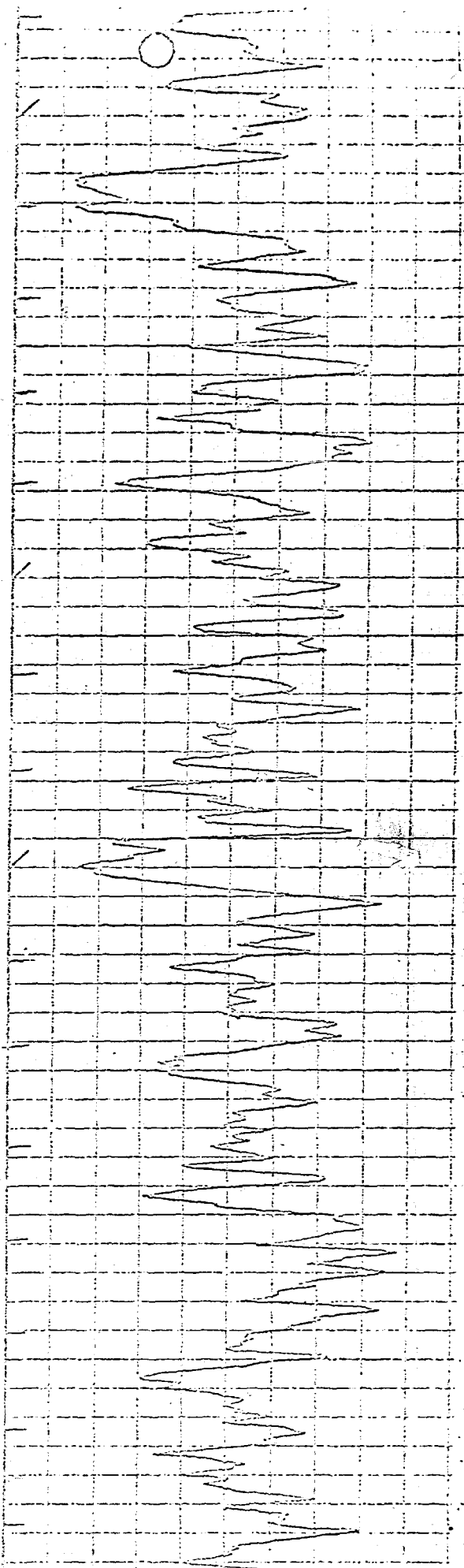
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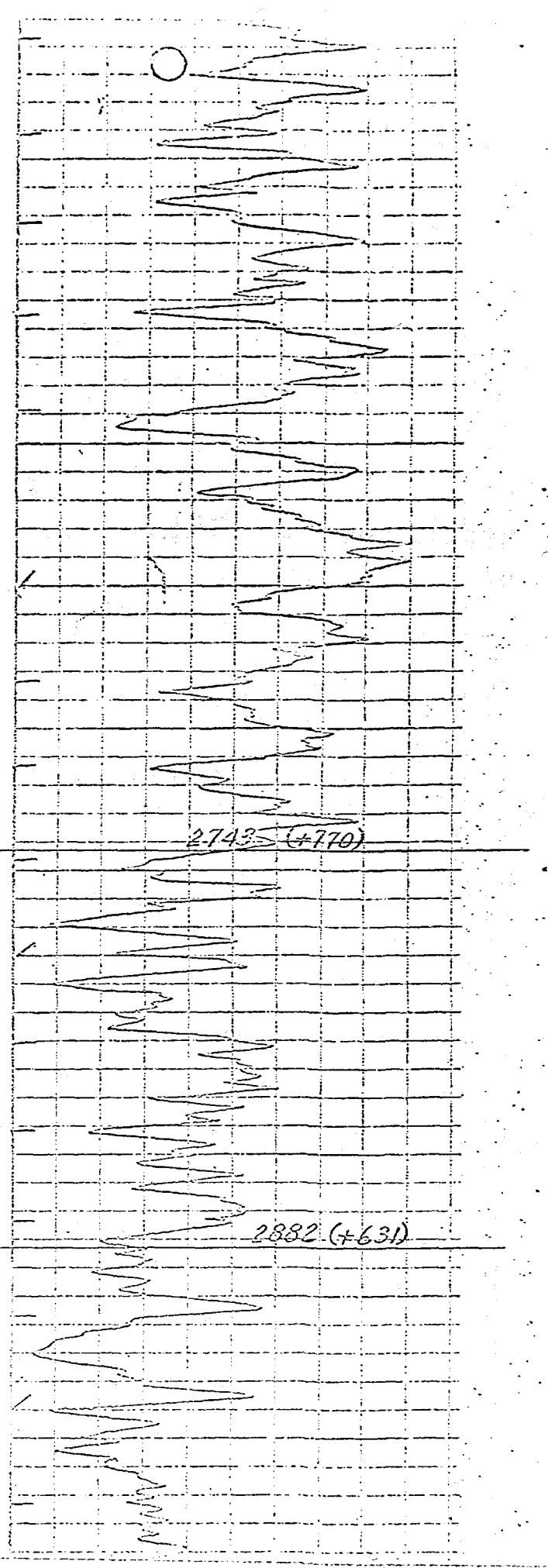
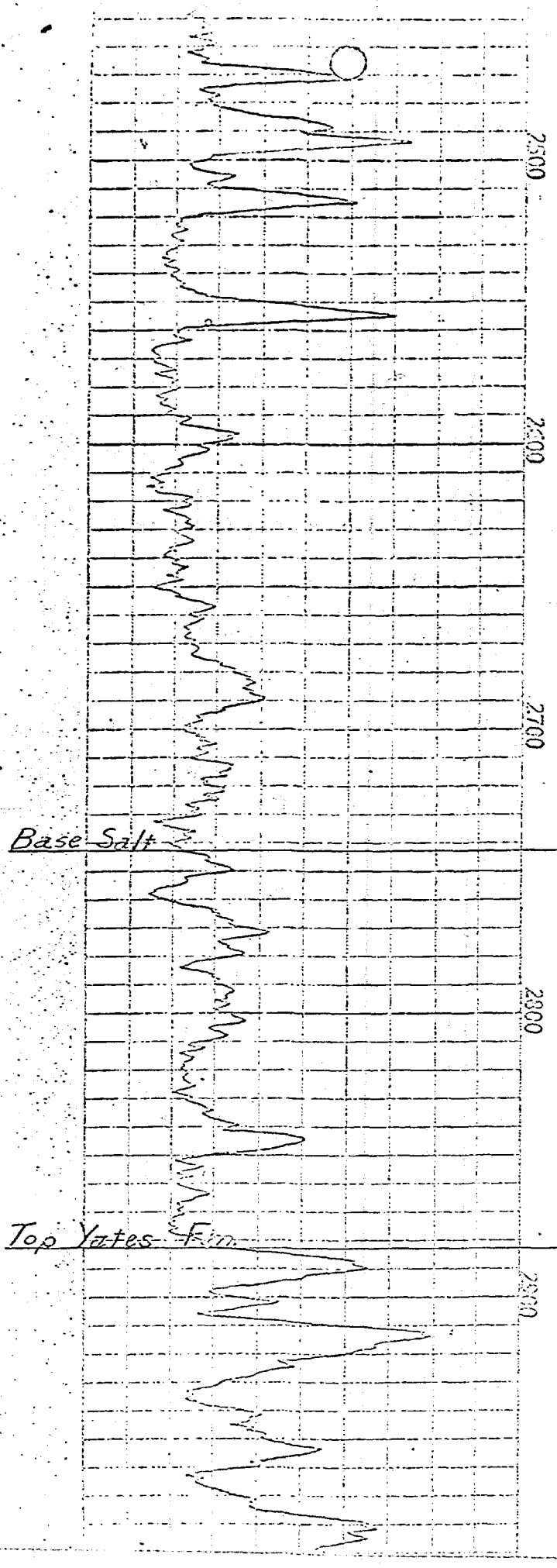


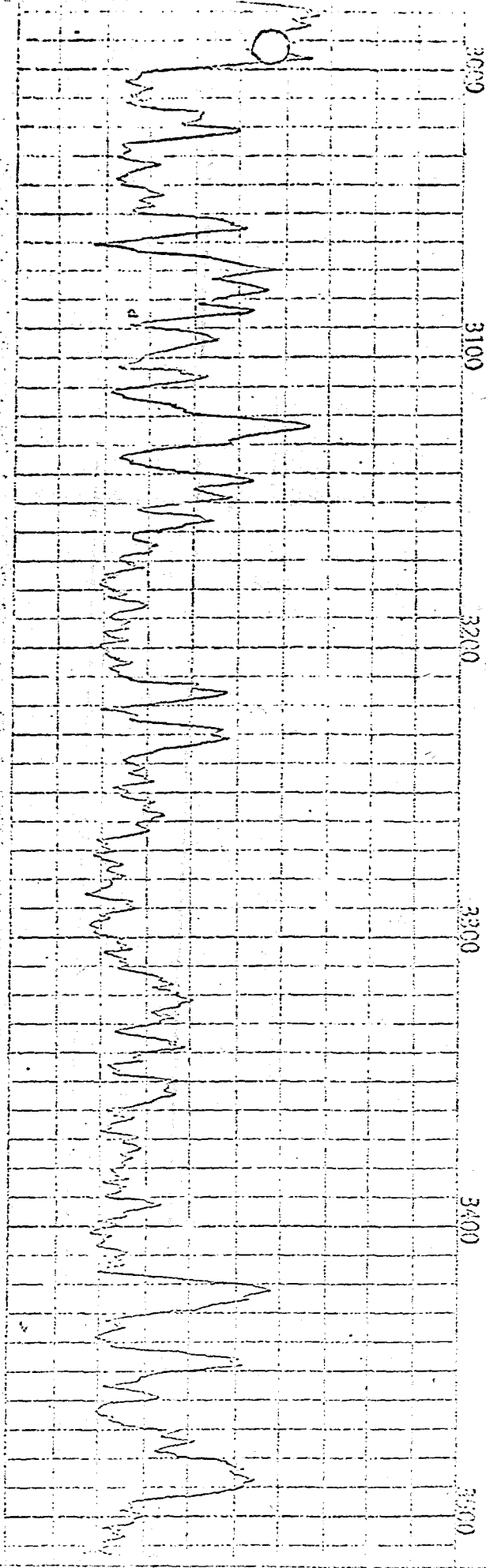
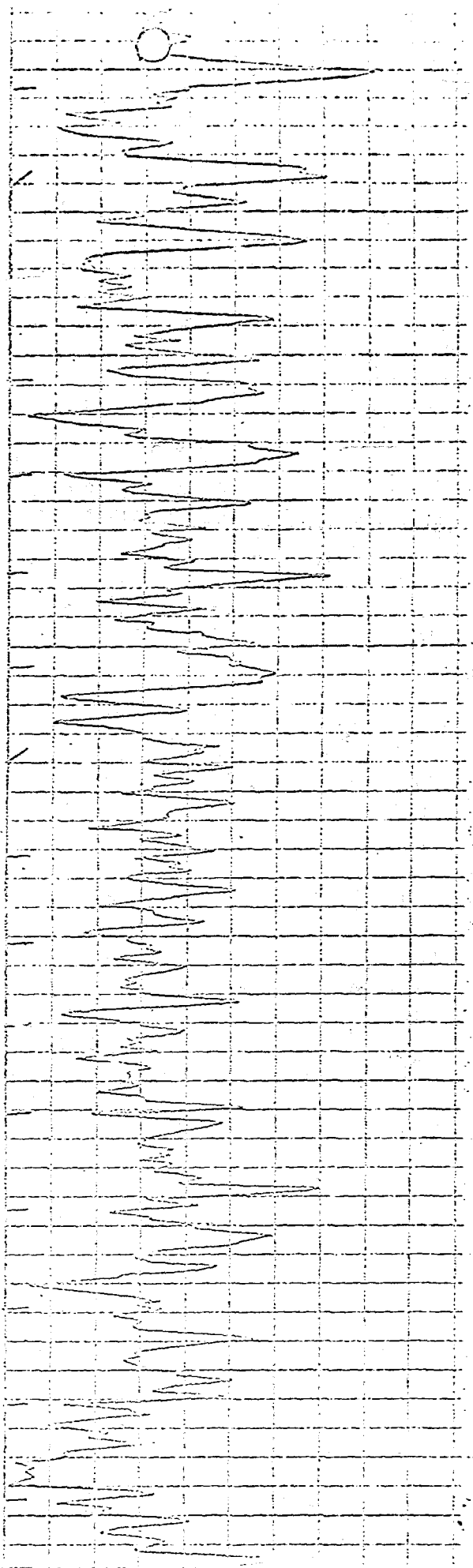


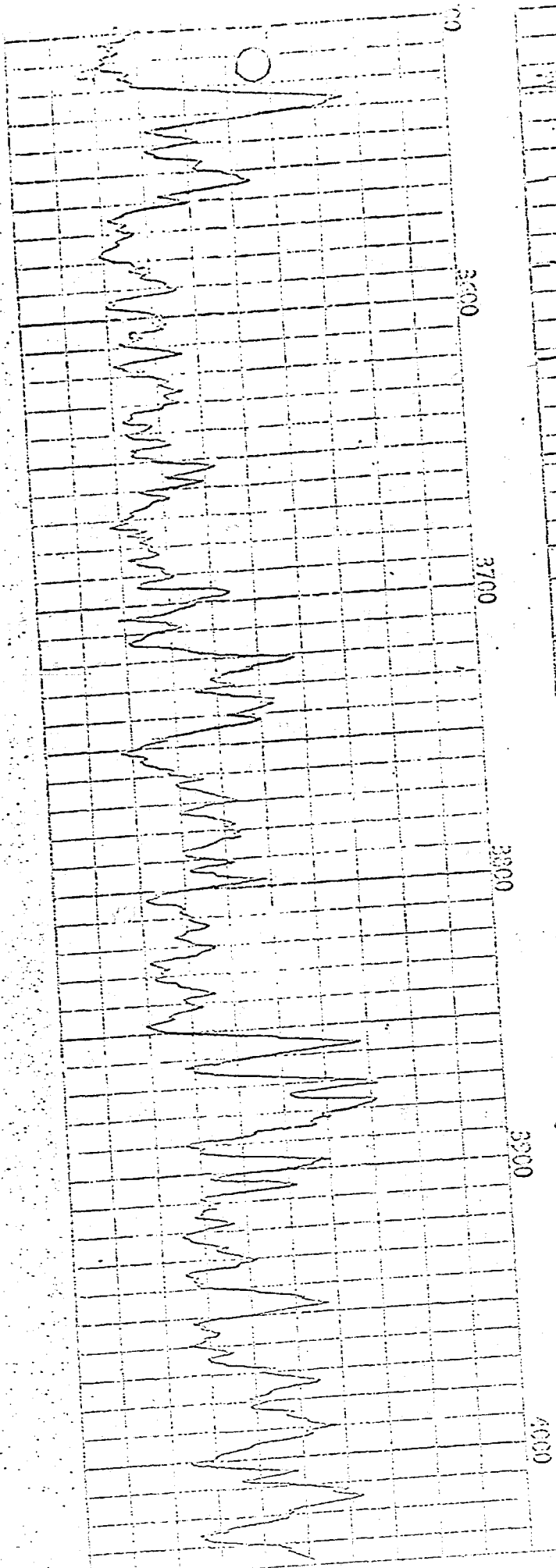
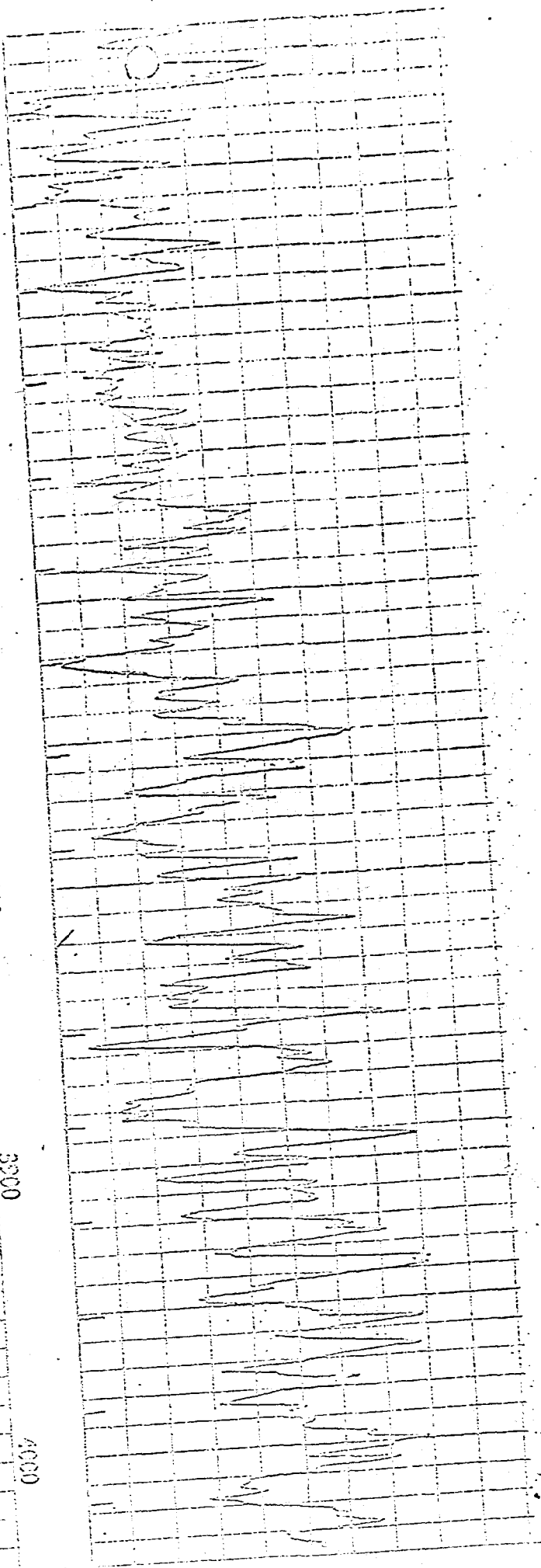


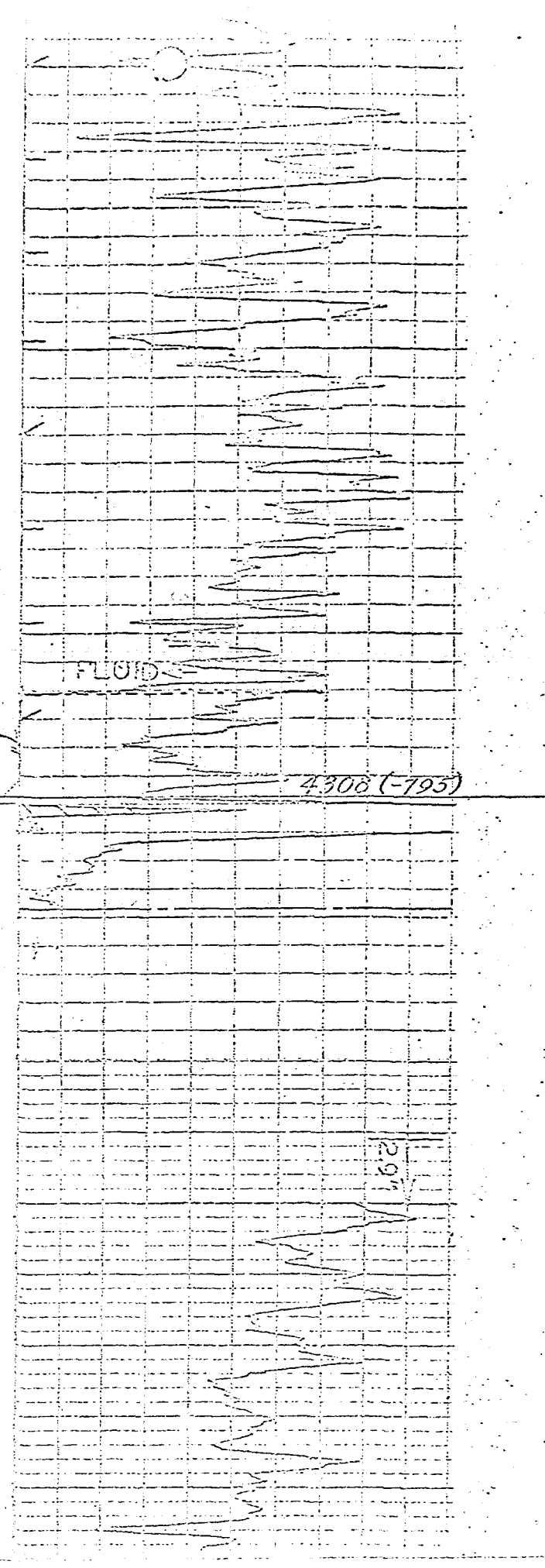
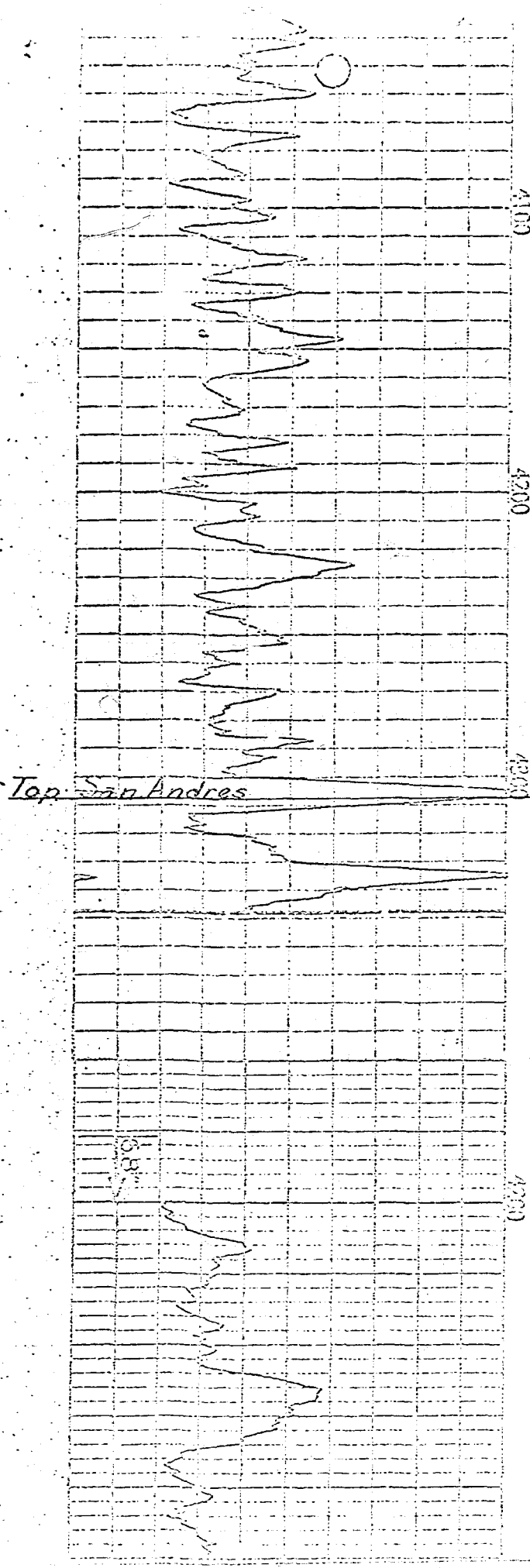


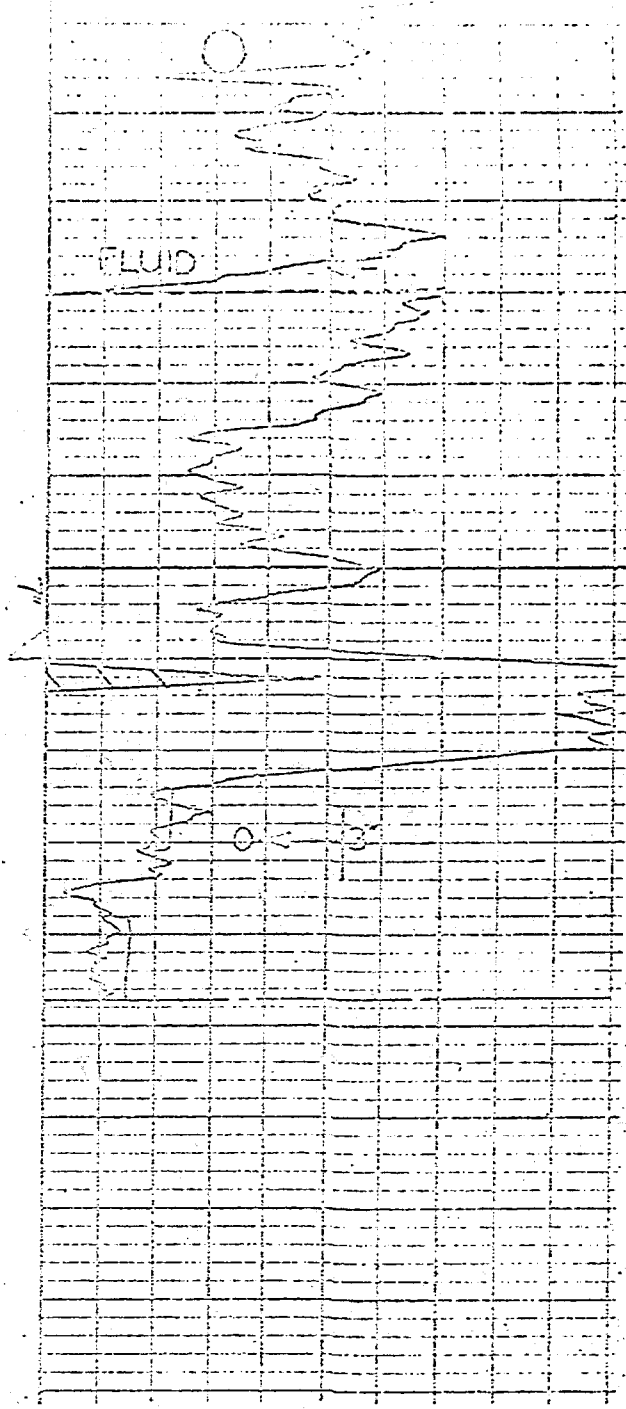
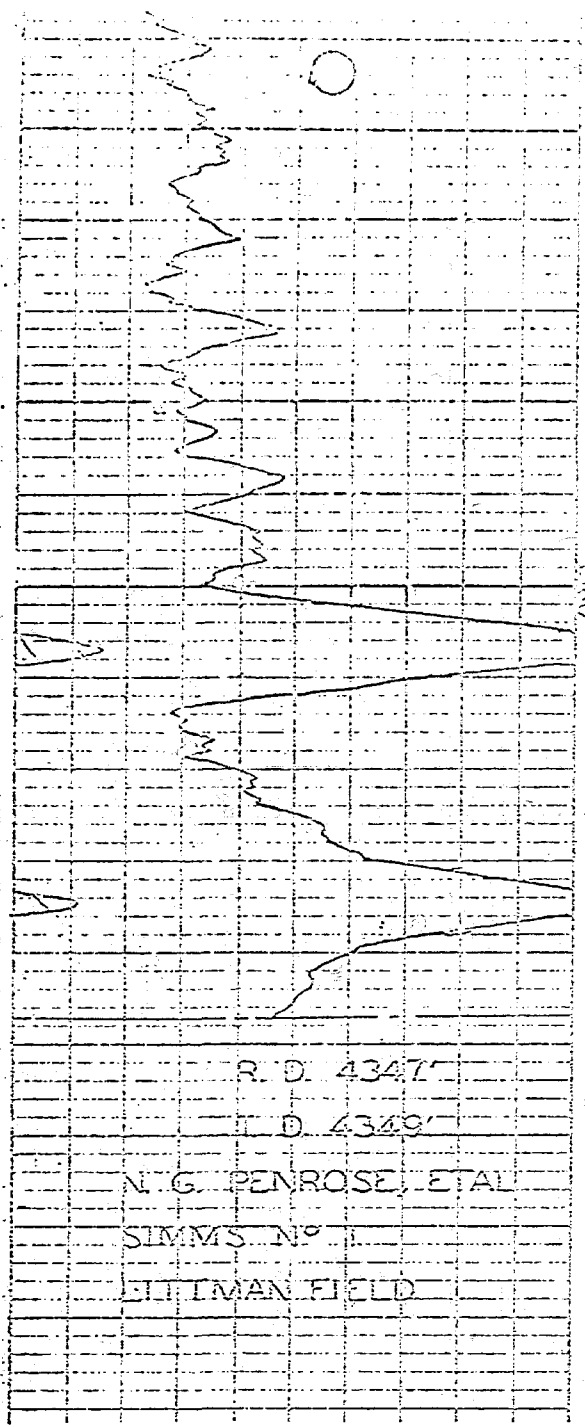












BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION

EXHIBIT NO. 15
CASE NO. 3049 + 3050

COMPANY: PEACOCK, WEXILLE
WELL: SOUTHWIND #4
FIELD: LEWIS
COUNTY: ANDREWS STATE: TEXAS
LOCATION: 1760*PSL 2060*PSL SEC.5
FILE NO. _____
LOG NO. 1219 ELK-A-29 PSL SURVEY
LOG MEAS. FROM: 2' ABOVE WELL HEAD ELEV. 3552
DRILG. MEAS. FROM: 2' ABOVE WELL HEAD ELEV. 3552
PEAKL. DATA: G.L. ELEV. 3550

LOG NO. 1219
WELL: SOUTHWIND #4
FIELD: LEWIS
COUNTY: ANDREWS STATE: TEXAS
LOCATION: 1760*PSL 2060*PSL SEC.5
FILE NO. _____

RUN NO.	ONE	ONE
TYPE OF LOG	C/L	NEUTRON
DATE	1-27-53	1-27-53
TOTAL DEPTH (OPERATOR)	1350	1350
EFFECTIVE DEPTH (OPERATOR)	1350	1350
EFFECTIVE DEPTH (WESTERN)	1350	1350
TOP OF LOGGED INTERVAL	1350	1350
BOTTOM OF LOGGED INTERVAL	1350	1350
TYPE OF FLUID IN HOLE	WATER	WATER
FLUID LEVEL	1350	1350
NEUTRON SOURCE TYPE	POOK	POOK
SOURCE SPACING IN.	3.25	3.25
LENGTH OF DETECTOR IN.	3	3
O.D. OF INSTRUMENT IN.	3 5/8	3 5/8
TIME CONSTANT SEC.	3	3
LOGGING SPEED FT./MIN.	25-50	25-50
STATISTICAL VARIATION IN.	33	33
SENSITIVITY REFERENCE	27	27
RECORDED BY	EDDIE DENNIS	EDDIE DENNIS
CHECKED BY	TOM MARKS	TOM MARKS

CASING RECORD

RUN NO.	PIPE SIZE	CASING	WELLS	FROM WELL RECORD	FROM RA LOG
ONE	5 1/2	5 1/2	SURF.	TO 1325	TO
TWO	5 1/4	5 1/4	1325	TO 1350	TO
				TO	TO
				TO	TO
				TO	TO

REMARKS

LEWIS RAY

NEUTRON

RADIATION INTENSITY INCLUDED

RADIATION INTENSITY INCLUDED

Top Anhydrite

1637 (+1915)

Top Salt

1698 (+1854)

1400

1500

1600

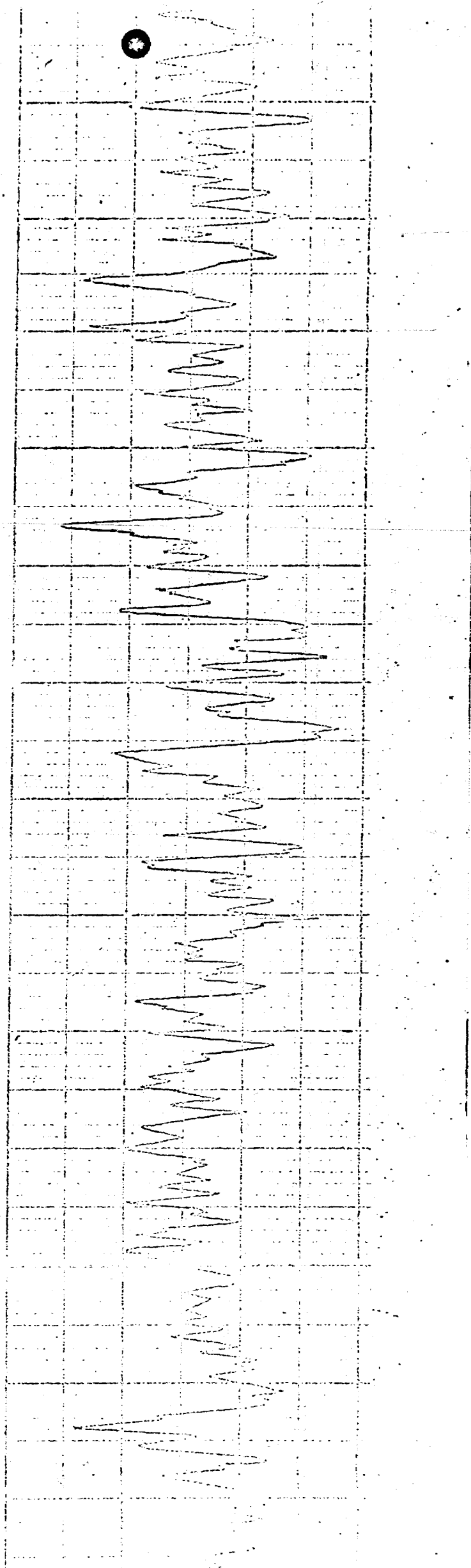
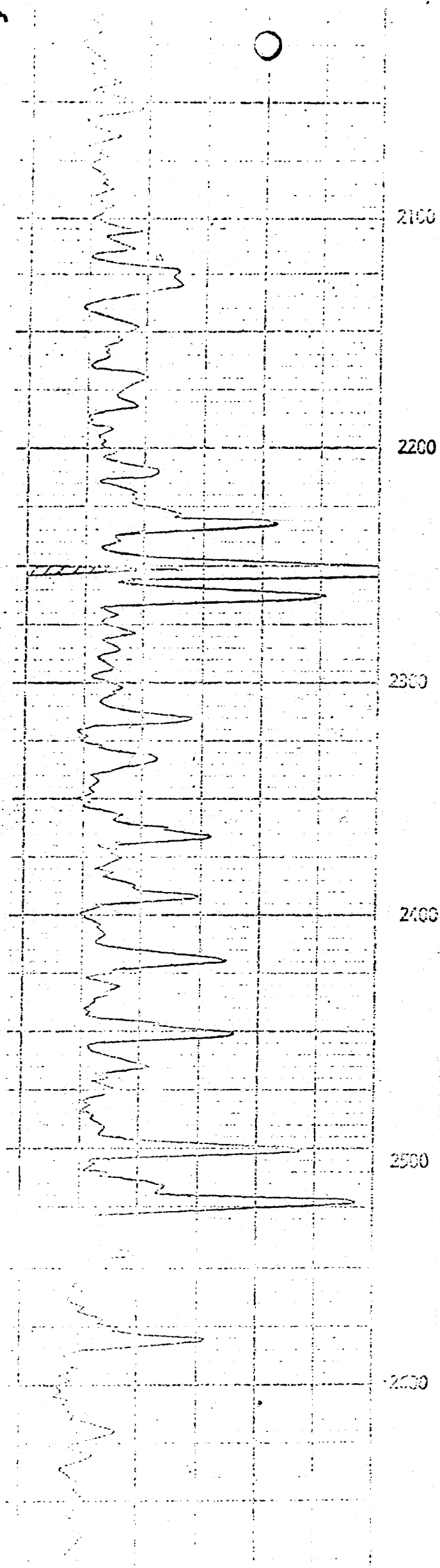
1700

1800

1900

2000

12



Base Salt

2700

2762 (+790)

2800

Top Yates Fm

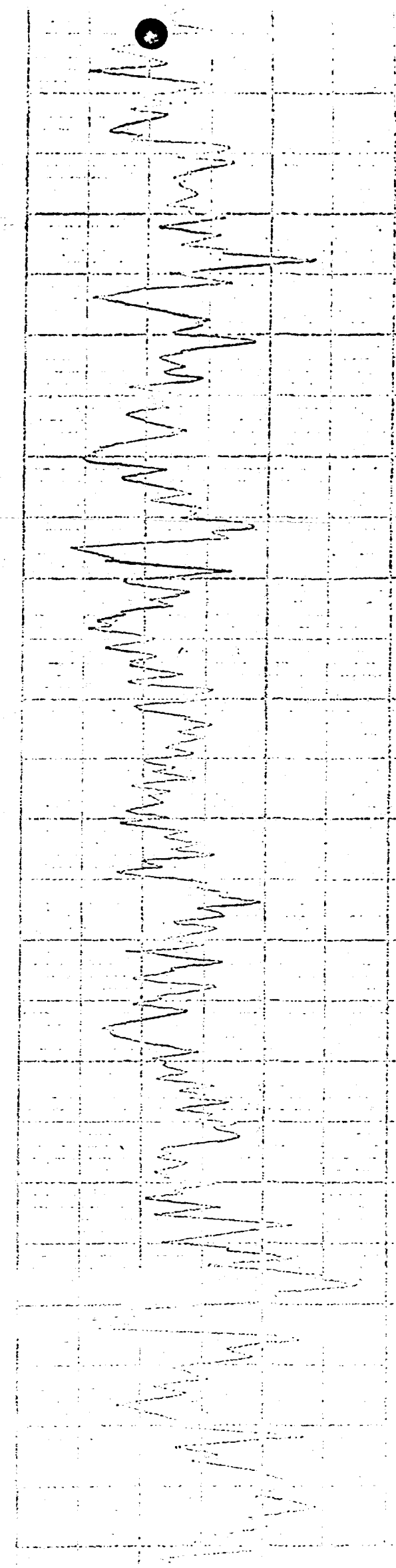
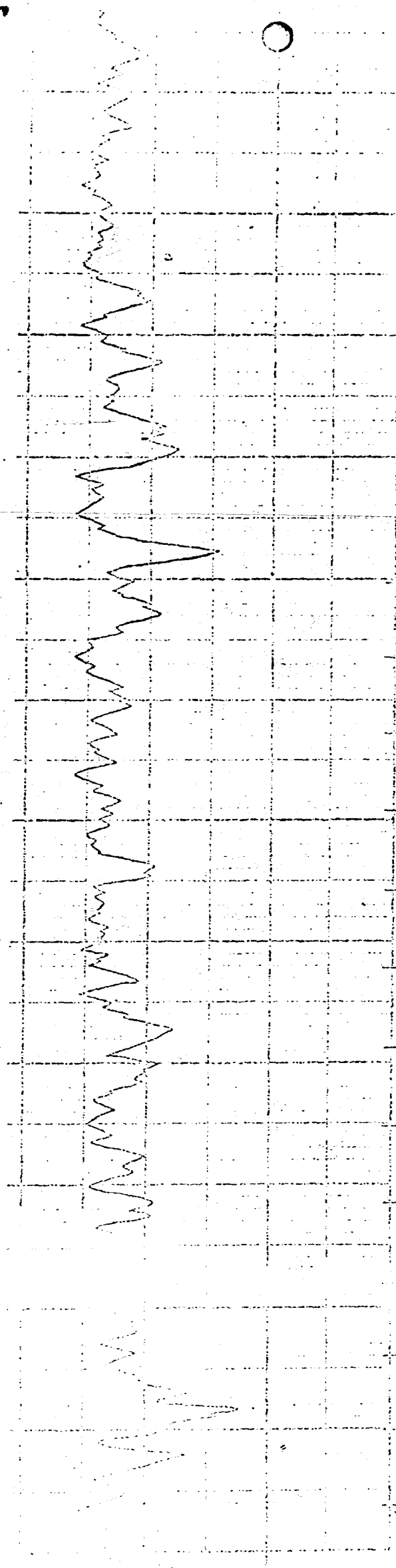
2838 (+654)

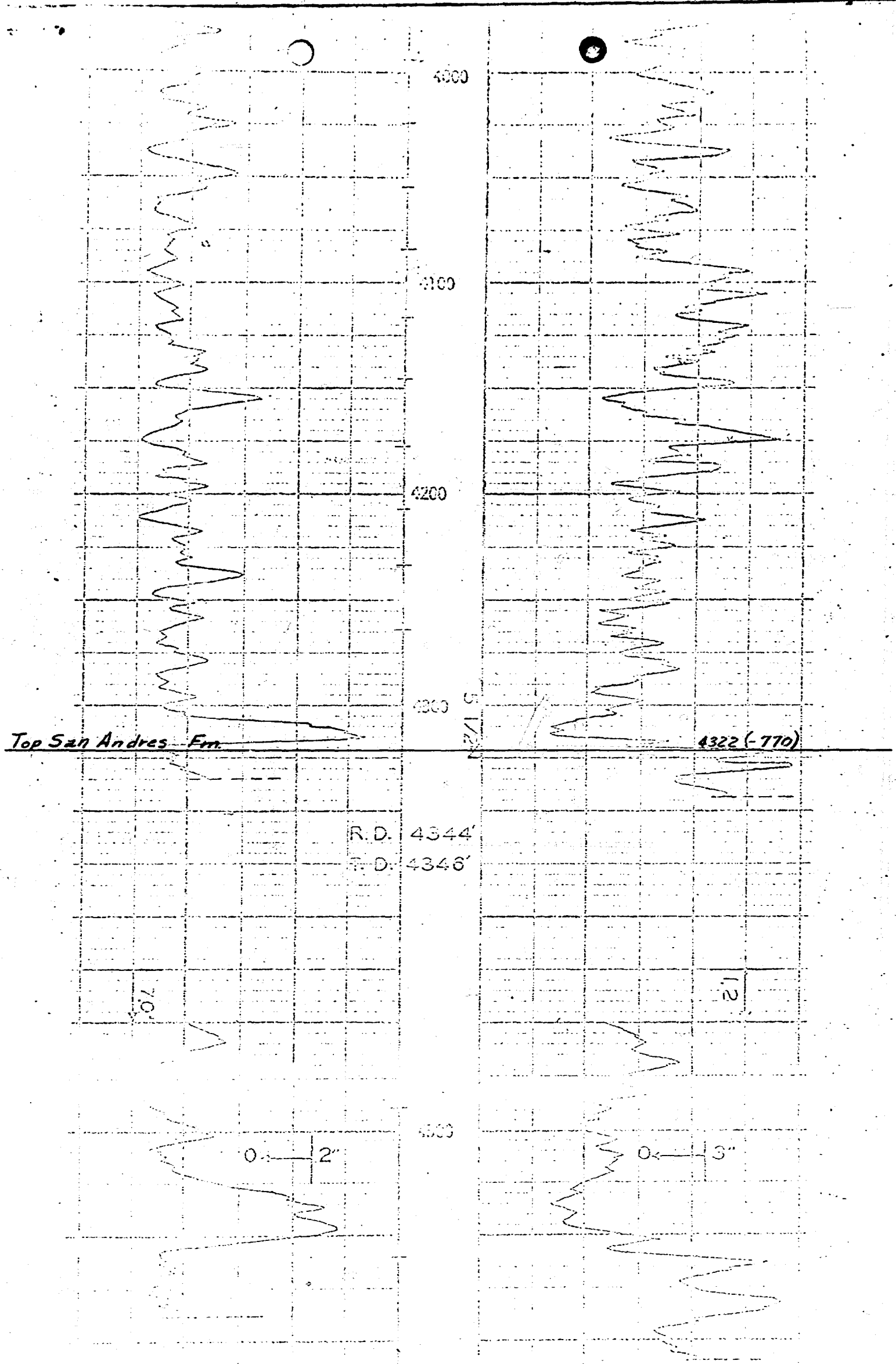
3000

3100

3200

3300





Top San Andres Fm.

4322 (-770)

R.D. 4344'
R.D. 4346'

R.D. 4344'
R.D. 4346'

PENROSE, NEVILLE

T.D. 348

OPENROSE, NEVILLE

SOUTHLAND NO. 4

LITTMAN FLD.

ANDREWS CO. TEX.

STATISTICAL AT 1403

BEFORE EXAMINER UTZ

OIL CONSERVATION COMMISSION

LITTMAN SAN ANDRES

FIELD EXHIBIT NO. 17

LEA COUNTY, NEW MEXICO

ANDREWS COUNTY, TEXAS

CASE NO. 3049 & 3050

OPERATOR Elliott, Inc. LEASE Parcell WELL 2

LOCATION 990' FSL & 330' FEL, Sec. 8-T21S-R38E, Lea County, New Mexico

Surface

8-5/8" Csg. @ 1614' with 450 Sacks

Production Tubing:

2" @ 4330'

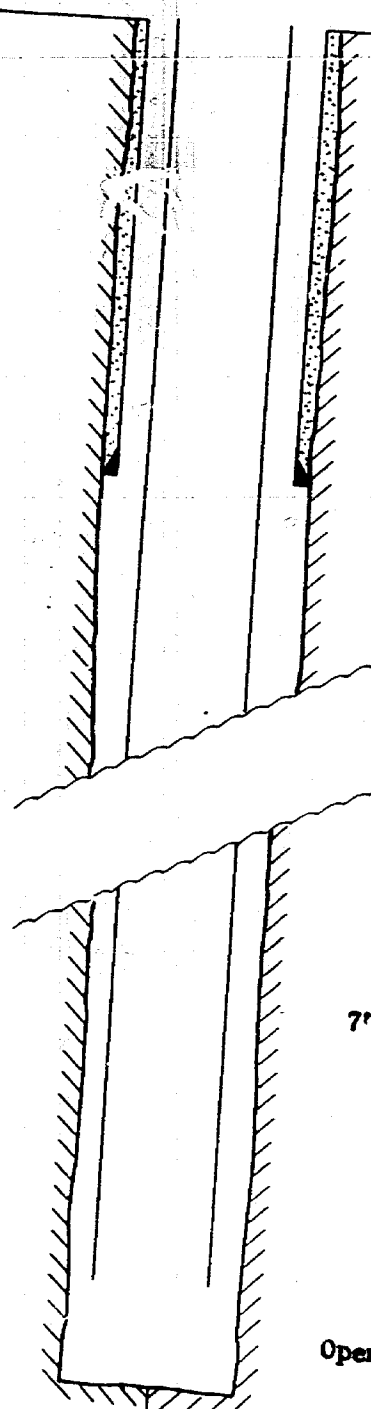
5-1/2" Csg. @ 4316' with 350 Sacks

Open Hole 4316'-60'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Elliott, Inc. LEASE Wylie WELL 1
LOCATION 990' FSL & 330' FKL, Sec. 9-T21S-R33E, Lea County, New Mexico

Surface



8-5/8" Csg. @ 1616' with 150 Sacks

7" Csg. @ 4321' with 200 Sacks

Open Hole 4321'-60'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Elliott, Inc. LEASE Wylie WELL 3

LOCATION 1650' FSL & 1650' FSL, Sec. 9-T21S-R38E, Lea County, New Mexico

Surface

8-5/8" Csg. @ 1625' with 600 Sacks

5-1/2" Csg. @ 4327' with 350 Sacks

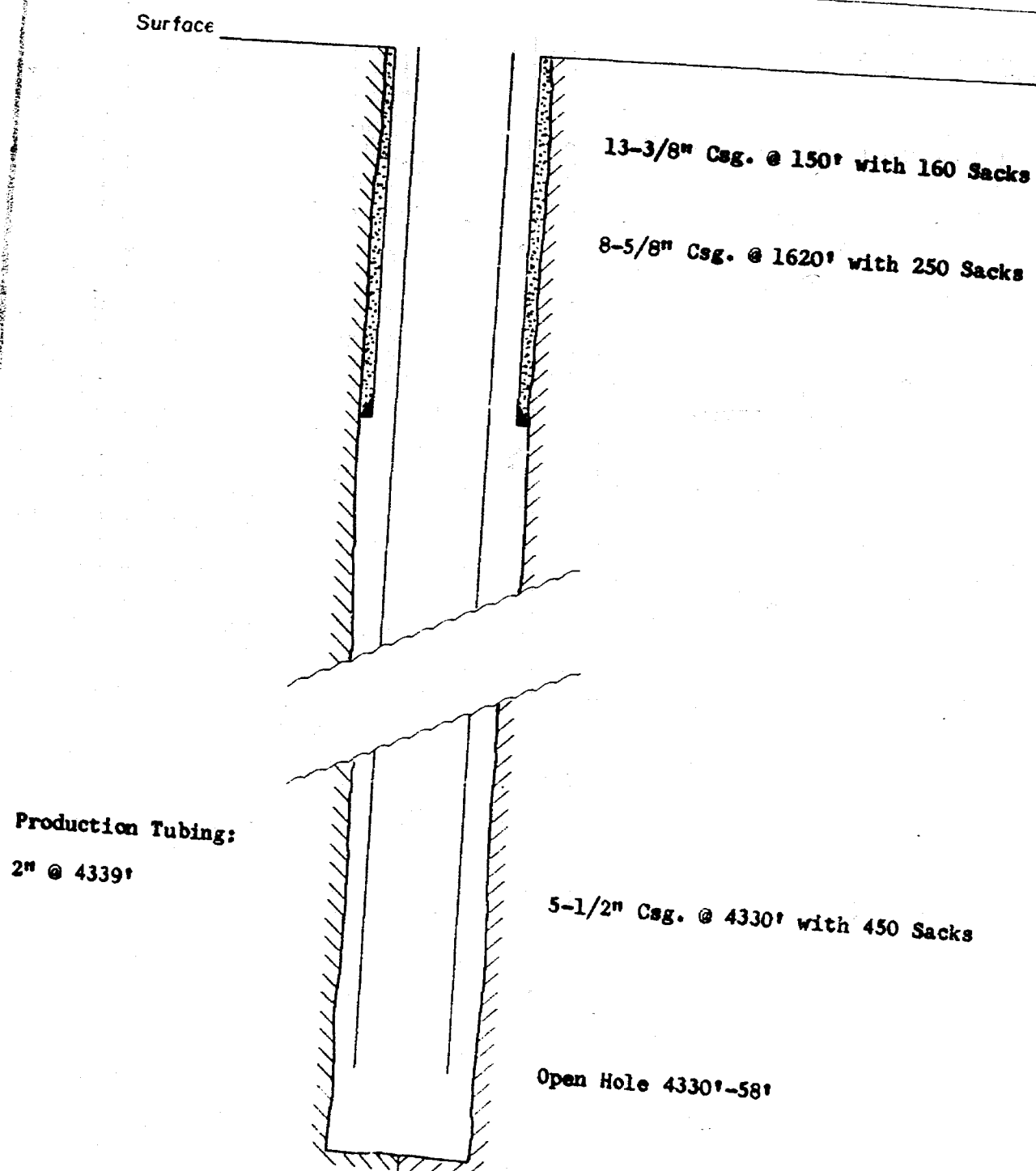
Production Tubing:

2" @ 4337'

Open Hole 4327'-59'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE NuMex WELL 2
LOCATION 1650' FEL, 330' FNL, Sec. 16-T21S-R38E, Lea County, New Mexico



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman WELL 2
LOCATION 2173' FSL & 2027' FEL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1636' with 450 Sacks

Production Tubing:

2" @ 4358'

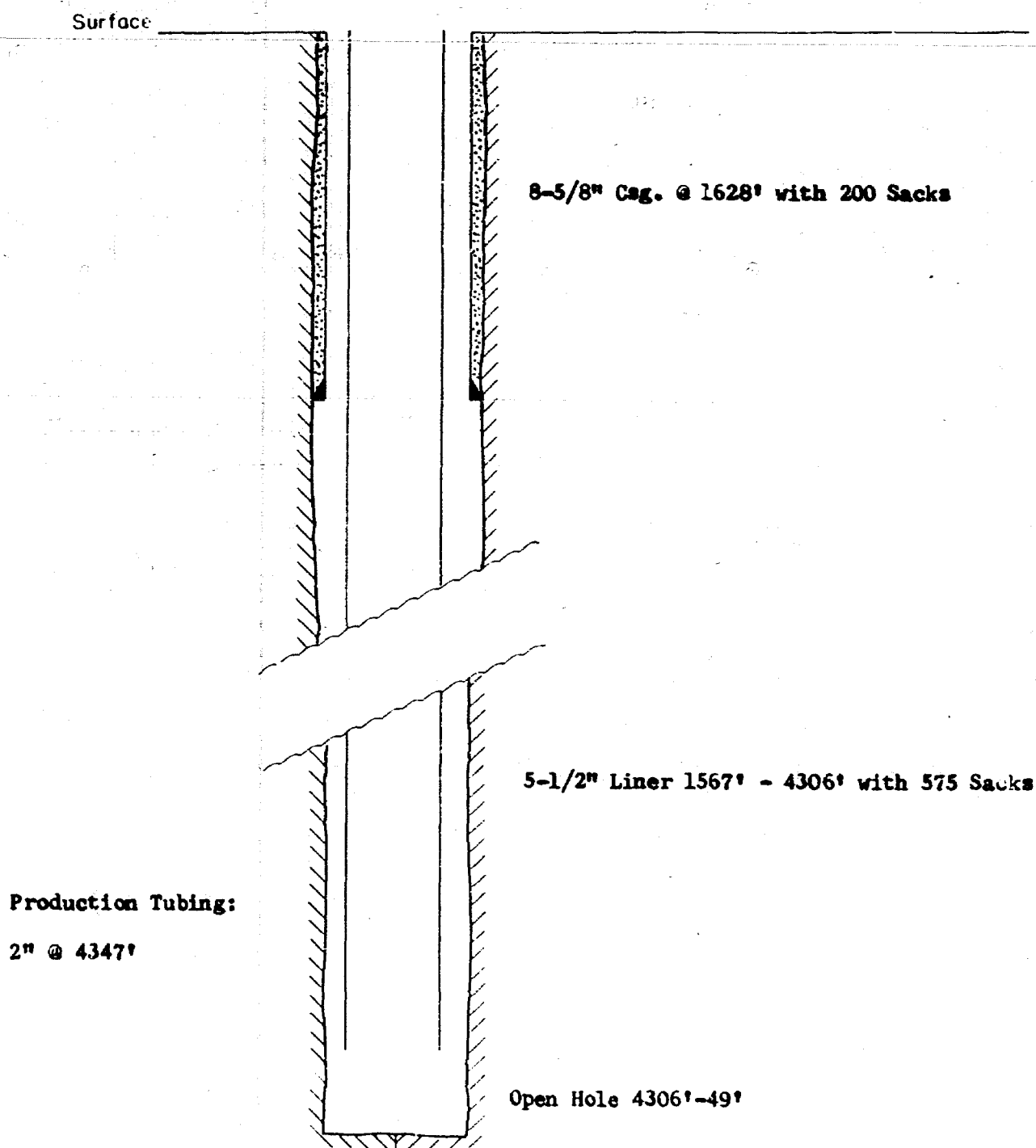
5-1/2" Csg. @ 4321' with 150 Sacks

Open Hole 4321'-58'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman WELL 3

LOCATION 811' FEL & 880' FSL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman WELL 6
LOCATION 440' FWL & 2200' FSL, Sec. 6, Blk. A-29, PSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1625' with 500 sacks

Production Tubing:

2" @ 4350'

5-1/2" Csg. @ 4323' with 100 sacks

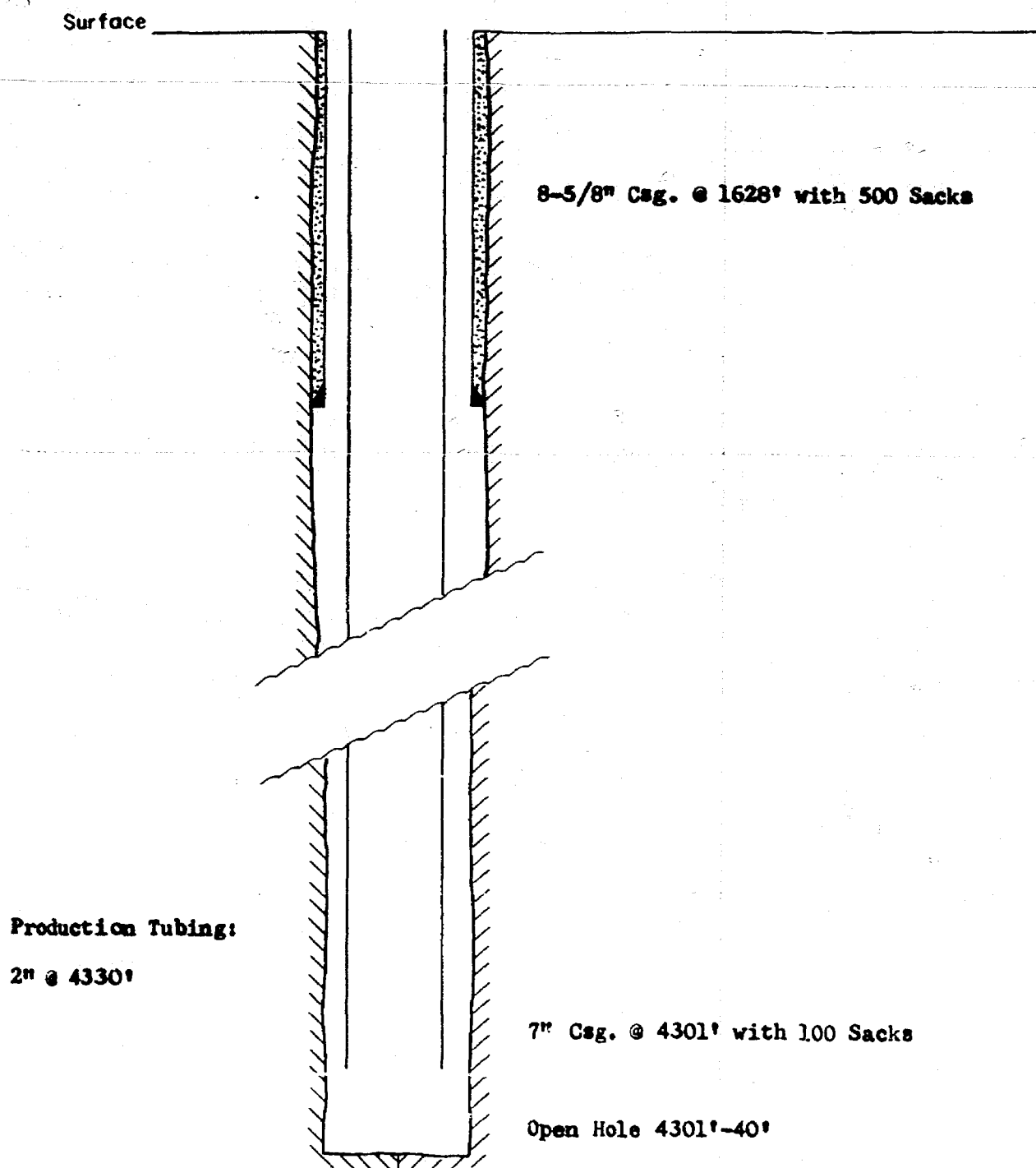
Open Hole 4323'-53'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman "A" WELL 1

LOCATION 467' FNL & 467' FNL, SE/4 NE/4 of Sec. 6, Blk. A-29, PSL Sur.,

Andrews County, Texas



LITTMAN SAN ANDRES FIELD

LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman "A" WELL 5

LOCATION 1760' FNL & 1691' FNL, Sec. 6, Blk. A-29, FSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1622' with 250 Sacks

Production Tubing:

2" @ 4353'

7" Csg. @ 4323' with 125 Sacks

Open Hole 4323'-56'

LITTMAN SAN ANDRES FIELD

LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Littman "B" WELL 1

LOCATION 467' FNL & 467' FWL of S/2 Sec. 7, Blk. A-29, PSL Sur., Andrews County,
Texas

Surface

13-3/8" Csg. @ 160' with 150 Sacks

8-5/8" Csg. @ 1630' with 40 Sacks

Production Tubing:

2" @ 4347'

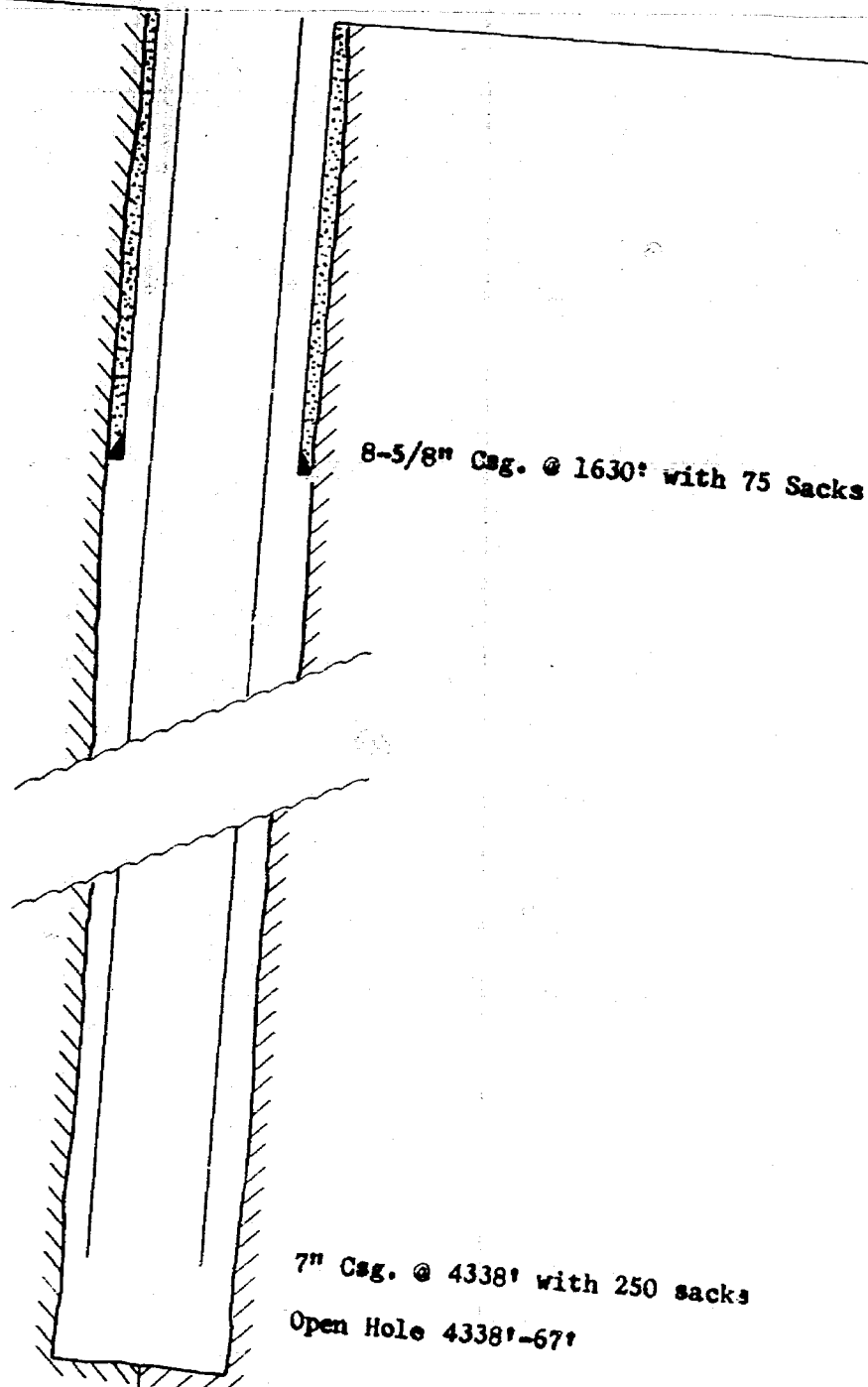
5-1/2" Csg. @ 4315' with 60 Sacks

Open Hole 4315'-51'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Monarch WELL 1
LOCATION 330' FSL & 1691' FWL, Sec. 5, Blk. A-29, FSL Sur., Andrews County, Texas

Surface



LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Southland WELL 2
LOCATION 880' FSL & 810' FSL, Sec. 5, Blk. A-29, FSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1635' with 150 Sacks

Production Tubing:
2" @ 4350'

7" Csg. @ 4338' with 50 Sacks

Open Hole 4338'-60'

LITTMAN SAN ANDRES FIELD
LEA COUNTY, NEW MEXICO - ANDREWS COUNTY, TEXAS

OPERATOR Sohio Petroleum Company LEASE Southland WELL 4
LOCATION 1760' FSL & 2060' FEL, Sec. 5, Blk. A-29, FSL Sur., Andrews County, Texas

Surface

8-5/8" Csg. @ 1630' with 450 Sacks

Production Tubing:

2" @ 4345'

5-1/2" Liner @ 1558'-4325' with 675 Sacks

Open Hole 4325'-50'

COMPANY: RAMMO HEVILLE

WELL: SOUTH 28 / 4

FIELD:

COUNTY: ANDREWS STATE: TEXAS

LOCATION: 1760°FSL 2060°FEL SEC.5

FILE NO.

LOG NO. 1212

ENR-A-29 PSL SURVEY

LOG MEAS. FROM: 2' ABOVE WELL HEAD ELEV. 3552

ORIG. MEAS. FROM: 2' ABOVE WELL HEAD elev. 3552

PERM. DATA: G.L. ELEV. 3550

RUN NO.

TYPE OF LOG

DATE _____
TOTAL DEPTH (OPERATOR) _____

EFFECTIVE DEPTH (OPERATOR)

EFFECTIVE DEPTH WESTERN

TOP OF LOGGED INTERVAL

BOTTOM OF LOGGED INTERVAL

TYPE OF FLUID IN HOLE

FLUID LEVEL

NEUTRON SOURCE TYPE

SOURCE SPACING _ _ IN.

LENGTH OF DETECTOR.....IN.

Q.O. OF INSTRUMENT____IN.

TIME CONSTANT...SEC.

LOGGING SPEED____FT./MIN.

STATISTICAL VARIATION. IN.

SENSITIVITY REFERENCE

RECORDED BY

1953 24

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

— INTERNAL —

RUN NO.	BIT SIZE	CASHING	WELL-LOG	FROM WELL RECORD	FROM RA LOG
ONE		5 1/2		SURE TO 4325	TO
ONE	5 1/4			4325 TO 4350	TO
				TO	TO
				TO	TO
				TO	TO

1995

1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 26

ACKNOWLEDGMENTS

• *Journal of the American Academy of Child and Adolescent Psychiatry*, 2000, 39, 10, 1253-1260.

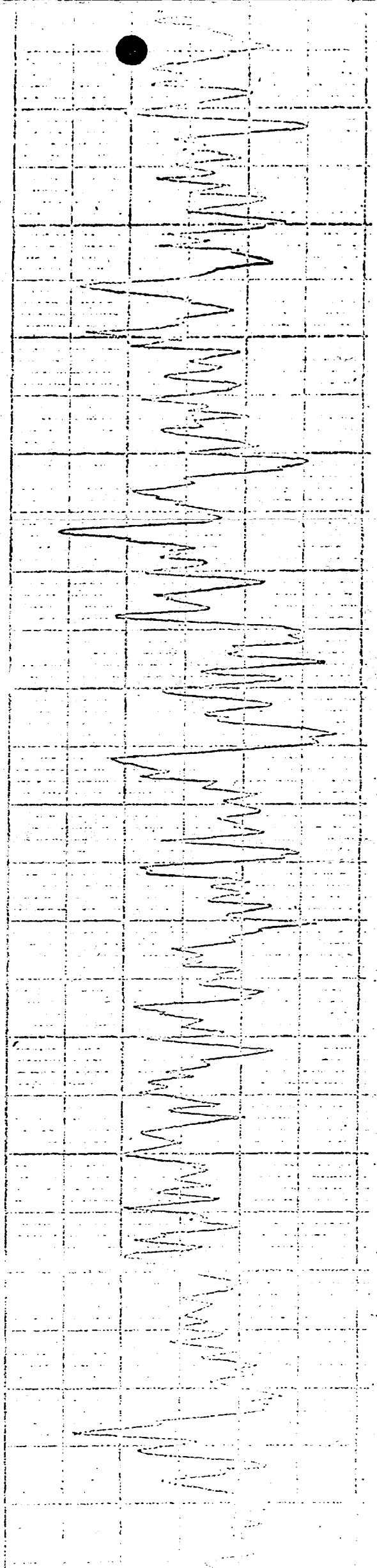
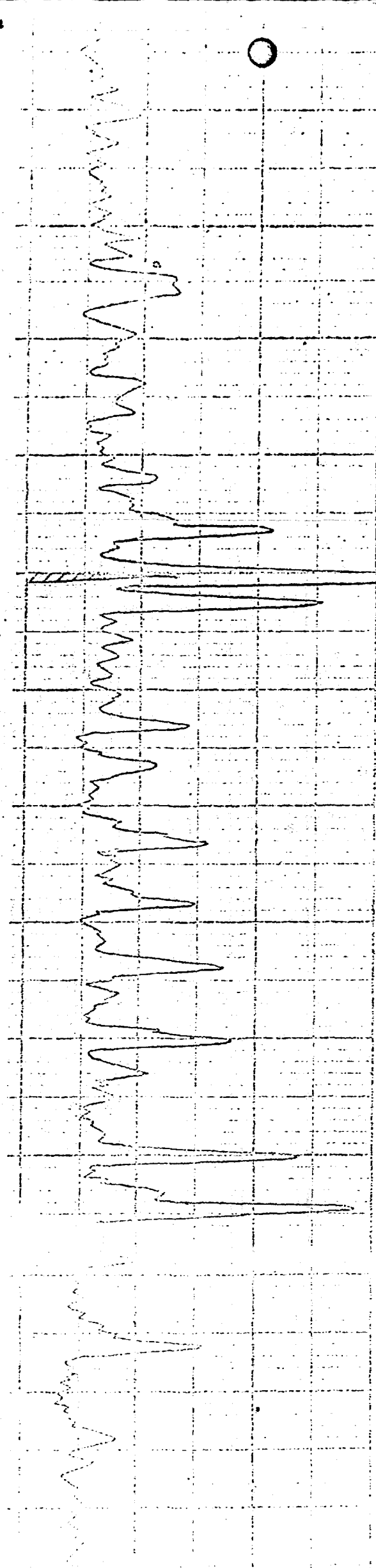
RAJIVAN POLYMER 12.2.80

Top Anhydrite

Top Salt

1637 (+1915)

1698 (+1854)



Base Salt

2700

2762 (+790)

2800

Top Yates Fm

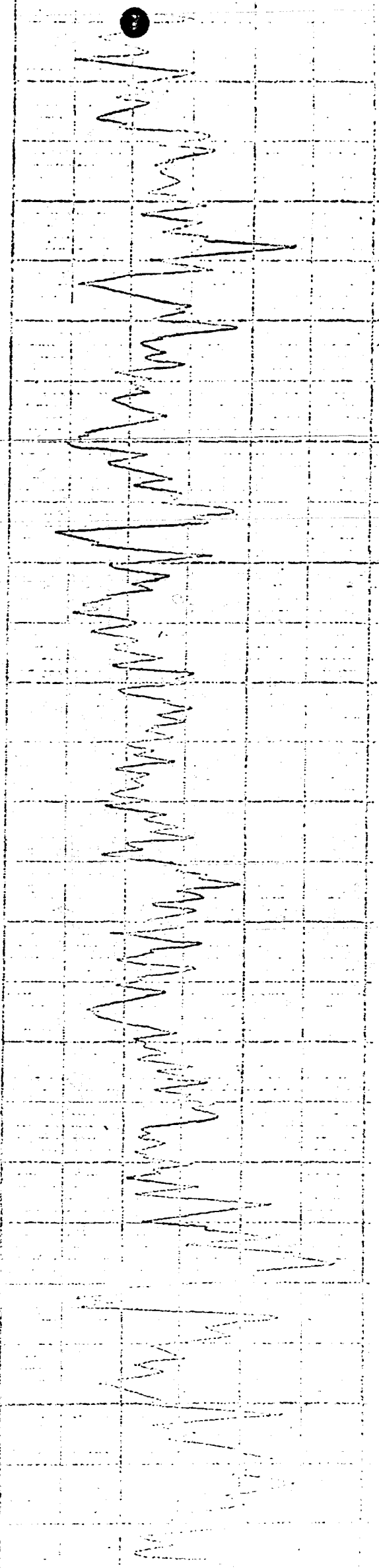
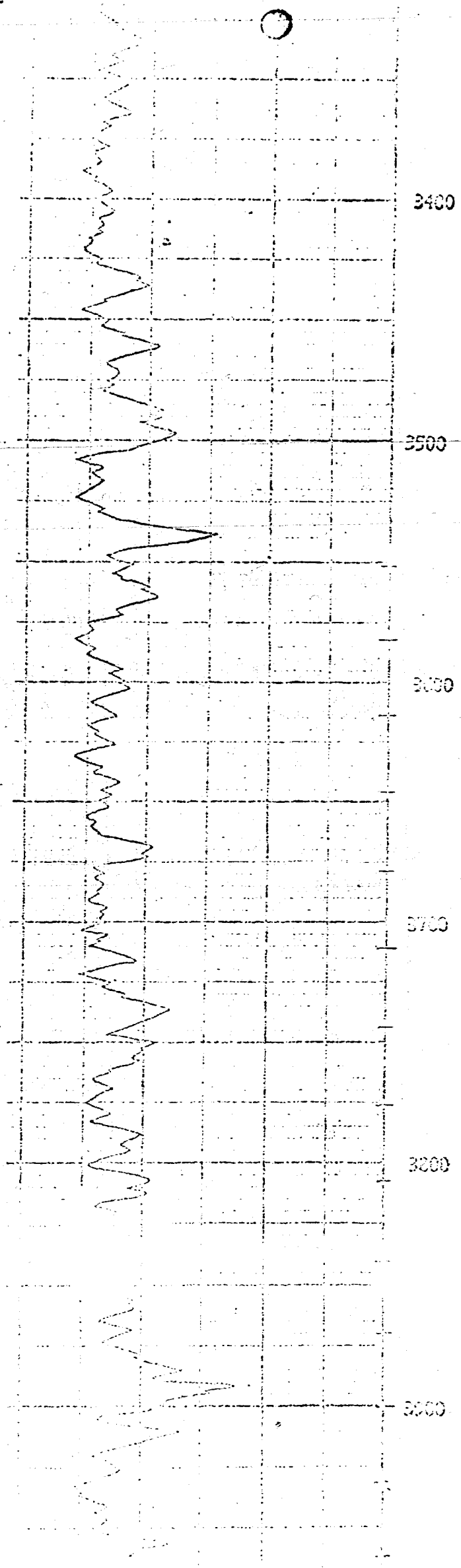
2900

2898 (+654)

3000

3100

3200



Top San Andres Fm.

4322 (-770)

R.D. 4344'

T.D. 4346'

70'

12'

0.5 2"

0.5 3"

R.D. 4344'

T.D. 4346'

PERFOR. INTERVAL

7.3.13.13

O ENROSE, NEVILLE

SOUTHLAND NO. 4

LITTMAN FLD.

ANDREWS CO. TEX.

STATISTICAL AT 1400'

LANE RADIOACTIVITY LOG WELLS

COMPANY

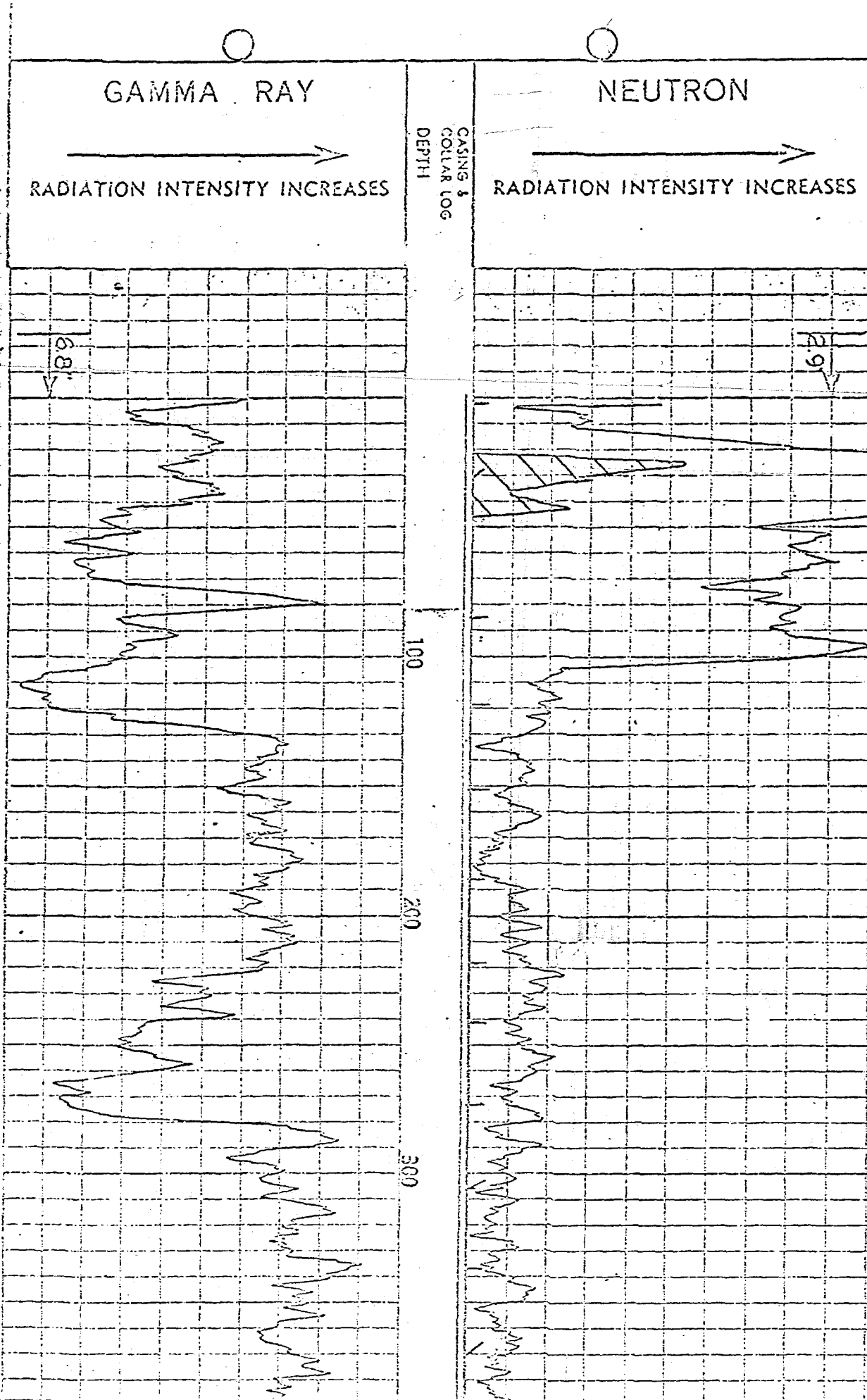
Location of Well 3513' D.F.	COMPANY: N. G. PERROSE ETAL. WELL: SIDS NO. 1 FIELD: LITMAN COUNTY: ANDREWS STATE: TEXAS LOCATION: 140' FN & WL SEC. 14 - BLK. A - 29	FILE NO. COMPANY: N. G. PERROSE ETAL. WELL: SIDS NO. 1 FIELD: LITMAN COUNTY: ANDREWS LOCATION: DEERS STATE: TEXAS
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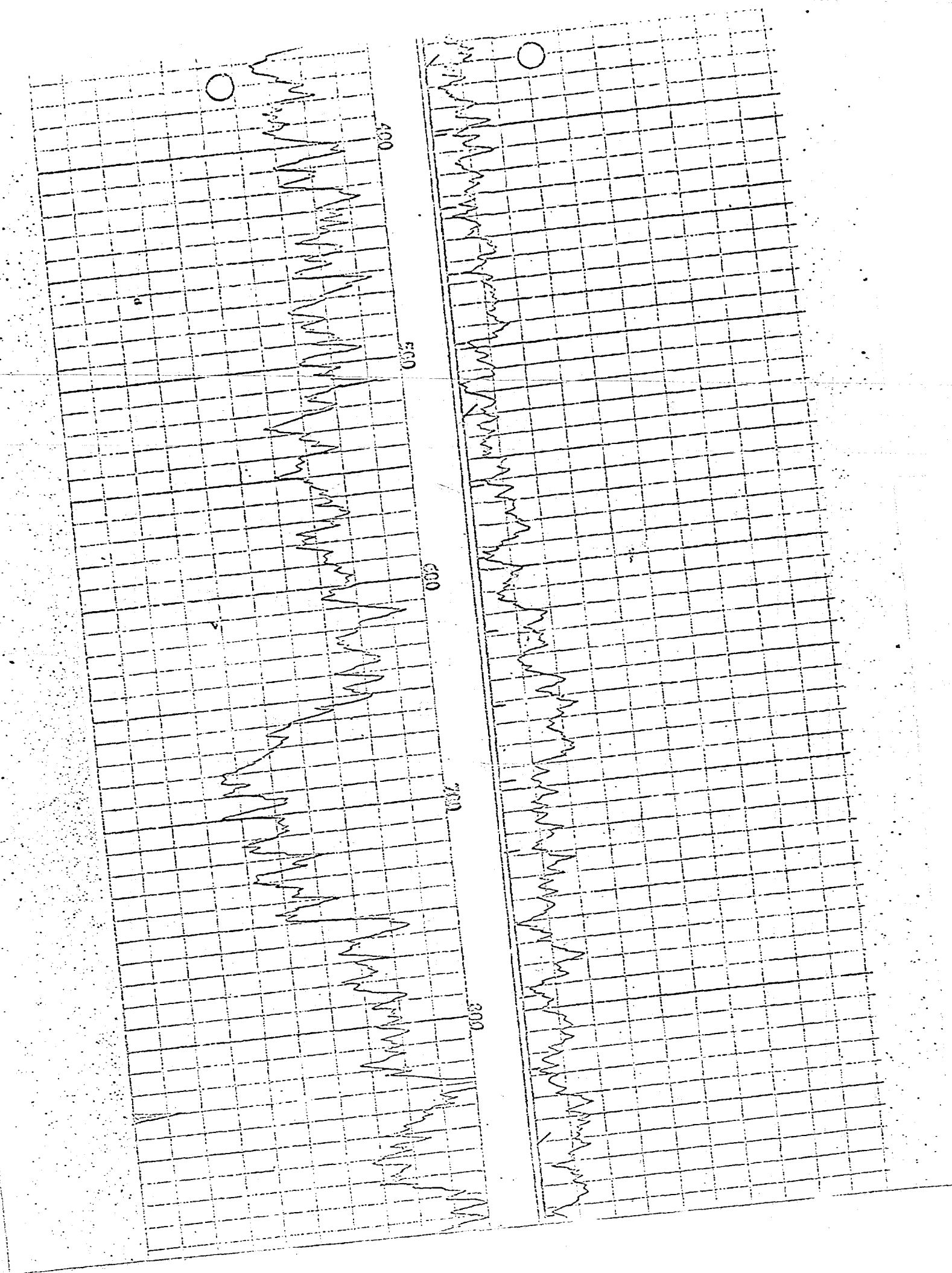
LOG MEAS. FROM	CABLE TOOL FLOOR	ELEV. 3513'
DRLG. MEAS. FROM	CABLE TOOL FLOOR	ELEV. 3513'
PERM. DATUM	7" BRADEN HEAD	ELEV. 3509.5'

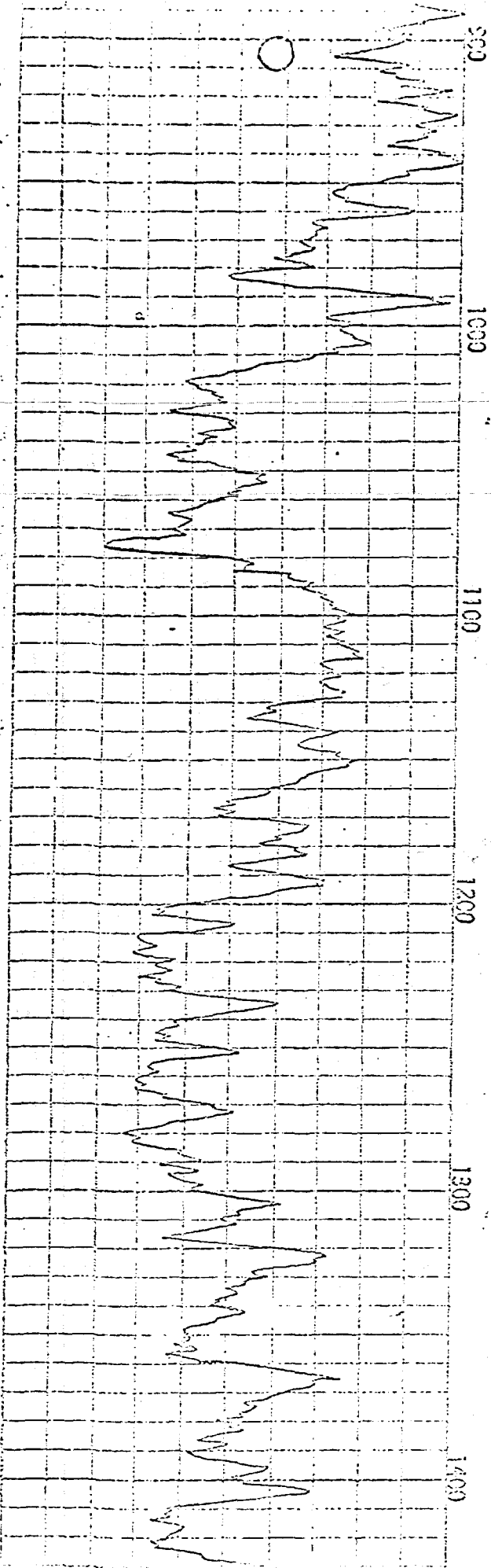
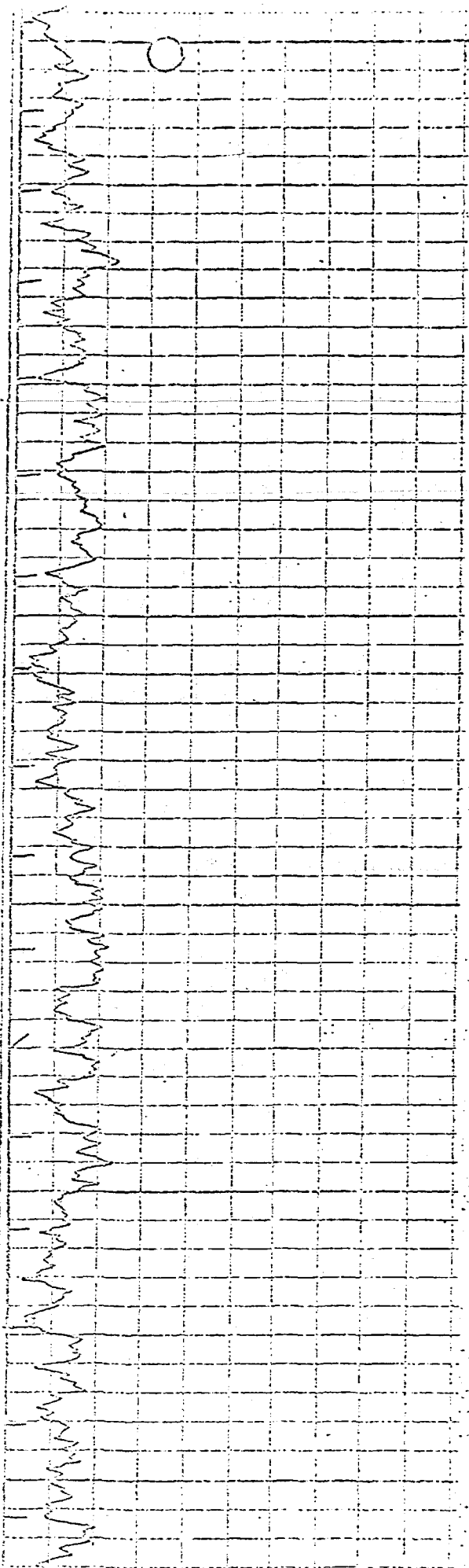
TYPE OF LOG	GAMMA RAY	NEUTRON	
RUN NO.	1 N.W.	1 N.W.	
DATE	4-17-52	4-17-52	
TOTAL DEPTH (DRILLER) WIRE LINE	4350'	4350'	
EFFECTIVE DEPTH (DRILLER)	4350'	4350'	
TOP OF LOGGED INTERVAL	SURFACE	SURFACE	
BOTTOM OF LOGGED INTERVAL	4347'	4347'	
TYPE OF FLUID IN HOLE	OIL	OIL	
FLUID LEVEL	4268'	4268'	
MAXIMUM RECORDED TEMP.		600N	
NEUTRON SOURCE STRENGTH & TYPE		8.25"	
SOURCE SPACING — IN.		9"	
LENGTH OF MEASURING DEVICE — IN.	36"	3 5/8"	
O.D. OF INSTRUMENT — IN.	3 5/8"	2.5	
TIME CONSTANT — SECONDS	4	40	
LOGGING SPEED FT. MIN.	40		
STATISTICAL VARIATION — IN.			
SENSITIVITY REFERENCE	274	275	
RECORDED BY	RUNION	RUNION	
WITNESSED BY	ANDERSON	ANDERSON	

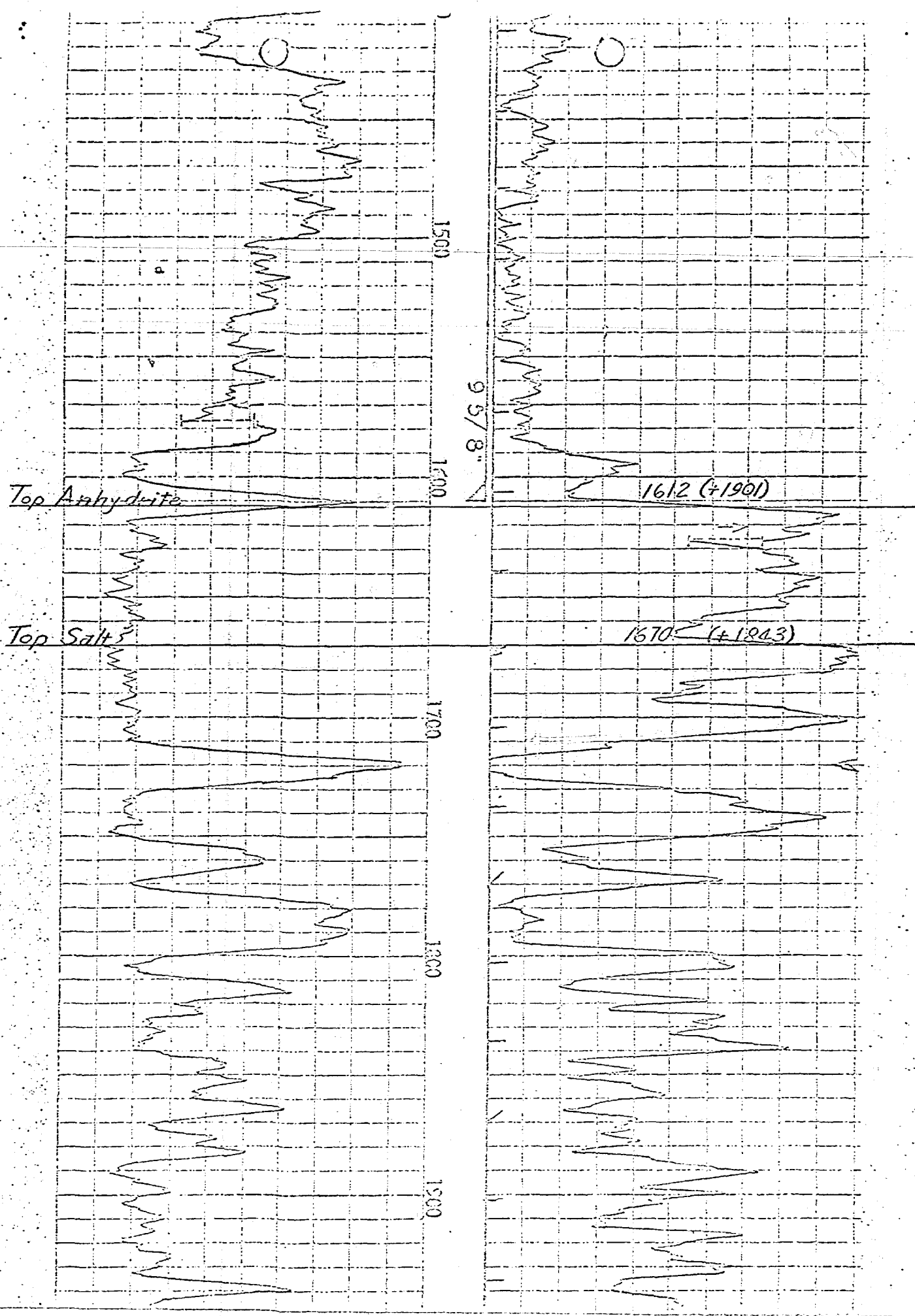
CASING RECORD				INTERVAL	
RUN NO.	BIT SIZE	CASING WT.—LB.	FROM WELL RECORD	FROM R.A. LOG	TO
1	12 1/4"	9 5/8"	SURF. TO 1610'	SURF. TO 1610'	
1	8 3/4"	7"	SURF. TO 4311'	SURF. TO 4310'	
1	8 1/4"		4311' TO 4350'	4310' TO 4349'	
			TO	TO	
			TO	TO	

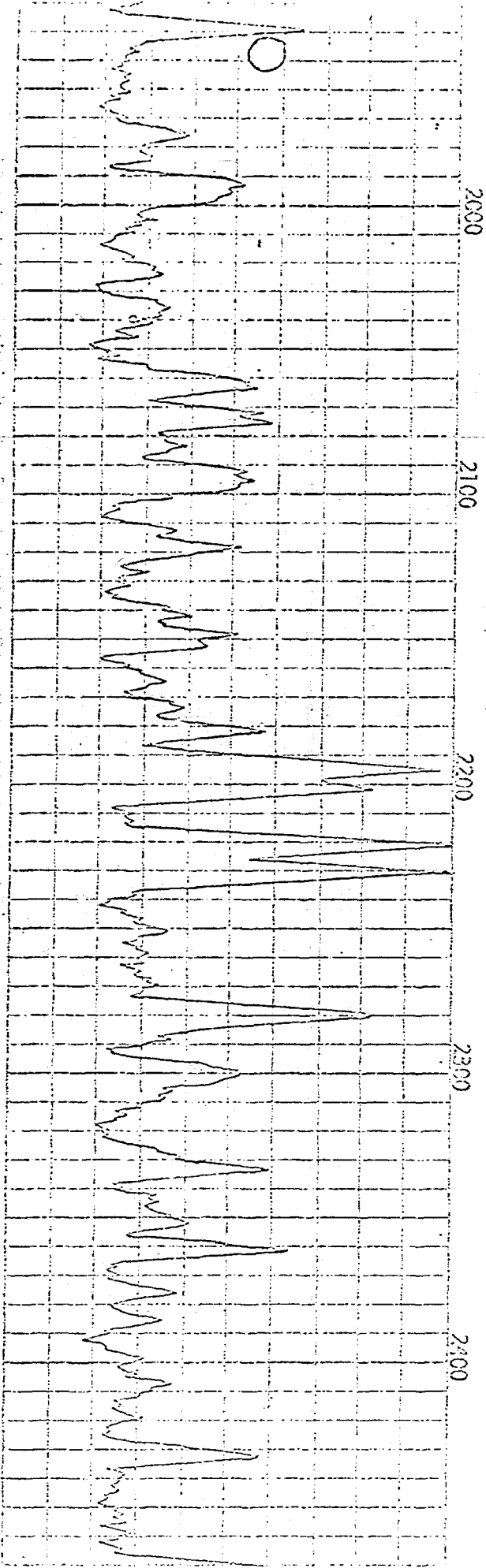
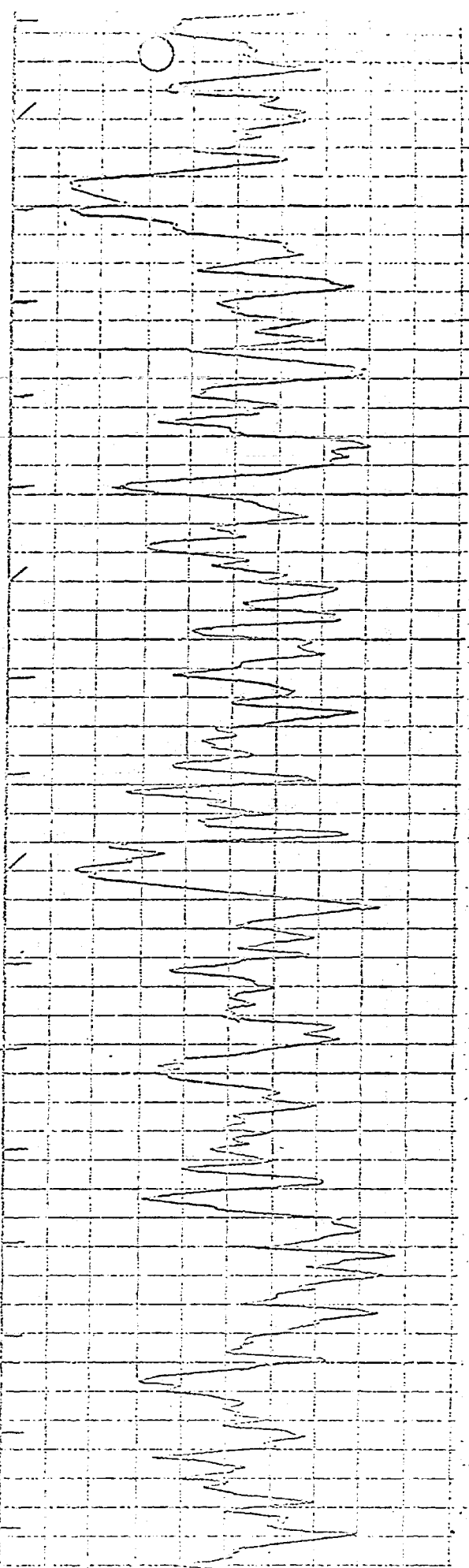
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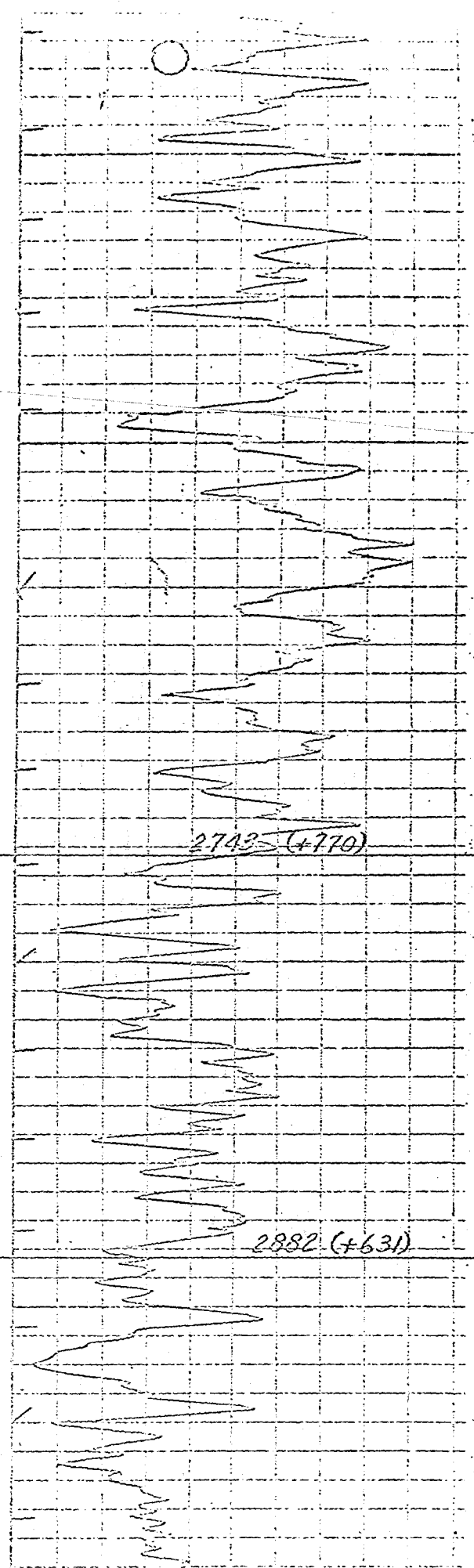
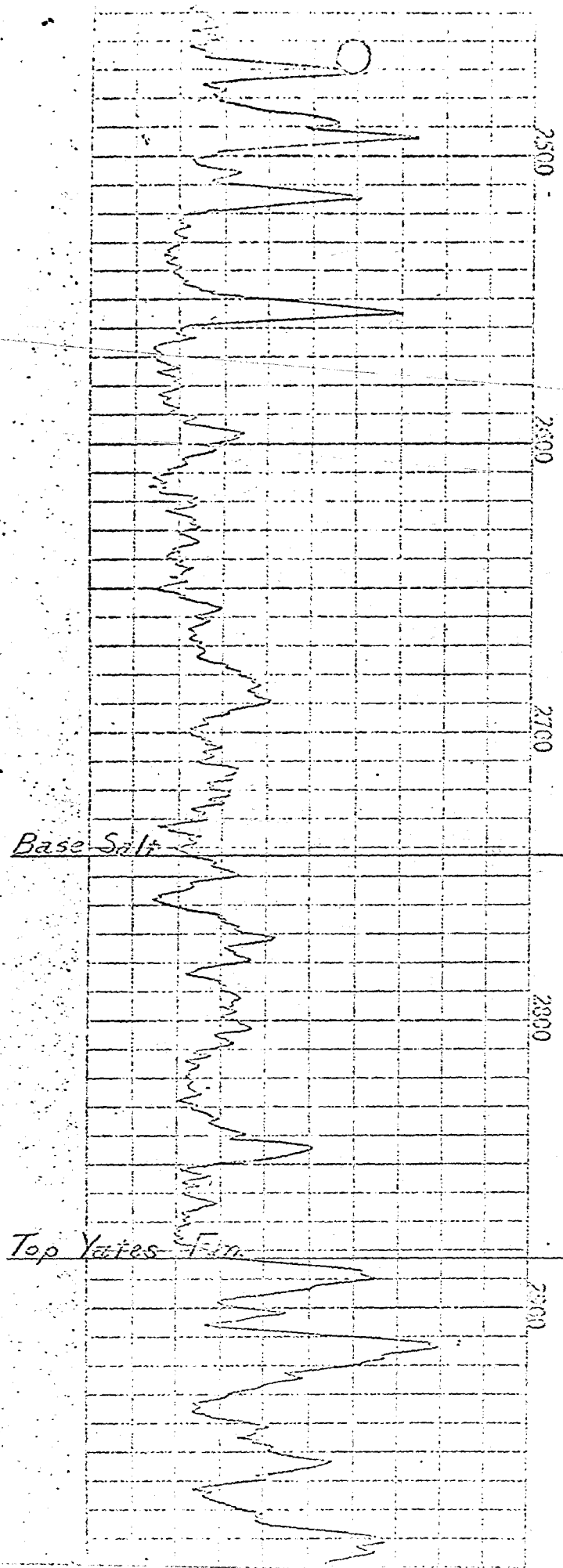


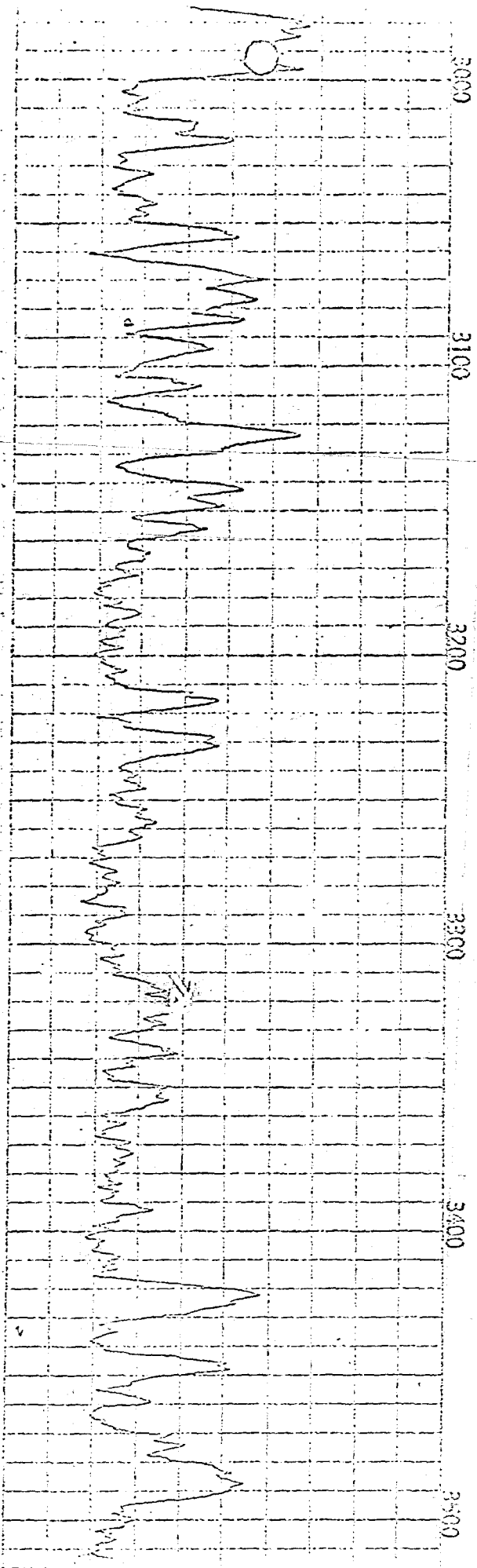
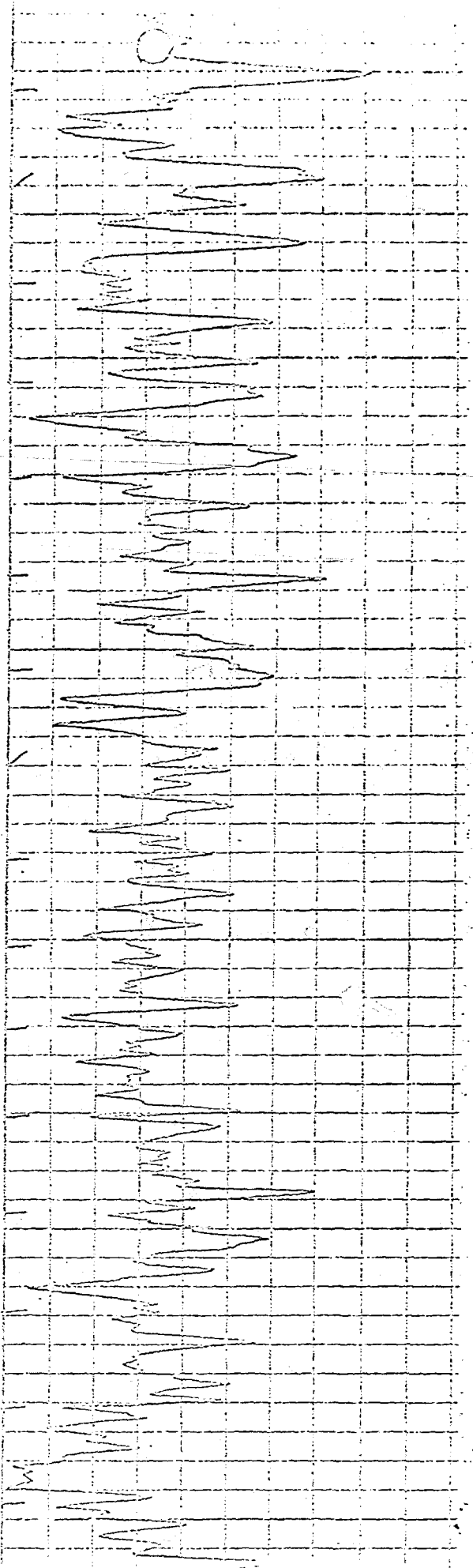


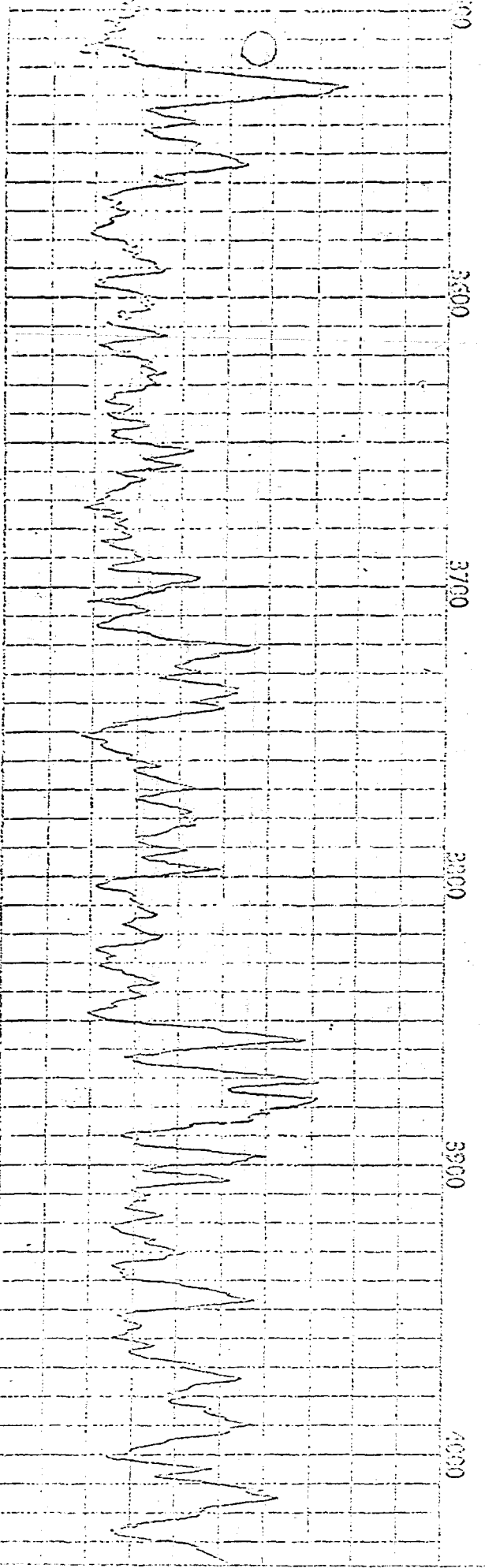
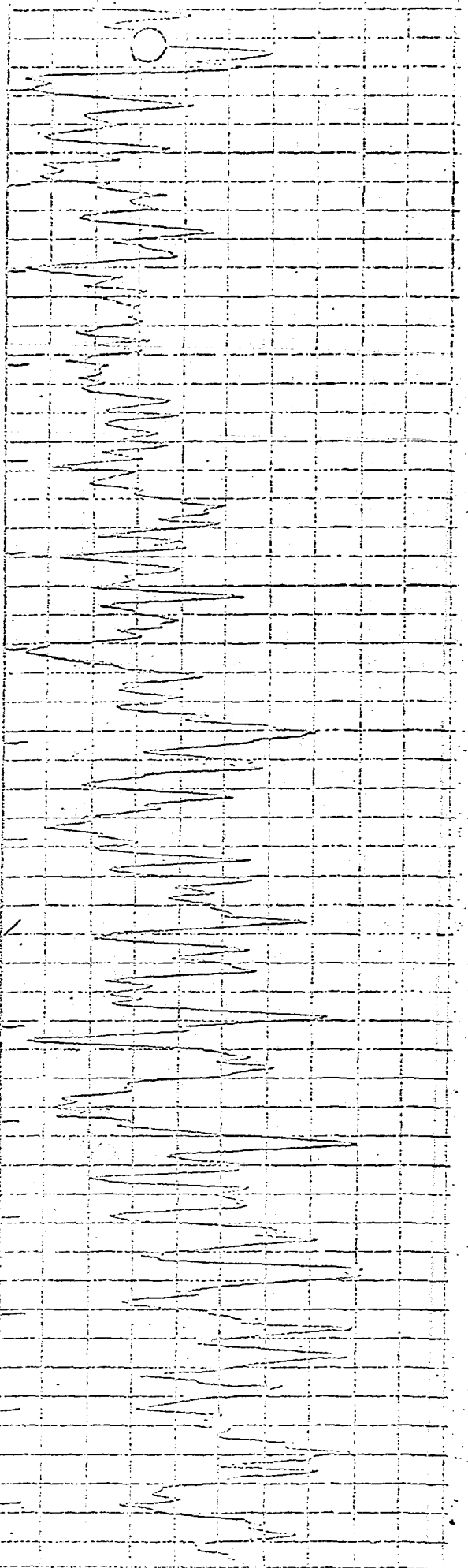












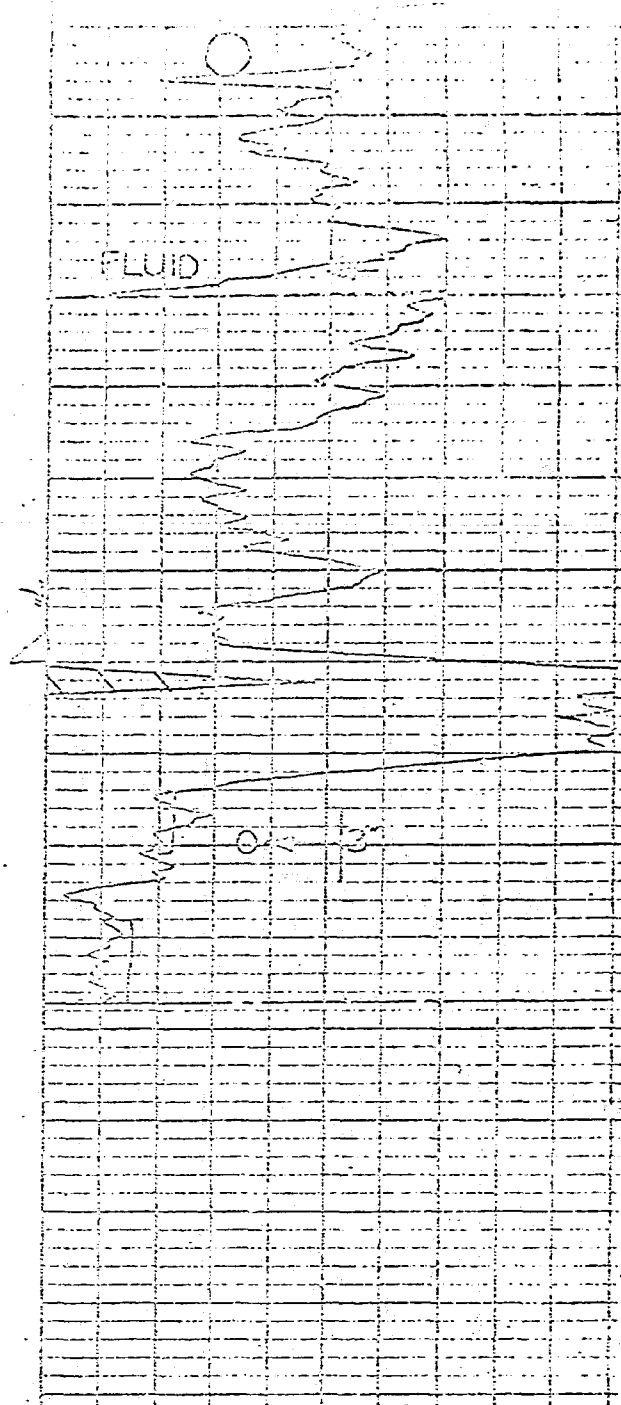
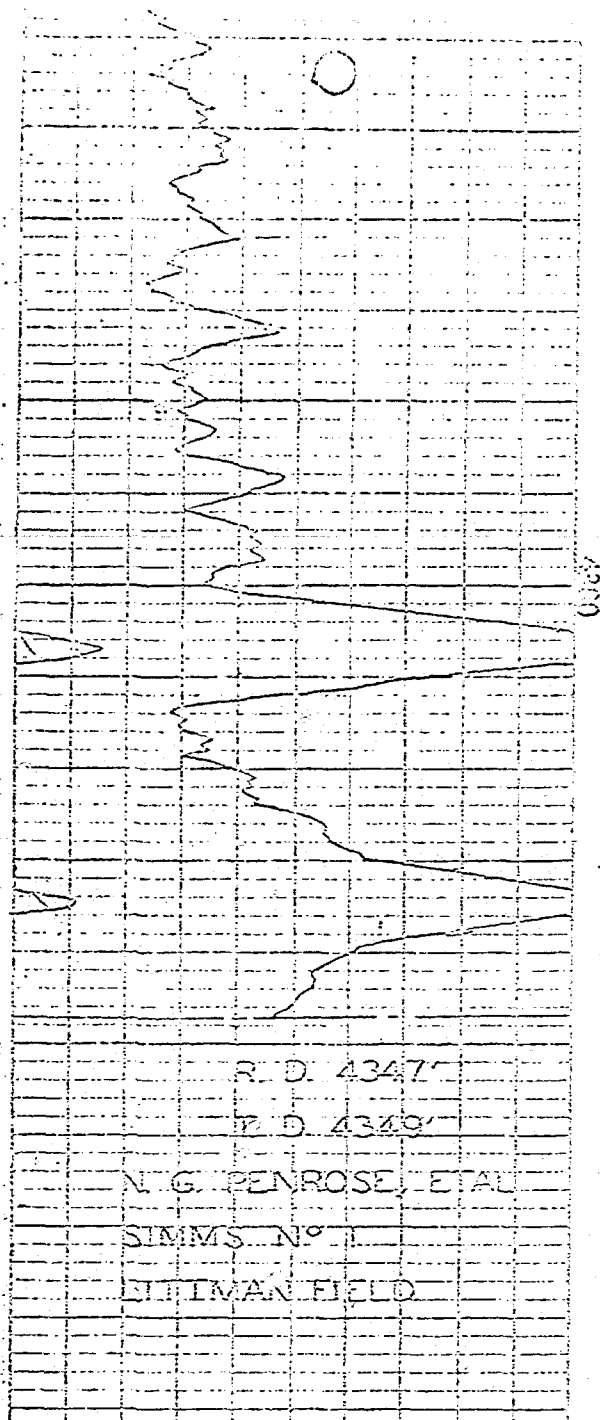
Top San Andres

FLUID

4308 (-795)

68"

29"



BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

May 27, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Sohio Petroleum Company
for a unit agreement, Lea County, New
Mexico. Applicant, in the above-styled
cause, seeks approval of the Littman San
Andres Unit Area comprising 661 acres,
more or less, of State and Federal lands
in Sections 8, 9, 16, and 17, Township
21 South, Range 38 East, Lea County, New
Mexico. The Unit Area also includes 1280
acres of fee land in Sections 5, 6, 7,
14, and 15, Block A-29, PSL, Andrews
County, Texas.

Case No. 3049

and

Case No. 3050

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 328-1182

SANTA FE, N. M.
PHONE 963-3971

ALBUQUERQUE, N. M.
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MR. UTZ: Case 3049.

MR. DURRETT: Application of Sohio Petroleum Company for a unit agreement, Lea County, New Mexico.

MR. COOTER: Paul Cooter of Atwood, Malone, Roswell, appearing for the Applicant. Mr. Utz, for purposes of this hearing and the taking of testimony, we would move the consolidation of Cases 3049 and 3050.

MR. UTZ: 3050 is a waterflood application for the Littman San Andres Unit?

MR. COOTER: Yes, sir.

MR. UTZ: For purposes of testimony, 3049 and 3050 will be consolidated.

MR. COOTER: We have two witnesses, C. L. Ware and R. L. McCormick.

(Witnesses sworn.)

C. L. WARE

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. COOTER:

Q Would you state your name for the record, please?

A My name is C. L. Ware.

Q By whom are you employed, Mr. Ware?

A Sohio Petroleum Company.



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Q In what capacity?

A A staff landman.

Q Are you familiar with Sohio's application in Case 3049 for the approval of the unit agreement?

A I am.

Q What is the purpose of Sohio's application?

A The purpose of the application is to secure approval of the Littman San Andres agreement and Unit Area for the purposes of instigating a secondary recovery project to promote conservation and prevent waste.

(Whereupon, Sohio's Exhibit No. 1 marked for identification.)

Q I'll hand you what has been marked for purposes of identification Exhibit No. 1 and ask you if this is a copy of the unit agreement.

A It is.

Q There was a unit agreement filed with the application. Is this the same unit agreement that was filed with that?

A Yes. There are three minor mechanical corrections that have been made in there. There's three typing errors that were discovered and corrected.

Q For the purposes of the record, would you identify those three corrections? I believe they appear on pages 5, 6, and 18.

A On page 5 under Article 4, the definition reference to 2.15 should have been 2.14 and that has been corrected. 2.15



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I believe defined the unit manager, the unit operator rather than the Unit Area.

MR. PORTER: I find that as you read it in, 2.14.

A In the one we are submitting it is corrected.

MR. PORTER: It is corrected?

A Yes, sir. On page 6 in paragraph B at the top of the page on the second line, the word "immediately" was mis-spelled. It is corrected.

Q (By Mr. Cooter) Page 18 I believe is the third change.

A On page 18 in Article 24, on the second line of 24.1, the word "and" should have been "any" and has been corrected.

MR. COOTER: Mr. Examiner, we would offer Exhibit 1 and ask to withdraw the copies of the unit agreement which were filed with the application.

MR. UTZ: You may do so.

(Whereupon, Sohio's Exhibit No. 2 marked for identification.)

Q I will hand you next what has been marked for purposes of identification Exhibit No. 2 and ask you to identify that exhibit.

A Exhibit No. 2 is a unit operating agreement prepared to cover the operations of the Littman San Andres unit agreement.

(Whereupon, Sohio's Exhibit No. 3 marked for identification.)

MR. UTZ: These three copies that you sent with the



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application are incorrect?

MR. COOTER: Right. I think it would clarify the record if we just withdrew those.

MR. UTZ: All right.

Q (By Mr. Cooter) Was the unit agreement submitted to the office of the Commissioner of Public Lands of the State of New Mexico?

A Yes.

Q I'll hand you what has been marked for purposes of identification as Exhibit No. 3 and ask you to relate what that is.

A It's a letter from the Commissioner of Public Lands dated March 19, 1963, approving the Littman San Andres unit agreement as to form and content, subject to two changes requested by the Commissioner.

Q Were those changes made in the unit agreement which has been marked as Exhibit No. 1?

A Yes.

Q Was the unit agreement submitted to the U.S.G.S.?

A Yes.

(Whereupon, Sohio's Exhibit No. 4 marked for identification.)

Q I will hand you what has been marked for identification as Exhibit 4 and ask you to relate what that is.

A This is a letter from the United States Department of



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the Interior dated August 13th, 1963, approving the Littman San Andres Unit Area and approving the form and content of the unit agreement, subject to changes as requested by the U.S.G.S.

Q Were those changes incorporated into the exhibit that is now Exhibit 1?

A Yes.

(Whereupon, Sohio's Exhibit No. 5 marked for identification.)

Q I hand you what has been marked for purposes of identification as Exhibit No. 5 and ask you to relate what Exhibit 5 is.

A Exhibit 5 is a map to the scale of one inch to 2,000 feet showing the Littman San Andres Unit outlined in hashers, and further outlined in red pencil showing the State land between New Mexico and Texas indicated in red. This map shows the entire Littman San Andres Field, showing the proposed injection wells, the producing wells, and an areal extent of approximately two to two and a half miles around the Littman San Andres Field.

Q Are the wells in that two to two and a half mile area all shown?

A Yes.

Q What percentage of the area involved in the proposed Unit is Federal acreage?

A Twenty-five percent.

Q What percentage is State land owned by the State of New Mexico?



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A 8.75 percent.

Q Does the Federal and State land comprise all of the land within the Unit in the State of New Mexico?

A Yes.

Q What percentage of the proposed Unit is fee land?

A 66.25 percent.

Q Where is the fee land located?

A The fee land is located entirely within the State of Texas.

Q Is all of the land in the State of Texas fee land?

A Yes.

Q Is this exhibit which has been marked as Exhibit No. 5 substantially the same as the index map filed with the application?

A Yes.

(Whereupon, Sohio's Exhibit No. 7 marked for identification.)

Q I hand you what has now been marked for purposes of identification as Exhibit No. 7 and ask you to relate what that is.

A This is a map on a scale one inch to 1,000 feet, again showing the Littman San Andres Unit outlined with a hashered line and indicating in a code, in color code, the percentage of the sign-up of the royalty interest, overriding royalty interest, production payment interest, and so forth, under the heading "Royalty" in each tract within the Unit Area.



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The tracts colored yellow or gold-colored indicate the tracts in which 100 percent of the interest is signed. Incidentally, the 100 percent interest sign-up includes all of the working interest in every tract. The tracts indicated in solid red indicate 90 to 99.99 percent sign-up. The cross-hatched red indicates 80 to 89.99 percent sign-up. You will note on the tract number three it shows 96.2496 percent as committed royalty. There is a 3.7 percent of a two and one-half percent overriding royalty which I did not have in hand. This interest is in the Estate of C. H. Kyte, and we have been advised that the Executor of the Estate has signed the ratification and joinder, and has requested confirmation of his signature from the beneficiaries of the Estate, which we have been assured by the counsel for the Estate will be forthcoming.

MR. COOTER: At this point we will offer Exhibit No. 10 which is a letter from Mr. Bondurant, the lawyer for the C. H. Kyte Estate, dated May 25, 1964.

(Whereupon, Sohio's Exhibit No. 10 marked for identification.)

A With the C. H. Kyte joinder in hand, we will have 100 percent sign-up within the State of New Mexico.

(Whereupon, Sohio's Exhibit No. 8 marked for identification.)

Q I hand you now what has been marked for purposes of identification as Exhibit No. 8 and ask you to briefly relate what that shows.



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A Exhibit 8 is an ownership schedule of the entire ownership by tracts in the entire Littman San Andres Unit, showing the tract number, the lease name and description, the number of acres, the number of wells, the lease numbers where applicable, the basic royalty and amount, royalty owners and amount, overriding royalty owners and amount, production payment owners and amounts, working interest owners and amounts, on a tract basis; and then the respective owner's unit participation within that tract; also shows the tract participation of the tract.

(Whereupon, Sohio's Exhibit No. 9 marked for identification.)

Q In connection with that, I'll hand you what has been marked as Exhibit No. 9 and ask you to relate what that exhibit shows.

A Exhibit No. 9 is a summation of the unit participation parameter factors, showing the tract numbers, the lease names, the number of wells, the percentage of wells; a summation of the various parameters within each tract going to make up the total tract participation of the tract.

Q And you have stated that the unit agreement has been executed by all owners of the operating rights?

A That is right.

Q And in the State of New Mexico by all owners of any overriding royalty interest with the exception of the C. H. Kyte Estate?

A Right. We have everyone in hand except the Kyte



ratification.

Q Do you have the ratification and joinders to the unit agreement by the owners of the working interest and the royalty, overriding royalty?

A Yes, I have an original plat of ratification with a set of two Xerox copies of the ratification which I have in hand.

MR. COOTER: We would offer these if the Commission would like to have them.

MR. UTZ: I don't believe it's necessary.

MR. COOTER: Fine.

Q (By Mr. Cooter) This Unit comprises land both within the State of New Mexico and within the State of Texas. Have you had a hearing on this Unit before the Texas Railroad Commission?

A Yes, the hearing was held on May 20th at 2:00 P.M. before the Railroad Commission.

Q Were there any objections presented to the Railroad Commission of Texas by the owners or adjoining owners at that time?

A There were no protests and no objections.

Q Under the terms of the unit agreement, will there be any commingling of the production across the State line?

A No.

Q In your opinion, would this Unit promote the best economic recovery and prevent waste of the oil?

A Yes.



Q Are there provisions in the unit agreement for subsequent enlargement of it?

A Yes.

Q How about subsequent joinder?

A Subsequent joinder is provided for.

Q Were Exhibits 5, 7, 8, and 9 which have been offered prepared by you or under your direction?

A Yes, sir.

Q Do you have anything else to add to your testimony?

A I would think not.

MR. COOTER: That concludes this phase of the testimony.

MR. UTZ: You are offering at this time Exhibits 5, 7, 8, and 9?

MR. COOTER: We will offer all of the exhibits, Mr. Utz, and some additional ones.

MR. UTZ: All right. Any questions of the witness?
The witness may be excused.

(Witness excused.)

(Whereupon, Sohio's Exhibits No. 16 marked for identification.)

ROBERT L. MCCORMICK

called as a witness, having been first duly sworn, was examined and testified as follows:



DIRECT EXAMINATION

BY MR. COOTER:

Q Would you state your name for the record, please?

A Robert L. McCormick.

Q By whom are you employed, Mr. McCormick?

A Sohio Petroleum Company.

Q In what capacity are you employed?

A Petroleum engineer.

Q You have previously testified before the New Mexico Oil Conservation Commission?

A I have not.

Q Are you a college graduate?

A Yes, sir.

Q From which college?

A Pennsylvania State University.

Q What degree did you obtain?

A Bachelor of Science degree in Petroleum Natural Gas Engineering.

Q Would you please relate briefly your experience that you've had since your college graduation?

A I graduated in 1938, was employed by Plymouth Oil Company from 1938 to 1944 doing field grade work in geology; then by the Pennsylvania State University from 1944 to '45 doing graduate work and from 1945 to date with Sohio Petroleum Company. That entire

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time has been in the capacity of a petroleum engineer.

MR. COOTER: Are his qualifications acceptable, Mr. Utz?

MR. UTZ: Yes, sir, they are.

Q I'll hand you what has been marked for purposes of identification as Exhibit No. 6 and ask you to relate what that exhibit discloses.

A Exhibit No. 6 is a structure map drawn on top of the San Andres formation. All wells on the map are San Andres completions excepting only three, and those wells have symbols by them showing W.S.W., which symbol means Water Supply Well. They are shallower completions from the Santa Rosa. One of these wells is located in Section 8 on the New Mexico side, one of them is located in Section 6 on the Texas side, and the third one in Section 7 on the Texas side.

Q Does the proposed Unit include all lands expected to be or possibly productive?

A Yes, it does.

Q Would you briefly describe the geology and the reservoir characteristics?

A The Sohio acquired their interest in this field through our position so we did not do the original drilling. The original drilling from the records is shown to have been done by combination use where they used rotary to the top of the San Andres, set their production string of casing and cable tooled in. So there



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are no cores, and such knowledge we have of the San Andres formation is derived entirely from sample analysis by geologists at that time.

Q Could you go ahead further and explain generally a little about the geology of it?

A The structure is an elongated east-west anticlinal structure. Drilling encountered water along the south side of the field at the subsea depth of minus 820. We have reason to believe that the formation in this field is susceptible to waterflood through a single pilot injection test. It was made on the northernmost well shown on the map, tract 11, Southland No. 4.

This pilot test was done by the former operator of these properties and in it they were able to inject up to about 600 barrels a day at a pressure of about 1200 pounds, 1280 pounds.

From the performance, it is a solution gas drive pressure depletion type reservoir. There's no gascap and there's no water drive.

(Whereupon, Sohio's Exhibit No. 11 marked for identification.)

Q I hand you what has now been marked as Exhibit No. 11 and ask you what tabulation that exhibit shows. Perhaps in conjunction with it you would also like to have Exhibits 12, 13 and 14.

(Whereupon, Sohio's Exhibits Nos. 12, 13 and 14 marked for identification.)



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A Exhibit No. 11 is a tabulation by month of the entire productive history of the San Andres Field and it has been subdivided into the New Mexico subdivision and the Texas subdivision and then a total. The first production from the field having occurred in June, 1951, Exhibits 12, 13 and 14 are graphic presentations of this tabular data, again subdivided between New Mexico subdivision and the Texas subdivision and the pool total.

Q Do any of the exhibits reflect the remaining primary production contemplated under this?

A The exhibits identify the declining rate of production; the average rate of production on a per well basis is slightly less than five barrels a day at the present time, so that this reservoir is in an advanced stage of primary depletion. There are approximately 200,000 barrels of remaining primary reserve, about 50,000 of these barrels to be recovered on the New Mexico subdivision and about 150,000 on the Texas subdivision.

Q Have you been able to form an opinion as to the probable additional recovery through the use of a waterflood project?

A It is our estimate that the additional oil to be recovered from secondary recovery by water injection will be as much as one and three-quarter million barrels.

Q If this waterflood project is approved, from where will the water be obtained?

A From the Santa Rosa formation, which in this area is



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at a depth of approximately 1200 feet.

Q What type of water is this?

A It's a brackish water, slightly brackish.

Q Water will be injected into which formation?

A The San Andres formation.

Q At what depth?

A 4300 feet.

Q At what rate?

A We anticipate injection rates of 800 barrels per injection well with injection pressures up to 2,000 pounds. We will design our system for that maximum pressure.

Q What is the depth of the Santa Rosa water bed in this area?

A About 1200 feet.

(Whereupon, Sohio's Exhibit No. 15 marked for identification.)

Q I hand you what has now been marked as Exhibit No. 15 and ask you to relate what that is.

A Exhibit No. 15 is a gamma ray neutron log of Southland No. 4, which is one of the wells proposed for injection service on the Texas side. It is the northernmost well shown on the map. It identifies the top of the San Andres formation in this well at a depth of 4322 feet, which is a subsea depth of minus 770.

(Whereupon, Sohio's Exhibit No. 16 marked for identification.)



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Q I hand you what has been marked for purposes of identification as Exhibit No. 16 and ask you to relate what that exhibit is.

A This exhibit is again a gamma ray neutron log of Sims No. 1 Well which is the most southeasterly well on the map, again on the Texas side. The San Andres formation in that well is shown to be at 4,308 feet with a subsea datum of minus 795 feet.

Q Are there any other logs, to your knowledge, of any of the injection wells?

A There are none to my knowledge. These are presented as exhibits and represent the only logs available on proposed injection wells.

(Whereupon, Sohio's Exhibit No. 17 marked for identification.)

Q I hand you what has now been marked as Exhibit No. 17 and ask you what that exhibit shows.

A Since logs aren't available, we've constructed a schematic diagram of the well bore to show for each of the proposed injection wells the surface string of pipe, its size, setting depth, and number of sacks used to cement it, the setting depth of the production string, and then the total depth of the well.

All wells are completed through open hole, and such data as we have available to us indicates that essentially every well, the surface casing had cement circulated back to surface and that the setting depth was in the range of 1600 feet, which is



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well below the Santa Rosa water formation and therefore the Santa Rosa is protected by surface pipe and by circulated cement.

Q Assuming that permission is given both by the Texas Railroad Commission and by the New Mexico Oil Conservation Commission, where will the first operation under the waterflood project commence?

A Our plan of operation calls for initiating the project on the Texas subdivision. We have made application and had a hearing requesting wells shown on Exhibit 5 for injection wells, and if that request is granted we will select a five-spot which would mean we would convert four wells to injection and produce the center well as our initial development.

Q On the proposed injection wells in the State of New Mexico, have definite plans yet been made for the conversion of the wells to injection wells?

A Not in specific detail, no, sir.

Q Were Exhibits 11, 12, 13, 14, and 17 either prepared by you or under your direction?

A Yes, sir.

MR. COOTER: At this time, Mr. Examiner, we would offer all exhibits, being numbered 1 through 17.

MR. UTZ: Without objection Exhibits 1 through 17 will be entered into the record of these two cases.

(Whereupon, Sohio's Exhibits Nos. 1 through 17 received in evidence.)



Q (By Mr. Cooter) Do you have anything further to add to your testimony?

A I believe not.

CROSS EXAMINATION

BY MR. UTZ:

Q On your Exhibit No. 17, Mr. McCormick, which is a schematic of your injection wells in Lea County, I notice on your Wylie No. 1 that there was only 150 sacks used on the 8-5/8ths, which is approximately the same length as those in which 450 and 250 sacks were used on other wells. Do you think that's enough cement to circulate on that 8-5/8ths?

A Cement fill-up in absence of an variants in the cement are about 800 feet, I mean eight feet per sack, so this would be approximately 1200 feet, and I think that the evidence that we have been able to gather, that while maybe this record shows 150 sacks, it appears that they did circulate and we are wondering whether or not we have a complete enough record of all the detail to know that they didn't circulate. I think they did.

Q It is your opinion on all of the surface casing that all the cement is circulated?

A Yes, that's my opinion. We went back to the cementing companies and asked for the data from them, and we did get response from most of them. Unfortunately, on the New Mexico side is where we were least able to get cementing records. I

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would wonder as we go on to the Wylie No. 3, they report 600 sacks; well, that's far in excess of the need for fill-up. That would be page 3, the third page.

Q Yes.

A 600 sacks is much too much. They would have cement all over the surface, all over the ground.

Q Might be enough to cement a driveway, too, wouldn't it?

A Yes, sir.

Q How about the production strings? Do you have any data as to the top of the cement on those?

A No temperature surveys, no data other than some theoretical fill-up calculations we could derive from cementing records.

Q How old are these wells?

A Our first development was 1951 and the development was complete by 1954.

Q Do you have any idea as to how you are going to complete these wells for injection?

A We have some tentative proposals for this initial area in Texas. First off, we probably will develop even a few wells down to this water table of minus 820, this for investigative purposes to see that we have the entire reservoir exposed, and then we very well will set a liner in that and complete through perforations and tubing will be run on a packer.

Q And inject under a packer?



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A Under a packer, yes, sir.

Q With inert fluid in the annulus?

A Yes.

Q You are at this time requesting that these four wells in New Mexico on Exhibit 17 be approved as injection wells?

A Yes, we respectfully request that if this project is approved, the Commission provide for administrative approval of the conversion of the injection wells in accordance with Rule 701.

MR. UTZ: Are there other questions of the witness?

MR. PORTER: I was wondering if you were going to get into any discussion of the allowable.

MR. UTZ: He wants it under Rule 701.

MR. PORTER: It is to be operated under the rules of 701?

A That is our request, yes, sir.

MR. PORTER: Okay. That's all I have.

MR. UTZ: Mr. Irby.

BY MR. IRBY:

Q I notice some of these wells in Texas have very small amounts of cement used, and actually Texas isn't my concern unless something gets loose and migrates across the line; let them worry about their problem.

MR. PORTER: We're kind of hoping the oil will get



loose and migrate across.

MR. IRBY: I hope so, too, but I hope this injection water doesn't.

Q (By Mr. Irby) I would like for you to tell me just what you know about this very limited amount of cement used in the wells just across the imaginary line.

A Well, one of them that you might be referring to is the Littman "B" Well No. 1 and in it they set 160 feet of 13-3/8ths and cemented it with 150 sacks. That was followed by 8-5/8ths set at 1630 and with a reported 40 sacks of cement on it. I can't say much more about it, except this is the data that we have to work with now, and hope that it does do the job of protecting us. If it doesn't, we're going to have to work with it some more.

Q What about the Littman A-4?

A Littman A-4 is where there is no cement reported.

Q Yes.

A We just haven't found a record of it at all. Halliburton didn't do the job, it isn't on their records. Maybe we can find out who did it and get from the cementing company the cement that was used.

Q Where would you estimate the top of the 300 sacks used on the 7-inch casing?

A 300 sacks on 7-inch, let's just for easy arithmetic say about 10 feet per sack which would be about 3,000 feet above



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4300, which would be roughly 1300 feet from the surface.

Q I know this is hard for you. Do you have any reason to believe there's any cement at all around this surface string, this 8-5/8ths?

A Oh, yes. I think it's just we don't have the record. Yes, sir, I think it's there.

Q Do you have any notion that it might be circulated or that it would be protecting the Santa Rosa formation?

A This well was drilled by the same operator who did a lot of their drilling. In all cases, he circulated cement, that we have been able to tell, and in absence of a specific record for this well, I am assuming that he performed a cement job on this well similar to all the rest. That's as much evidence as I have now.

Q Now most of these wells, the surface casing is set at approximately 1600 in all of these. Does this completely penetrate the Santa Rosa and go into a lower formation for setting?

A Yes, the bottom of the Santa Rosa is approximately 1400 feet, so we have it at least 200 feet below it.

Q I notice that on nearly all of the wells -- not all, but nearly all, you have 2-inch production tubing in there. Is it your intention to inject water through tubing?

A Yes, sir.

Q Will there be a packer on here?



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A Packer, yes, sir.

Q And this packer, will it be set below the top of the cement on the production string?

A Yes, sir. It will be set nearer the bottom of the pipe and if we run liners, we'll have to lap them over and the packer will be set above liner depth, or maybe into the liner.

Q Good. Now you gave some testimony with regard to your Exhibit 5, which is the San Andres structural map, I believe.

A Yes, sir.

Q I didn't get down all of the information. My shorthand is a little bit slow. You made some remarks about the water, I believe it was on the south side of the field?

A Yes, sir.

Q Then you remarked about whether this was a water or gas drive, and I didn't get that. Would you repeat it for me, please?

A We have evidence of an oil-water contact at minus 820 feet, and this evidence arises from the deepest well drilled, which is along the south side of the field. Then I intended by talking about performance, that there is no gas cap, that this is a solution gas drive reservoir and there's no evidence of water drive. There seems to be, all the evidence points to a porosity and permeability pinchout of the San Andres around this field, and it is ringed by dry holes or -- there are a couple of wells that were



completed, production attempted in the San Andres. They recovered as much as 2,000 barrels and they were temporarily abandoned. They were very uneconomical.

Q You said this pilot test was injected under 1280 psi?
A Yes, sir.

Q What did you say that volume was in barrels per day?
A They injected about 580 barrels a day. This test was

of relatively short duration, about two weeks, and they kept varying the rates and conditions and --

Q You feel that this is indicative of what you can expect?

A Yes, sir. Furthermore, the well that was used for the injection is a flank well and we knew from its primary performance that the reservoir is getting tight, we're toward the edge of the reservoir, and we reduced it. If we could inject at effective rates into this edge well, we will be able to inject higher volumes and lesser pressures as we get to the better part of the reservoir.

MR. IRBY: Thank you, Mr. McCormick.

MR. UTZ: Any other questions of the witness? Mr. Durrett.

BY MR. DURRETT:

Q What allowable did Sohio request in Texas?

A We did not request an allowable in Texas.

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Q What's the usual procedure there? Will they assign you an allowable that's similar to 701 allowables under water-flood projects?

A The usual occurrence in Texas with respect to allowable is we will be granted an allowable for the producing well and this can be worked up as performance shows an improved oil production rate through flood up to their Mer or their allowable and we will be granted in addition to the basic Mer allowable a transfer from the injection well.

Now this is not a full Mer. This is a test rate of production now, which would mean we would get something in the order of five barrels a day and a proportionate share of that for each of the four injection wells.

Q Well, then, do you think it would be feasible that the allowable in Texas would be higher or lower than the allowable in New Mexico, or proportionately similar, or what do you feel?

A It will be closely similar, and let's go at it this way. The Mer for the field as set by the Texas Railroad Commission is 81 barrels. They're down to 26 percent, but let's use 30 percent as their proration factor, that would make 24 barrels. Now we will be permitted to transfer from the injection well on the current rate of production basis. These wells, we'll say, average five barrels and we'll get a proportionate share of that. We'll probably get a quarter of the summation of the four wells. The



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summation might be 20, the summation is back to five, and that added gives 29 barrels so I anticipate that we'll be slightly under in Texas what we would expect to be normal allowable in New Mexico.

MR. DURRETT: Thank you.

MR. UTZ: Any other questions?

MR. IRBY: I would like to ask one more, if I may.

BY MR. IRBY:

Q I got the impression from some of your answers that you intend to continue in your efforts to get additional information with regard to the cementing of the casing in these wells, is this correct?

A Yes, sir.

Q Would you furnish me this information if you are fortunate enough to obtain it?

A We'll be very happy to, yes, sir.

MR. UTZ: Any other questions?

MR. COOTER: May I state to the Examiner that we would appreciate early consideration of this unit agreement and water-flood project, as under the terms of the unit agreement operation by July 1st is necessary in submitting it to the Commission and U.S.G.S., and reassure them that conversion with the injection wells in New Mexico will be by petition for administrative approval under Rule 701.



MR. DURRETT: I'm not sure I understand you. Do you want approval, are you seeking approval now of certain injection wells, or are you going to seek all of the injection wells by administrative approval?

MR. COOTER: I think under Rule 701, and I might be wrong, all that can be asked for now is the approval of the waterflood project and the proposed injection wells. Before the injection wells may be converted, we must comply with the porosity information, et cetera, and submit this for administrative approval of the actual conversion. I am incorrect?

MR. UTZ: The injection wells will be approved by this hearing right here. It is my understanding that you requested permission to have these four approved.

MR. DURRETT: You want the four approved, and then any additional could come through administrative approval?

MR. COOTER: Right.

MR. UTZ: If no further questions, the witness may be excused.

(Witness excused.)

MR. UTZ: Any other statements in this case? The case will be taken under advisement.

* * *

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STATE OF NEW MEXICO)
) ss
 COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 10th day of June, 1964.

Ada Dearnley
 NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner Hearing of Case No. 3049050 heard by me on May 27, 1964.
Shirley G. Jeff, Examiner
 New Mexico Oil Conservation Commission

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DRAFT
JMD/esr

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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3050

Order No. R- 272

**APPLICATION OF SOHIO PETROLEUM
COMPANY FOR A WATERFLOOD PROJ-
ECT, LEA COUNTY, NEW MEXICO.**

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ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 27, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz. ~~Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.~~

NOW, on this _____ day of June, 1964, the Commission,
a quorum being present, having considered the ~~application, the~~ testimony,
the record, ~~evidence adduced~~ and the recommendations of the Examiner,
~~-----~~ and being fully advised in the premises,

FINDS:

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

- (2) That the Littman-San Andres Unit Agreement has been approved by the Commission by Order No. R-2000; that the Littman-San Andres Unit Area comprises 661 acres, more or less, of State and Federal lands in Sections 8, 9, 16, and 17, Township 21 South, Range 38 East, NMPM, Lea County, New Mexico, as more fully described in said order.

- (3) That the applicant, Sohio Petroleum Company, seeks permission to institute a waterflood project in the Littman-San Andres

Pool by the injection of water into the San Andres formation through
four wells located within said ~~unit area~~ ^{unit subdivision}, that said project is to

four wells located within said unit area; ^{Unit Subdivision, Tract} Said project is to be operated in conjunction with applicant's proposed waterflood project in the Texas Subdivision of the Kitzmann San Andres Unit Area in Andrews Count, Texas.

(4) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the subject application should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sohio Petroleum Company, is hereby authorized to institute a waterflood project in the Littman-San Andres Pool by the injection of water into the San Andres formation through the following-described four wells in Township 21 South, Range 38 East, NMPM, Lea County, New Mexico:

- (a) Elliott Inc. Parcell well No 2 located ~~990~~ 990 feet from the South line and 330 feet from the East line of Section 8.
- (b) Elliott Inc. Wylie well No 1 located ~~950~~ 950 feet from the South line and 350 feet from the East line of Section 9.
- (c) Elliott Inc. Wylie well No 3 located 1650 feet from the South line and 1650 feet from the East line of Section 9.
- (d) Sohio Petroleum Company Nudney well No 2 located ~~1650~~ 330 feet from the North line and 330 feet from the East line of Section 16.

(2) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

-3-
CASE No. 3050

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.