

Case No.

377

Application, Transcript,
Small Exhibits, Etc.

orig.	BENSON-MONTIN
	EXHIBITS IN CASE NO. 377
	before the
	NEW MEXICO OIL CONSERVATION COMMISSION
	September 17, 1953
	ON BEHALF OF APPLICANT, BENSON-MONTIN

INDEX OF BENSON-MONTIN EXHIBITS IN
CASE # 377
BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION
SEPTEMBER 17, 1953

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PART TWO - DATA RELATIVE TO RESERVES AND ECONOMICS:

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Partial Drilling Histories of 3 Gallegos Canyon Unit wells showing increase in gas flow rates as productive sand is drilled.

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EXHIBIT G - (a) (b) (c) (d) (e) (f):
Interference Test No. 1

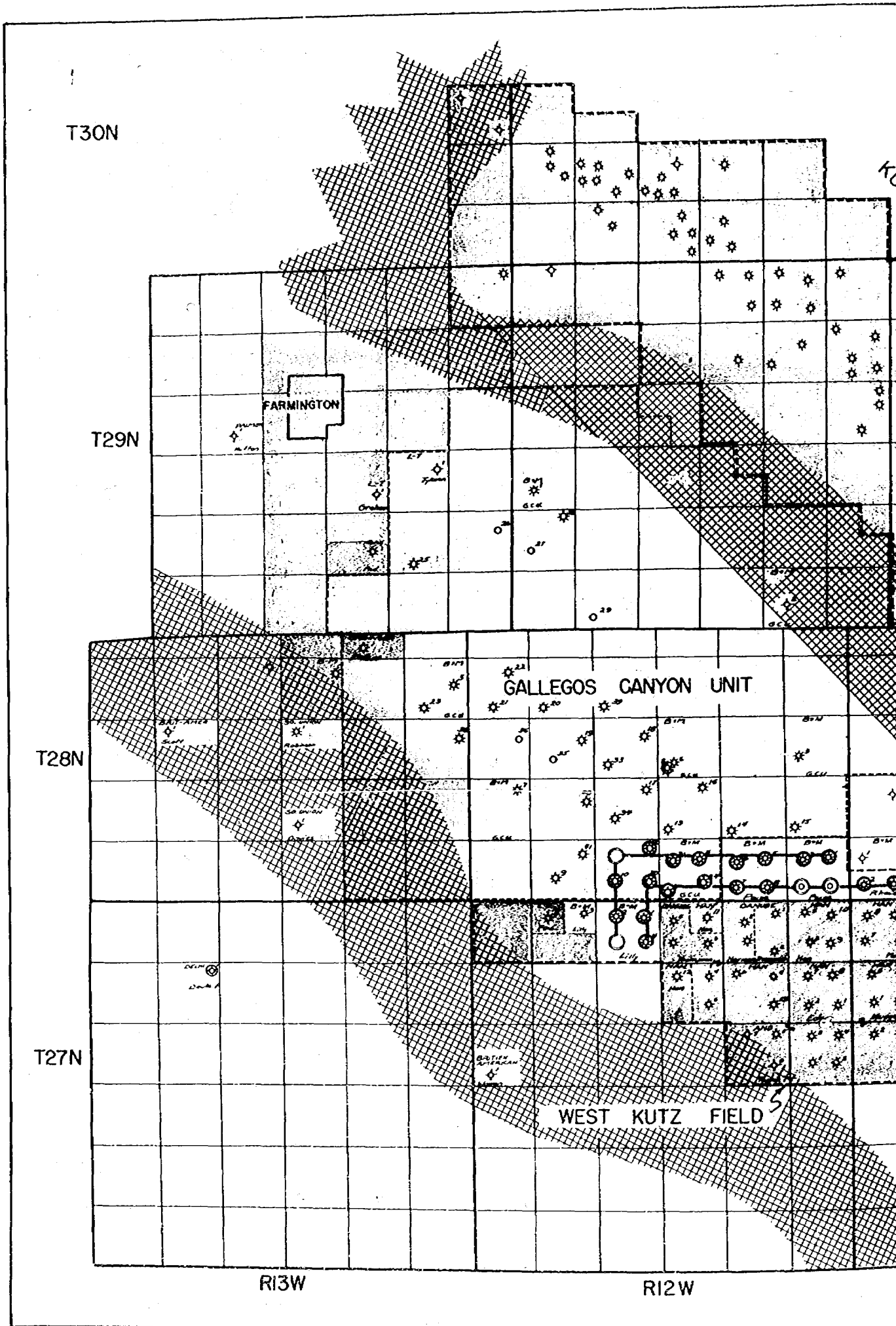
EXHIBIT H - (a) (b) (c) (d):
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EXHIBIT J - (a) (b) (c) (d) (e):
Interference Test No. 4

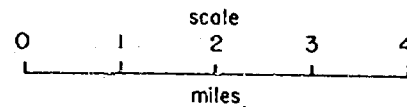
EXHIBIT K - (a) (b) (c) (d) (e) (f) (g) (h):
Interference Test No. 5





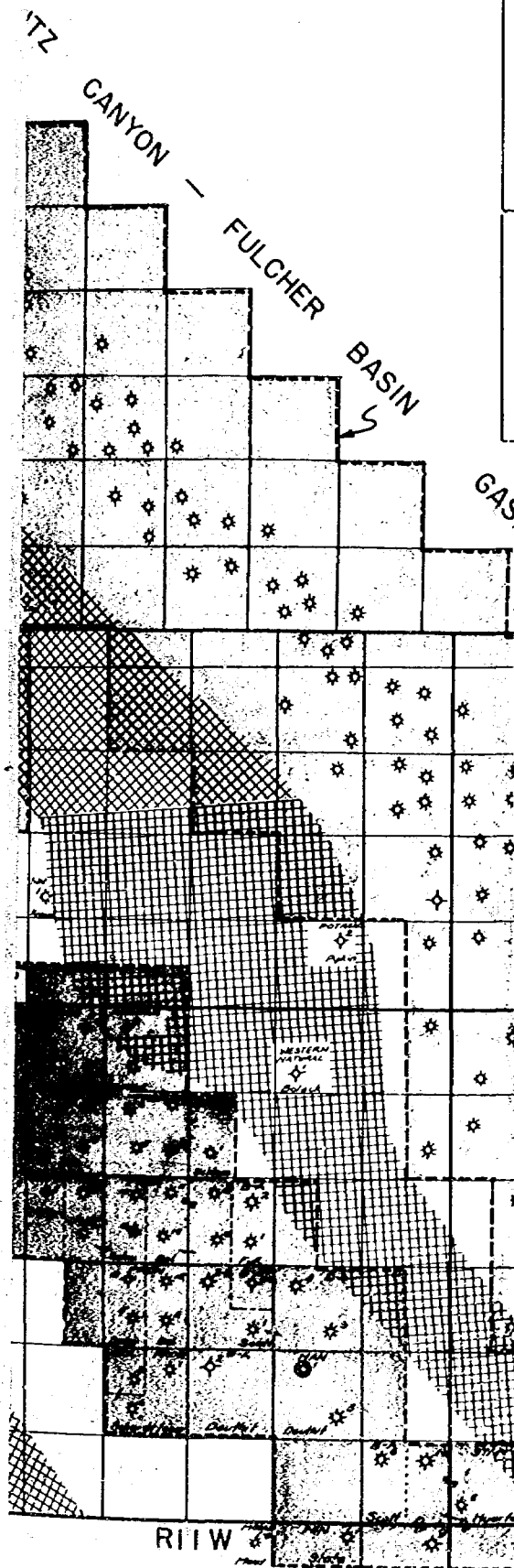
A

SAN JUAN COUNTY, NEW MEXICO



5-1-52 GREER
8-1-63 Rev. N. A. A. A.

 PRODUCING PICTURED CLIFFS WELL
 WELL ABANDONED IN PICTURED CLIFFS
 WELL LOCATION
 AREA INFERRED TO BE NON-COMMERCIAL
 FOR PICTURED CLIFFS PRODUCTION



-  FULCHER-KUTZ FIELD
-  GALLEGOS CANYON UNIT
-  AREA NORTHWEST OF GALLEGOS CANYON UNIT WHICH IS COVERED BY THE APPLICATION.
-  PART OF THE WEST KUTZ FIELD WHICH IS OUTSIDE OF THE GALLEGOS CANYON UNIT.
-  TRACTS WITHIN AREA COVERED BY 320-ACRE SPACING, ON WHICH ARE PRODUCTIVE WELLS OWNED BY OTHER THAN GALLEGOS CANYON UNIT WORKING INTEREST OWNERS.
-  ROWS OF 160-ACRE SPACED WELLS FORMING "BUFFER ZONE" WHICH PREVENTS DRAINAGE FROM UNITIZED LANDS.
-  PRODUCING WELLS WITHIN "BUFFER ZONE".
-  UNDRILLED LOCATIONS WITHIN "BUFFER ZONE".

RII W

RIOW

Exhibit A

DRILLING HISTORY

F

WELL NO. 32 LEASE GALLEGOS CANYON UNIT
 OPERATOR BENSON-MONTIN

B-a

WELL DRILLING AND COMPLETION HISTORY

DATE	REMARKS
	(Top of Pictured Cliffs 1377'. 7" casing cemented at 1381').
8- 7-53	2:00 AM TD 1383'. Flowing (15.9"/1") 118 MCF/day. 4-hour bailing test showed no water.
	5:00 AM TD 1390'. Flowing (2.9"/2") 203 MCF/day. Sand is exceptionally hard.
	8:00 AM TD 1395'. Flowing (14"/2") 442 MCF/day.
	9:00 AM TD 1400'. Flowing (23.5"/2") 572 MCF/day.
	10:00 AM TD 1405'. Flowing (32.4"/2") 672 MCF/day.
	2:00 PM TD 1405'. Flowing (32.4"/2") 672 MCF/day. 4-hour bailing test showed no water.
	4:00 PM TD 1410'. Flowing (7.4"/3") 720 MCF/day.
	6:00 PM TD 1415'. Flowing (8.9"/3") 790 MCF/day.
	8:00 PM TD 1420'. Flowing (7.5"/3") 725 MCF/day.
	11:00 PM TD 1425'. Flowing (6.5"/3") NG. Apparently erratic reading.
8- 8-53	3:00 AM TD 1425'. Flowing (7.4"/3") 720 MCF/day. 4-hour bailing test showed 4 gal. SW/hour.
	5:00 AM TD 1425'. Flowing (7.0"/3") 701 MCF/day. 2-hour bailing test showed 4 gal. SW/hour. Preparing to kill well.
	3:00 PM Killed well. Corrected TD 1419'. Plugged back to 1409' with hydromite, and from 1409' to 1407' with gravel.
	7:00 PM Loaded 40 quarts SNG from 1389' to 1407'. Tamped with 4' gravel and 50' calseal in casing.
8- 9-53	8:00 AM Waiting on shot.
	4:00 PM Shot went off. Commenced drilling calseal.
8-10-53	5:00 AM Drilled through tamp to 1405' and unloaded hole.
	6:00 AM Flowing (24.5"/4") 2,335 MCF/day and light spray of water.
	8:00 AM Flowing (14.6"/4") 1,785 MCF/day.
	9:00 AM Flowing (12.9"/4") 1,690 MCF/day.
	11:00 AM Flowing (12.0"/4") 1,620 MCF/day.
	Midnight Flowing (7.3"/4") 1,275 MCF/day and no water.

661 B-a

DRILLING HISTORY

F

DRILLING HISTORY

F

WELL NO. 39 LEASE GALLEGOS CANYON UNIT
 OPERATOR BENSON-MONTIN

WELL DRILLING AND COMPLETION HISTORY

DATE	REMARKS
	(Top of Pictured Cliffs 1263'. 5-1/2" casing cemented at 1269').
7-22-53	6:00 AM Drilling cement at 1220'.
	1:00 PM TD 1270'. Drilled cement and 1' of sand. Started water test.
	5:00 PM TD 1270'. 4-hour bailing test showed no water.
	Flowing (2.4"/1") 43 MCF/day.
	10:00 PM TD 1280'. Flowing (4.4"/2") 247 MCF/day.
	Midnight TD 1285'. Flowing (8.3"/2") 340 MCF/day.
7-23-53	2:00 AM TD 1290'. Flowing (8.3"/2") 340 MCF/day.
	6:00 AM TD 1290'. Flowing (8.0"/2") 333 MCF/day.
	4-hour bailing test showed no water.
	12 Noon TD 1295'. Flowing (21"/2") 542 MCF/day.
	5:00 PM TD 1300'. Flowing (18.7"/2") 513 MCF/day.
	10:00 PM TD 1310'. Flowing (21.2"/2") 544 MCF/day.
7-24-53	2:00 AM TD 1310'. Flowing (16.6"/2") 483 MCF/day.
	4-hour bailing test showed 1-1/4 gal. SW/hour.
	6:00 AM TD 1310'. Flowing (16"/2") 473 MCF/day.
	4-hour bailing test showed 2-1/2 gal. SW/hour.
	Preparing to plug back and shoot.
	7:00 PM TD 1310'. Plugged back to 1300' with hydromite.
	Plugged back 1300' to 1295' with gravel. Loaded 45 quarts SNG from 1276-1295. Tamped with 3' gravel and 50' calseal in casing.
7-25-53	8:00 AM Waiting on shot.
	3:00 PM Shot went off.
	10:00 PM Drilled through tamp and unloaded hole.
	11:00 PM Flowing (8.4"/3") 770 MCF/day.
7-26-53	6:00 AM Cleaning out at 1290'. Making no water. Bridging badly. Flowing (7.3"/3") 713 MCF/day.
7-27-53	6:00 AM Cleaned out to 1295'. Making no water. Flowing (6.7"/3") 685 MCF/day. Preparing to run tubing.

Exhibit E (A)

DRILLING HISTORY

F

DRILLING HISTORY

F

WELL NO. 17

LEASE

GALLEGOS CANYON UNIT

OPERATOR

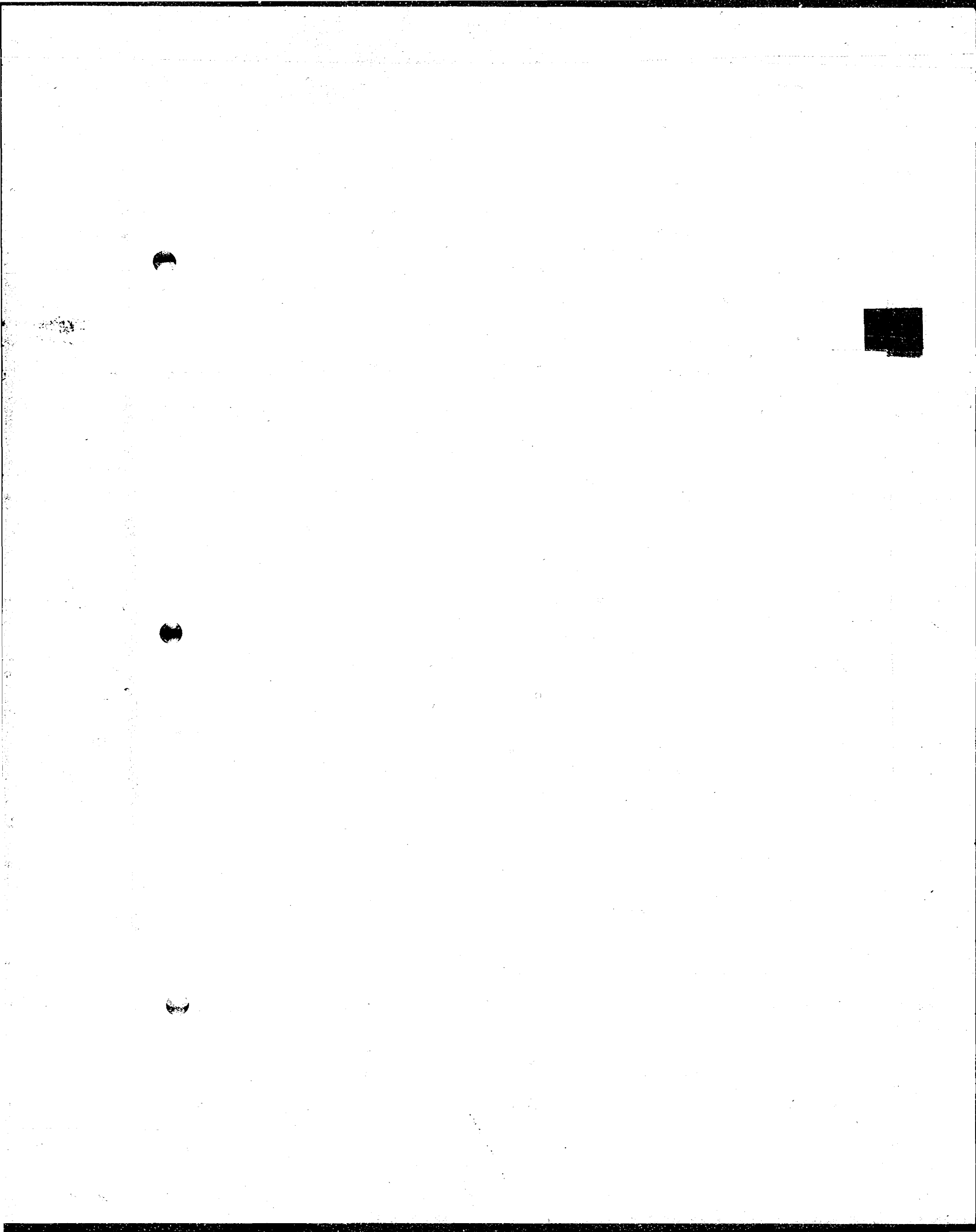
BENSON-MONTIN

WELL DRILLING AND COMPLETION HISTORY

DATE	REMARKS
	Top of Pictured Cliffs 1395'. 5-1/2" casing cemented at 1402'.
7-30-52	8:00 AM TD 1410'. At 1405' took 2-hour bailing test. No water. Slight show of gas at 1405'.
	1:30 PM TD 1415'. Measured 26"/1" (150 MCF)
	7:00 PM TD 1425'. Measured 8.6"/2" (345 MCF).
	2-hour bailing test showed no water.
7-31-52	2:00 AM TD 1435'. Measured 22" Wtr/2" (550 MCF)
	9:00 AM TD 1445'. Measured 2.2" Wtr/5" (1,100 MCF)
	1450'. Measured 4.0" Wtr/5" (1,470 MCF)
	1455'. Measured 6.0" Wtr/5" (1,800 MCF)
	3:00 PM TD 1458'. Measured 7.9" Wtr/5" (2,080 MCF)
	4:30 PM TD 1460'. Measured 7.9" Wtr/5" (2,080 MCF)
8-1-52	8:00 AM TD 1460'. Measured 6.9" Wtr/5" (1,910 MCF).

DRILLING HISTORY

F



GROSS PAY SECTION OF PRODUCTIVE WELLS DRILLED TO
THE PICTURED CLIFFS SAND IN THE GALLEGOS CANYON UNIT
AS OF SEPTEMBER 15, 1953

Gross Pay Section was determined for wells drilled in with cable tools as total interval from top of Pictured Cliffs Sand to base of last gas increase. Wells marked with single asterisk were cored with rotary tools. Pay section of these wells is determined from core data and electric logs.

<u>WELL</u>	<u>GROSS PAY SECTION (Feet)</u>	<u>REMARKS</u>
Gallegos Canyon Unit #1	20	
#3	23 *	
#4	64 *	
#5	45 *	
#6	40	
#7	30 *	
#9	41	16' from 1234-1250' and 25' from 1280-1305'.
#10	50	
#11	40	
#12	50	
#13	45	
#14	40	
#15	32	
#16	40	
#17	64	
#18	45	
#19	60	
#20	40	
#21	40	
#22	40	
#23	30	
#24	61	
#25	26	
#28	34	
#30	50	
#31	30	
#32	33	
#33	46	
#34	45	
#35	66	
#36	47	
#37	35	
#38	30	
#39	29	
#40	56	
#41	25	

66/17 c



<u>WELL</u>	<u>GROSS PAY SECTION (Feet)</u>	<u>REMARKS</u>
Lilly #1	40	
#2	31	
#3	50	
#4	76	
Payne #1	42	
#2	48	
#5	40	
#6	61	41' from 1619-1655 and 20' from 1675-1695.
#7	40	
#8	30	
Rhodes #2	47	
#3	52	

Arithmetical average of above 48 wells is 42.7'
(41.5' for original Gallegos Canyon Unit wells
and 46.5' for Rhodes, Payne and Lilly Leases
which became part of unit effective 7-1-53).

Exhibit C (page 2)

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

12
-1-

September 14, 1953

Benson & Montin
315-1/2 West Main
Farmington, New Mexico

Attention: Mr. Albert R. Greer

Subject: Core Analysis
Gallegos Canyon Units No. 27, 35, 41
San Juan County, New Mexico
Our File No. PR-5348

Gentlemen:

We submit herewith results of core analysis measurements on cores from the Pictured Cliffs formation of subject wells.

Rotary cores were obtained from wells No. 27 and No. 41, using water base mud. Cable tool cores were obtained from well No. 35, using oil as drilling fluid. In the latter case the hole was entirely loaded with oil, and no gas flowed from the well during coring.

The cores were quick-frozen and shipped to our Dallas laboratories, where the analysis was made using special methods in order primarily to obtain a very accurate measurement of water content; further, only a small quantity of core fragments were obtained from well No. 35 so that conventional methods could not be used. The Dean-Stark method was used for determination of fluid contents, refluxing the sample in xylene to obtain a direct measurement of water content, and determining oil by the net weight loss of the sample upon subsequent drying. Porosity was obtained by evacuating and saturating the sample with carbon tetrachloride, and permeability by drying and mounting the sample, or the largest piece thereof. Chlorides were determined by crushing a separate portion of sample and titrating with silver nitrate.

The results of the analysis are tabulated on the attached pages. On well No. 35, where the sample of core represented several feet of interval

Benson & Montin - Gallegos Canyon Units No. 27, 35, 41 Page Two

and the size of the sample permitted, several separate portions were taken for analysis as per instructions, in order to obtain more representative data.

It is noted that the average chloride content for the samples from well No. 35 was 36,000 parts of chloride ion per million parts of core water. Variations in individual values are due at least in part to the necessity of assigning to the measured chloride a core water content determined on a separate portion. Chlorides measured on well No. 41 were in general lower, indicating flushing of the core with drill water. The relatively high measured oil saturations in the core from well No. 35 would seem to indicate a relatively efficient displacement of reservoir gas with dead oil from the drilling fluid.

We are pleased to be of service and trust that the data here presented will be useful in the further evaluation of this reservoir.

Very truly yours,

Core Laboratories, Inc.

Frank C. Kelton

Frank C. Kelton,
Manager of Research

FCK:ma

30cc. - Addressee
2cc. - Mr. Justin Reid
Seth and Montgomery
Santa Fe, New Mexico

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

(D)
- 3 -

Company Benson & Montin Date Report September 14, 1953 Page 1 of 3
Well Gallegos Canyon Units No. 27, 35, 41 Cores Rotary File PR-5348
Field _____ Formation Pictured Cliffs Analysts _____
County San Juan State New Mexico Elevation _____ Coregraph _____
Location _____ Remarks Water base drilling mud in Unit No. 27

CORE ANALYSIS AND INTERPRETATION

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs	POROSITY PER CENT	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PRODUCTION	Chloride ppm.
				OIL	TOTAL WATER		

Gallegos Canyon Unit No. 27

1290 11 14.6 0.0 100 30,800

NOTE:

(*) REFER TO ATTACHED LETTER.

(2) OFF LOCATION ANALYSES—NO INTERPRETATION OF RESULTS.

(1) INCOMPLETE CORE RECOVERY—INTERPRETATION RESERVED.

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representation as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

SUMMARY OF RESERVOIR CHARACTERISTICS
AND
RECOVERABLE RESERVES FOR GALLEGOS CANYON UNIT
PICTURED CLIFFS FORMATION

(Taken from Benson-Montin Exhibits #4, #5, #8 and #9
in New Mexico Oil Conservation Commission Case #377,
heard June 19, 1952)

INITIAL RESERVOIR PRESSURE		465 psig (well head) 496 psia (reservoir)
FINAL ABANDONMENT PRESSURE		150 psig (reservoir) 162 psia (reservoir)
AVERAGE POROSITY		18.0%
AVERAGE INTERSTITIAL WATER		50.1%
GAS DEVIATION FACTOR AT 496 psia		.904
GAS DEVIATION FACTOR AT 272 psia		.946
GAS DEVIATION FACTOR AT 162 psia		.968
RESERVOIR TEMPERATURE		80°F
AVERAGE PAY THICKNESS		40.5'

VOLUME OF GAS IN PLACE (at 15.025 psia P.B. and 60°F)

$$\frac{(43,560) (520) (496) (9.0)}{(15.025) (540) (.904)} = 137 \text{ MCF/acre-foot.}$$

VOLUME OF GAS RECOVERABLE TO 150 psig RESERVOIR ABANDONMENT PRESSURE

$$\frac{\left(\frac{496}{.904} - \frac{162}{.968} \right)}{\left(\frac{496}{.904} \right)} (137) = (.695) (137) = 95.5 \text{ MCF/acre-foot.}$$

VOLUME OF GAS RECOVERABLE TO 250 psig LINE PRESSURE

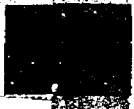
$$(137) \frac{\left(\frac{496}{.904} - \frac{272}{.946} \right)}{\left(\frac{496}{.904} \right)} = (.467) (137) = 65.2 \text{ MCF/acre-foot.}$$

Exhibit E

RESERVES BASED ON 40.5' OF SAND

- (a) GAS IN PLACE 5,550 MCF/acre.
- (b) GAS RECOVERABLE TO 150 psig RESERVOIR PRESSURE 3,870 MCF/acre.
- (c) GAS RECOVERABLE TO 250 psig LINE PRESSURE 2,640 MCF/acre.

Exhibit E (p2)



F-a

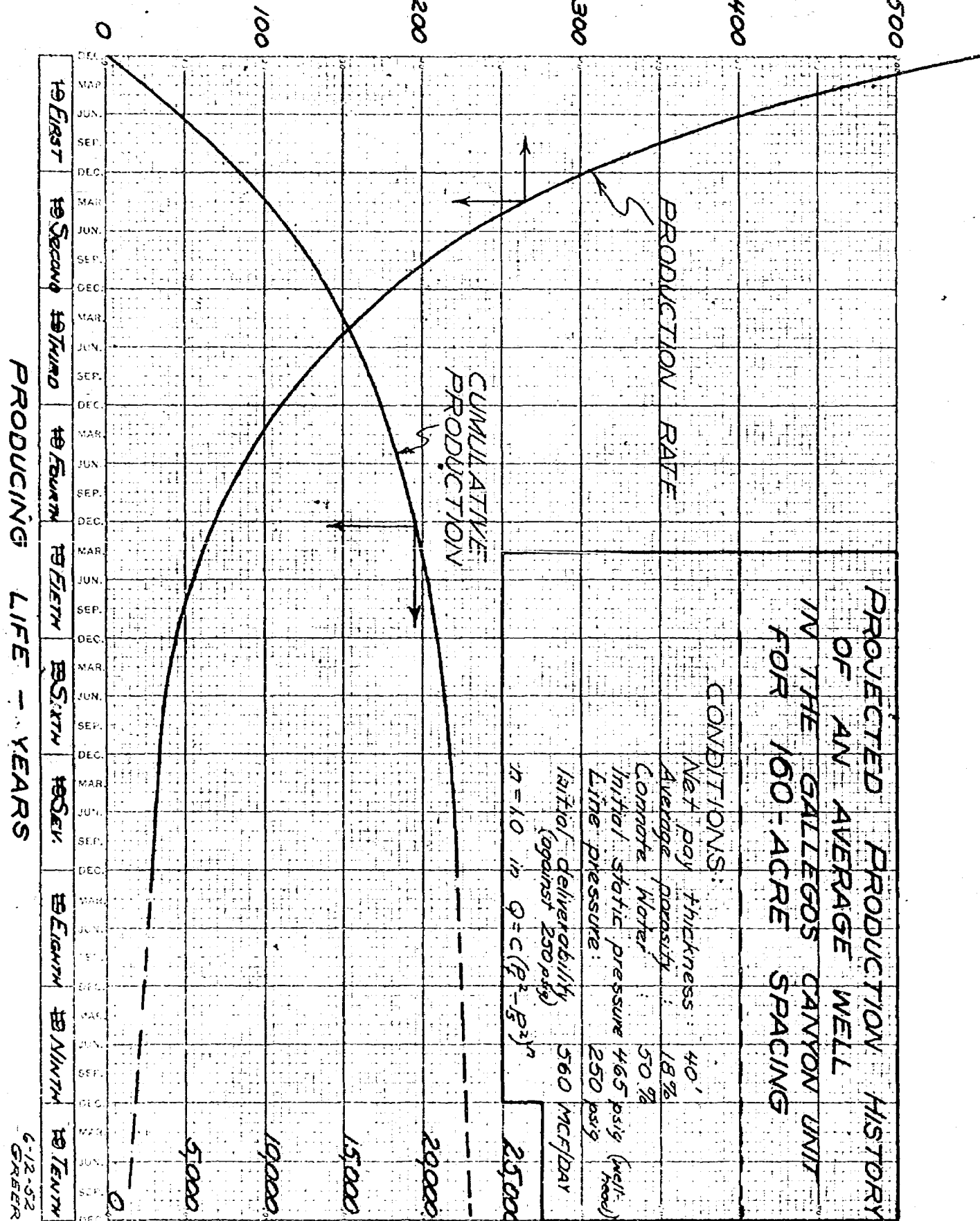
PRODUCTION HISTORY OF SIX ADJOINING WELLS IN THE
WEST KUTZ FIELD HAVING AN INITIAL PRODUCTION RATE
INTO PIPE LINE OF APPROXIMATELY 550 MCF/WELL/DAY
(MARCH, 1952, FIRST MONTH OF PRODUCTION FOR ALL SIX WELLS)
(FRONTIER #11, 12, 13, 14 BOLACK & #10 & 12 SCHWERTFEGER)
(W/2 OF SECTION 15 & ALL SECTION 16, TWP. 27N, RGE. 11W)

<u>1952</u>	<u>TOTAL PRODUCTION MCF/MONTH</u>	<u>NO. WELLS</u>	<u>DAILY AVERAGE PRODUCTION RATE PER WELL (MCF)</u>
JANUARY	46,940	3	505
FEBRUARY	102,929	5	710
MARCH	96,966	6	520
APRIL	100,207	6	555
MAY	102,511	6	548
JUNE	92,343	6	513
JULY	89,813	6	483
AUGUST	81,516	6	438
SEPTEMBER	71,135	6	395
OCTOBER	65,677	6	354
NOVEMBER	51,471	6	285
DECEMBER	59,907	6	322
<u>1953</u>			
JANUARY	57,137	6	307
FEBRUARY	44,025	6	262
MARCH	48,717	6	262
APRIL	41,977	6	232
MAY	54,967	6	295
JUNE	47,801	6	258

Exhibit F(a)

15-00

Ex. 11- Case 377
PRODUCTION RATE - MCF per DAY (@ 15.025 psi P_{wf})



BASIC GRAPH IS EXHIBIT #11 FROM
NEW MEXICO OIL CONSERVATION
COMMISSION CASE #377, HEARD
JUNE 19, 1952

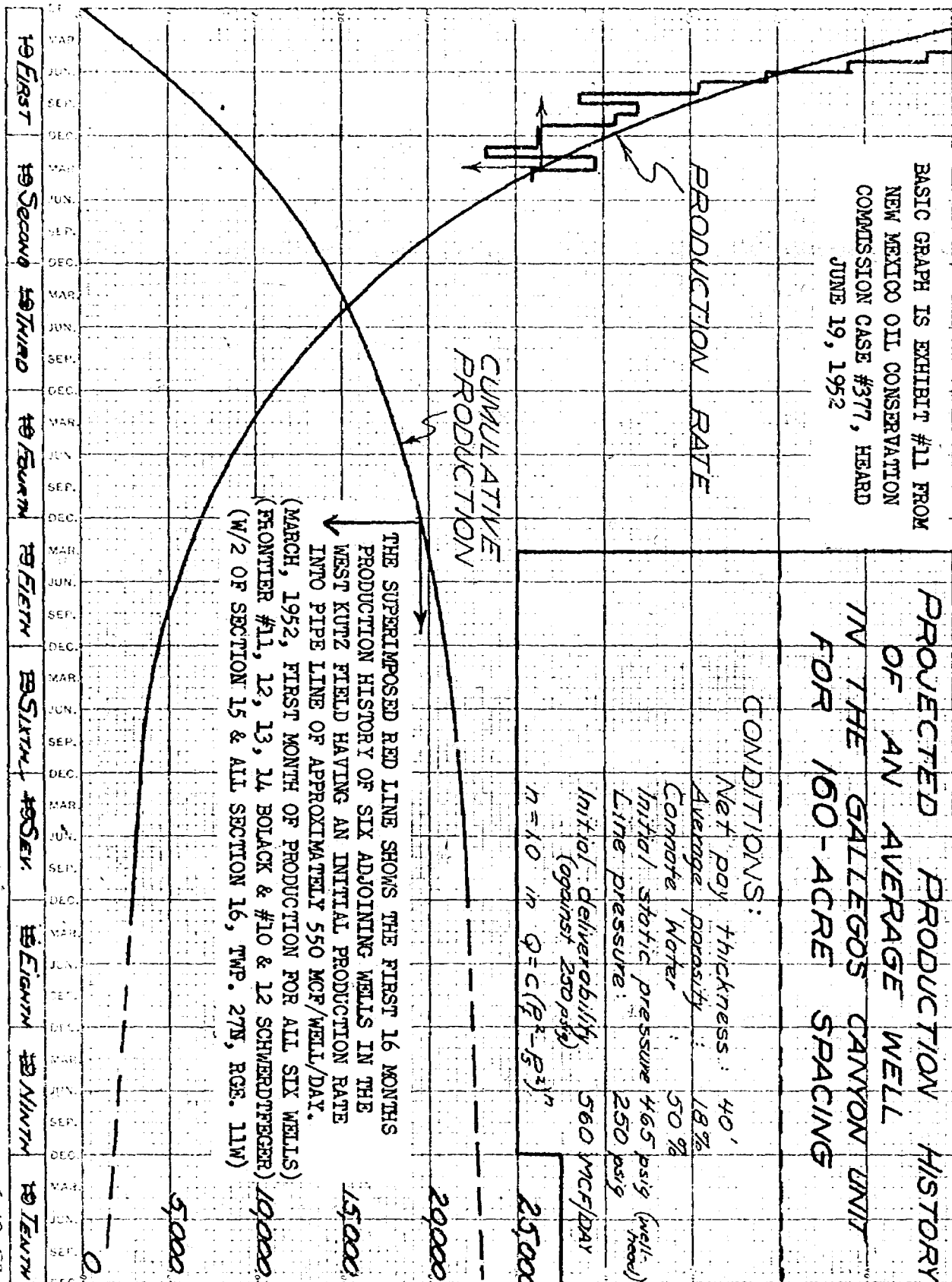
PROJECTED PRODUCTION HISTORY
OF AN AVERAGE WELL
IN THE GALLEGOS CANYON UNIT
FOR 160-ACRE SPACING

CONDITIONS:

Net pay thickness:	40'
Average porosity:	18%
Connate water:	50%
Initial static pressure:	465 psig (well-head)
Line pressure:	250 psig
Initial deliverability (against 250 psig):	560 MCF/DAY
$n = 10$ in $Q = C(P^2 - P_w^2)^n$	25,000

PRODUCTION RATE - MCF per DAY

(@ 15.025 per RB)



THE SUPERIMPOSED RED LINE SHOWS THE FIRST 16 MONTHS
PRODUCTION HISTORY OF SIX ADJOINING WELLS IN THE
WEST KUTZ FIELD HAVING AN INITIAL PRODUCTION RATE
INTO PIPE LINE OF APPROXIMATELY 550 MCF/WELL/DAY.
(MARCH, 1952, FIRST MONTH OF PRODUCTION FOR ALL SIX WELLS)
(FRONTIER #11, 12, 13, 14 BOLACK & #10 & 12 SCHWEDTKEGER) 19,000
(W/2 OF SECTION 15 & ALL SECTION 16, TWP. 27N, RGE. 11W)

PRODUCING LIFE - YEARS

CUMULATIVE VALUE - DOLLARS

(NET VALUE TO .86 WORKING INTEREST)
BASED ON PRICE of 7 3/4 per MCF

6-12-52
GREER

(5-a)

BENSON-MONTIN
INTERFERENCE TEST NO. 1
GALLEGOS CANYON AREA
SAN JUAN COUNTY, NEW MEXICO
PICTURED CLIFFS FORMATION

DATE OF TEST: May, June, July, 1952

AREA OF TEST:

<u>Description</u>	<u>Approximate Area</u>
All Section 33, Twp. 28N, Rge. 12W	640 acres
" Section 34, Twp. 28N, Rge. 12W	640 "
" Section 35, Twp. 28N, Rge. 12W	640 "
" Section 2, Twp. 27N, Rge. 12W	640 "
" Section 3, Twp. 27N, Rge. 12W	640 "
" Section 4, Twp. 27N, Rge. 12W	640 "
" Section 9, Twp. 27N, Rge. 12W	640 "
" Section 10, Twp. 27N, Rge. 12W	640 "
" Section 11, Twp. 27N, Rge. 12W	640 "
TOTAL	5,760 acres

PRODUCING WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u>	<u>Date of First Production into pipe line</u>
Benson-Montin #4 G.C.U.	NE/4 Sec. 34, T-28N, R-12W	February, 1952
Danube #1 Harmon	SW/4 Sec. 2, T-27N, R-12W	February, 1952
Danube #2 Harmon	NW/4 Sec. 2, T-27N, R-12W	February, 1952
Danube #1 Thompson	NE/4 Sec. 2, T-27N, R-12W	February, 1952
Danube #2 Thompson	SE/4 Sec. 2, T-27N, R-12W	February, 1952
Danube #3 Thompson	SE/4 Sec. 3, T-27N, R-12W	February, 1952
Danube #5 Thompson	NW/4 Sec. 3, T-27N, R-12W	May, 1952
Danube #7 Thompson	SW/4 Sec. 3, T-27N, R-12W	February, 1952
Hancock #4 Edgar	NE/4 Sec. 11, T-27N, R-12W	November, 1951
Hancock #6 Edgar	NW/4 Sec. 11, T-27N, R-12W	January, 1952

Ex. G. (a)

5-6

SHUT-IN WELL WITHIN TEST AREA:

Well: J. D. Hancock #11 Hancock
Location: 1575' FNL, 1650' FEL, Sec. 3, T-27N, R-11W

DISTANCES FROM NEAREST WELLS:

<u>Well</u>	<u>Distance from</u> <u>#11 Hancock</u>
Danube #3 Thompson	2,160 feet 214
Danube #5 Thompson	2,700 "
Danube #2 Harmon	3,300 "

Ex. 6 (K)

(5-C)

INTERFERENCE TEST OF
HANCOCK #11 HANCOCK
NE/4 SEC. 3, TWP. 27N, RGE. 12W
WEST KUTZ FIELD, SAN JUAN COUNTY, NEW MEXICO

SHOWING
RECORD OF WELL-HEAD PRESSURES

MEASURE- MENT NO.	DATE	TIME	TUBING-HEAD PRESSURE (psig)	DAYS SHUT IN	TYPE PRESSURE GAUGE	REMARKS
1	5-17-52	-	-	0		Shut in.
2	5-23-52	-	434	6	S.U.G. Dead- Weight	3-hour state potential test taken by Southern Union Gas Co.
3	5-26-52	7:30 PM	444	9	B & M Spring Gauge	
4	6- 3-52	2:00 PM	443	17	B & M Spring Gauge	Well has apparently reached maximum pressure.
5			446 $\frac{1}{2}$		EPNG Dead- weight Gauge	Spring gauge is 3 $\frac{1}{2}$ # in error.
6	6- 7-52	7:30 PM	446 $\frac{1}{2}$	21	EPNG Dead- Weight Gauge	Well blown through tubing in morning by Hancock personnel to check for water. No water in hole.
7	6- 8-52	1:00 PM	446 $\frac{1}{2}$	22	"	
8	6-11-52	10:00 PM	446 $\frac{1}{2}$	25	"	
9	6-25-52	12:30 PM	445-3/4	39	"	
10	7- 2-52	9:00 PM	445	46	"	
11	7- 5-52	4:30 PM	444 $\frac{1}{2}$	49	"	
12	7-11-52	12:00 N	444.2	55	"	
13			444.5		B & M Dead Weight Gauge	0.3# difference in B & M gauge and EPNG gauge.

5-08

INTERFERENCE TEST OF
HANCOCK #11 HANCOCK

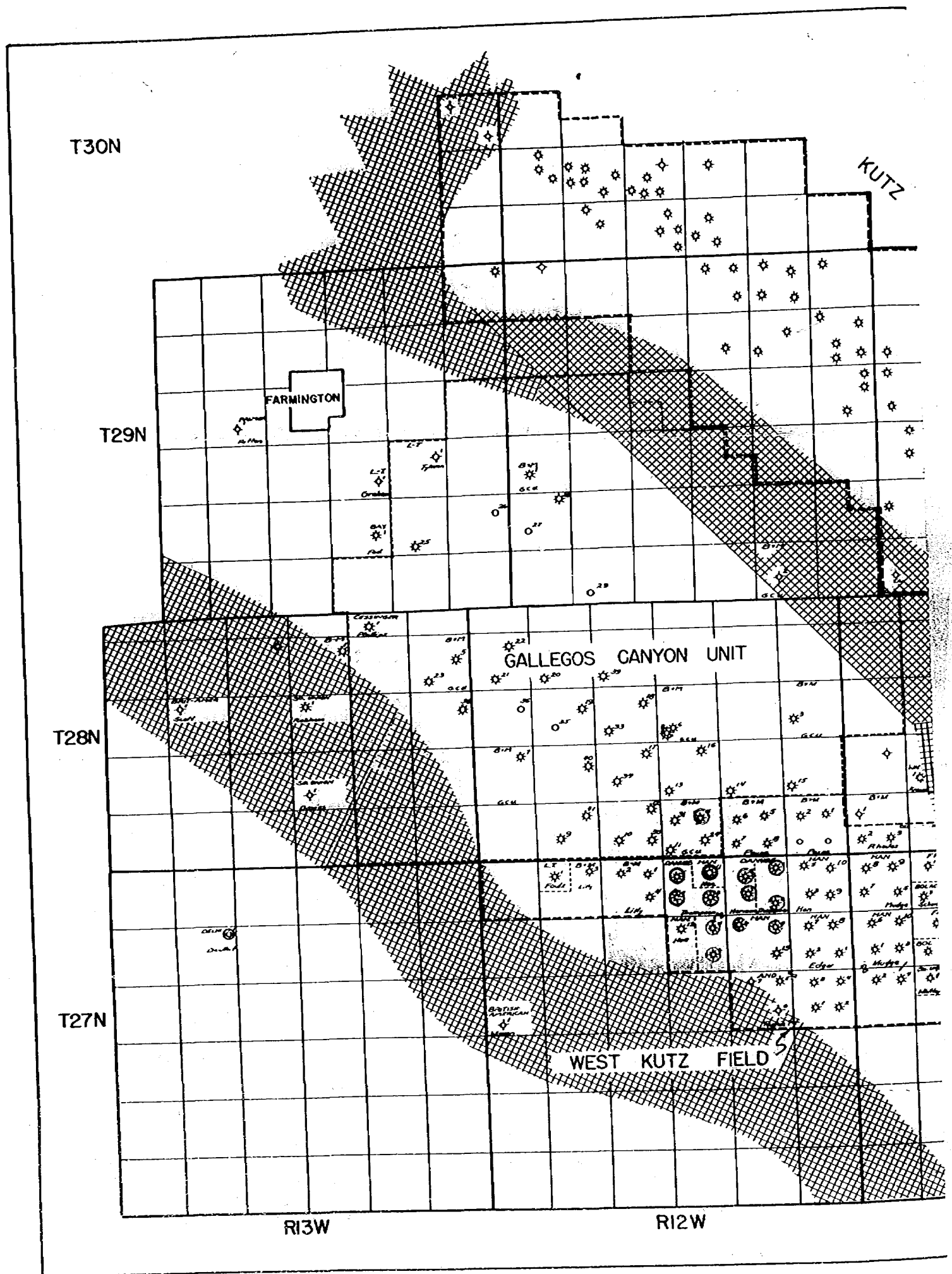
(CONTINUED)

NOTE:

To eliminate possible measurement error between different gauges, measurements 5 through 12 were taken with the same dead weight gauge, borrowed from El Paso Natural Gas Company. Smallest weight was 1#. Readings reported to nearest one-fourth and one-half pound were estimated.

For measurement #12, 1/10# weights from Benson-Montin's dead weight gauge were used and reading of 444.2# was determined to nearest 1/10# for that gauge. Difference in Benson-Montin and El Paso Natural Gas Company dead weight gauges was 3/10#.

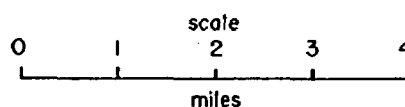
5. (d)



G. 2

SAN JUAN COUNTY, NEW MEXICO

SAN JUAN COUNTY, NEW MEXICO



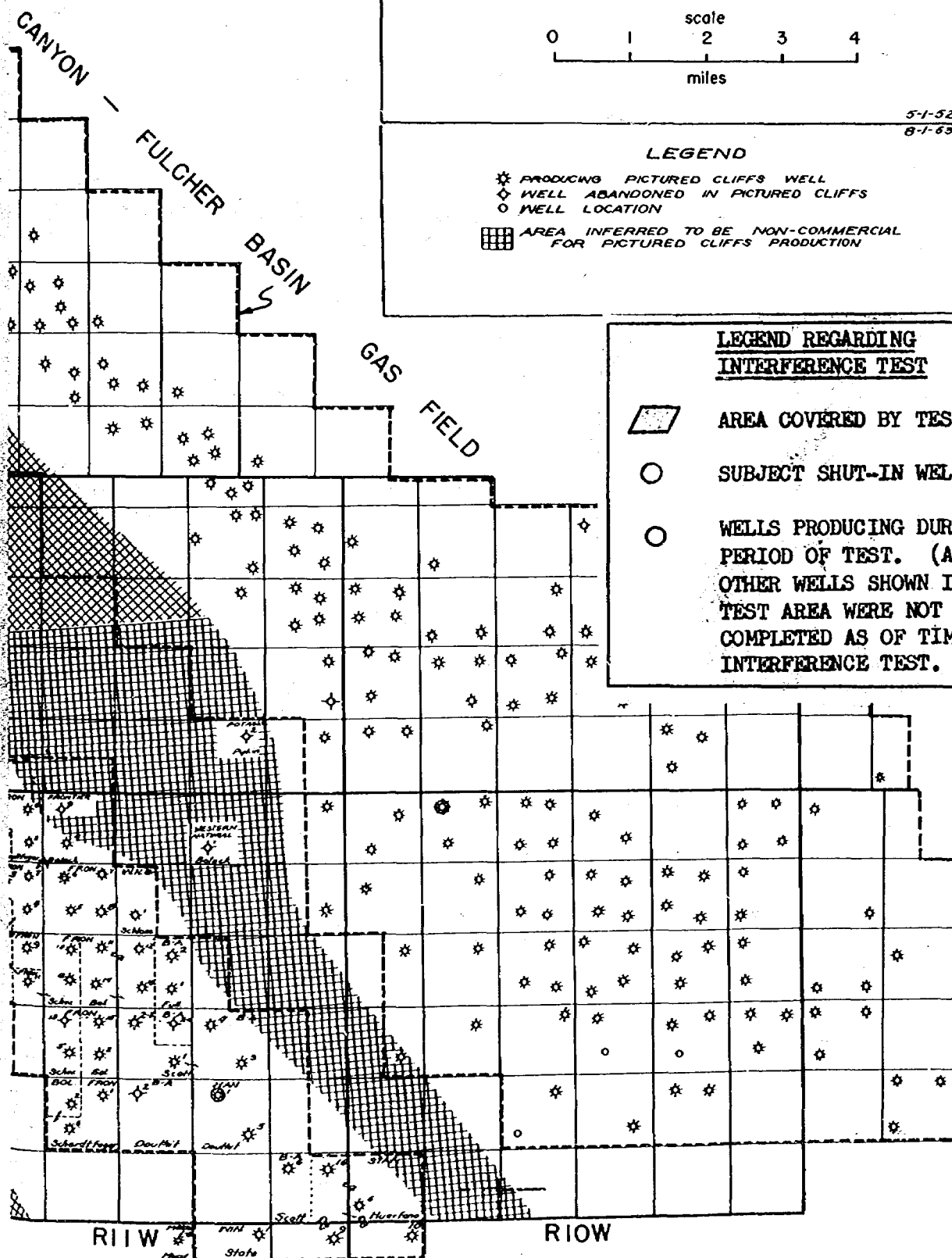
5-1-52 GREER
8-1-63 Rev. N. M. ...

* PRODUCING PICTURED CLIFFS WELL
 ♦ WELL ABANDONED IN PICTURED CLIFFS
 ○ WELL LOCATION
 AREA INFERRED TO BE NON-COMMERCIAL
 FOR PICTURED CLIFFS PRODUCTION

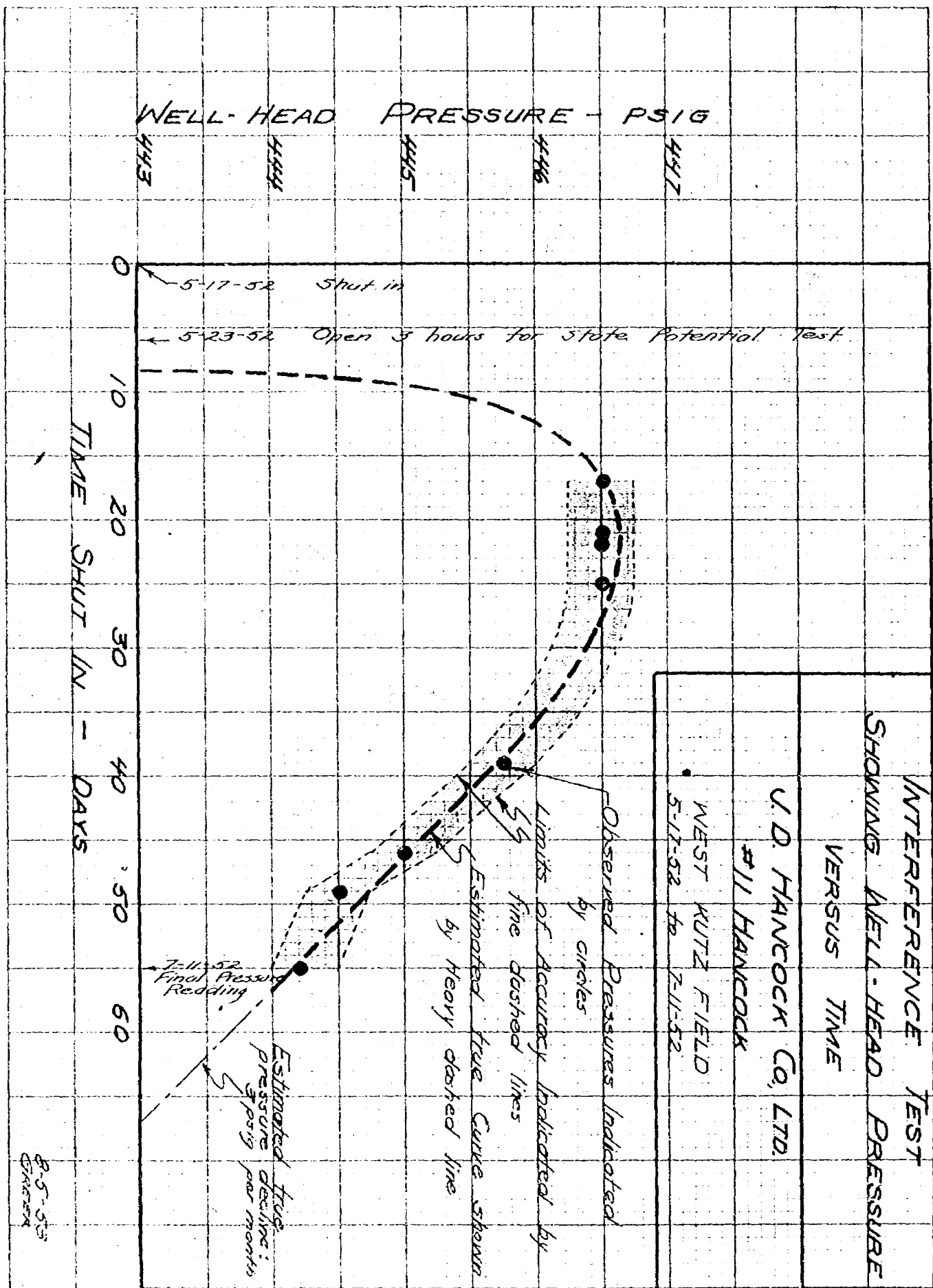
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Q

WELLS PRODUCING DURING PERIOD OF TEST. (ALL OTHER WELLS SHOWN IN TEST AREA WERE NOT COMPLETED AS OF TIME OF INTERFERENCE TEST.



512)



8-5

H-a

BENSON-MONTIN
INTERFERENCE TEST NO. 2
GALLEGOS CANYON AREA
SAN JUAN COUNTY, NEW MEXICO
PICTURED CLIFFS FORMATION

DATE OF TEST: July 1952 to March 1953.

AREA OF TEST:

<u>Description</u>	<u>Approximate Area</u>
All Section 15, Twp. 28N, Rge. 12W	640 acres
" Section 16, Twp. 28N, Rge. 12W	640 "
" Section 17, Twp. 28N, Rge. 12W	640 "
" Section 20, Twp. 28N, Rge. 12W	640 "
" Section 21, Twp. 28N, Rge. 12W	640 "
" Section 22, Twp. 28N, Rge. 12W	640 "
" Section 27, Twp. 28N, Rge. 12W	640 "
" Section 28, Twp. 28N, Rge. 12W	640 "
" Section 29, Twp. 28N, Rge. 12W	640 "
TOTAL	5,760 acres

PRODUCING WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u> (T-28N, R-12W)	<u>Date of First Production</u> <u>into pipe line</u>
#6 Gallegos Canyon Unit	SW/4 Sec. 22	February, 1952
#16 Gallegos Canyon Unit	NE/4 Sec. 27	September, 1952
#17 Gallegos Canyon Unit	NE/4 Sec. 28	September, 1952

SHUT-IN WELL WITHIN TEST AREA:

<u>Well</u>	<u>Location</u>	<u>Nearest Producing Well</u>	<u>Distance to Nearest Producing Well</u>
#18 Gallegos Canyon Unit	NE/4 Sec. 21 T-28N, R-12W	#6 G.C.U.	3,050 feet 1.2 mi

Ex-H (a)

H-6

INTERFERENCE TEST OF
BENSON-MONTIN'S #18 GALLEGOS CANYON UNIT
NE/4 SECTION 21, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF WELL-HEAD PRESSURES

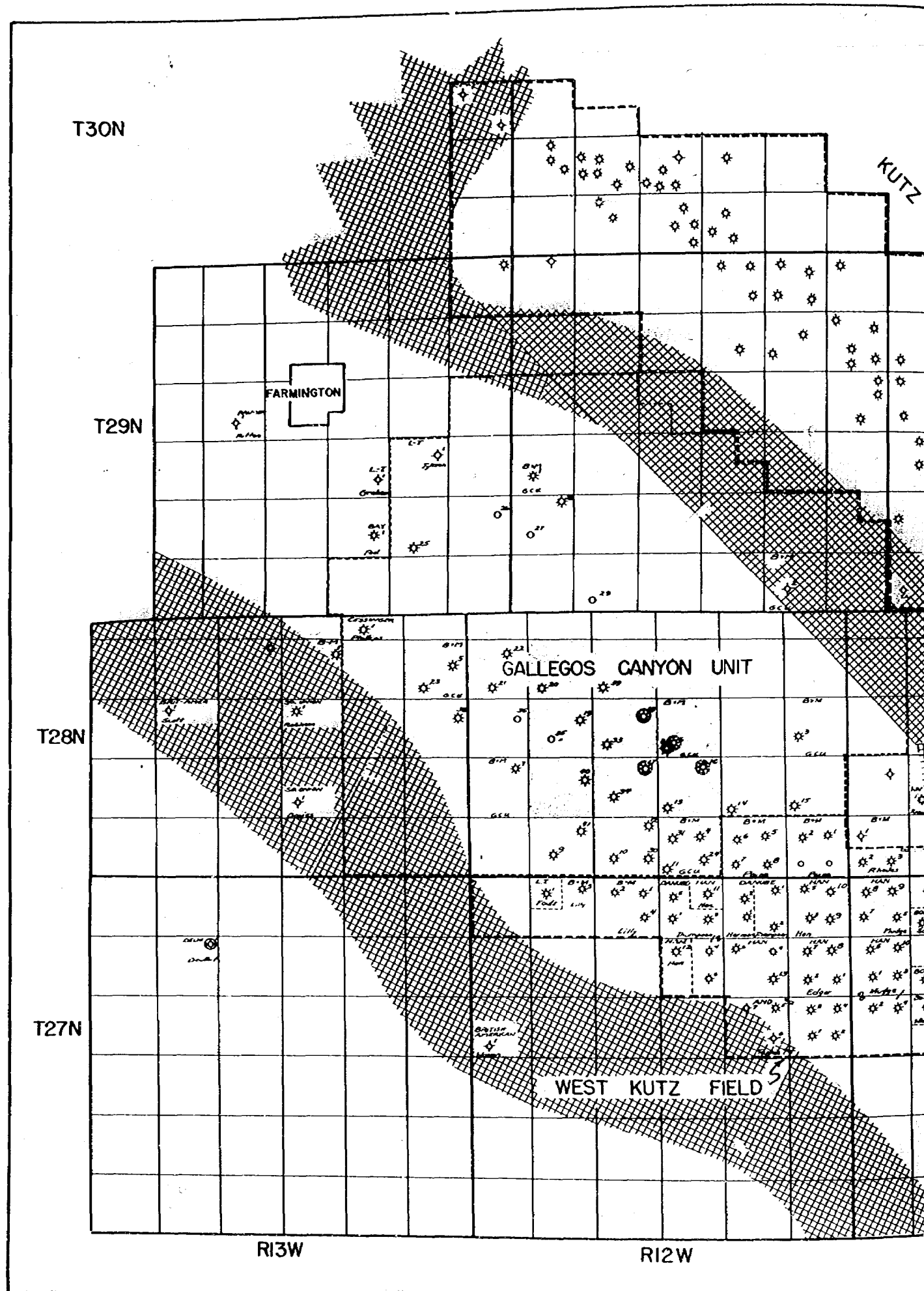
MEASURE- MENT NO.	DATE	TIME	CASINGHEAD PRESSURE (psig)	DAYS SHUT IN	REMARKS
1	7-27-52	6:30 PM	-	0	Shut in.
2	7-31-52	10:00 AM	450	3½	B & M Spring Gauge.
3	8- 5-52	6:00 PM	459.6	9	B & M Dead Weight Gauge.
4	8- 9-52	1:00 PM	460.9	13	"
5	8-21-52	12:00 Noon	462.7	25	"
6	9-21-52	4:00 PM	462.8	56	"
7	10-28-52	12:00 Noon	461.8	93	"
8	12-11-52	3:30 PM	460.5	137	"
9	1-22-53	4:00 PM	459.2	179	"
10	2-12-53	4:00 PM	458.4	200	"
11	3- 5-53	3:30 PM	457.7	221	"
12	3-28-53	11:00 AM	457.0	244	"

NOTE: Measurements #3 through #12 were made with Benson-Montin's dead weight gauge, which has a sensitivity of 1/10#.

After being shut in 7-27-52, the well was not opened until after Measurement #12 on 3-28-53, at which time it was blown through the tubing for 5 minutes to determine if there was any fluid in the hole. The well was absolutely dry.

State Potential Test was taken 4-3-53.

Ex H (67)

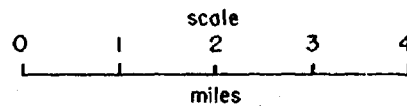


DATA ON PICTURED CLIFFS SAND

(H-C)

KUTZ CANYON - FULCHER BASIN, WEST KUTZ,
AND GALLEGOS CANYON AREAS

SAN JUAN COUNTY, NEW MEXICO



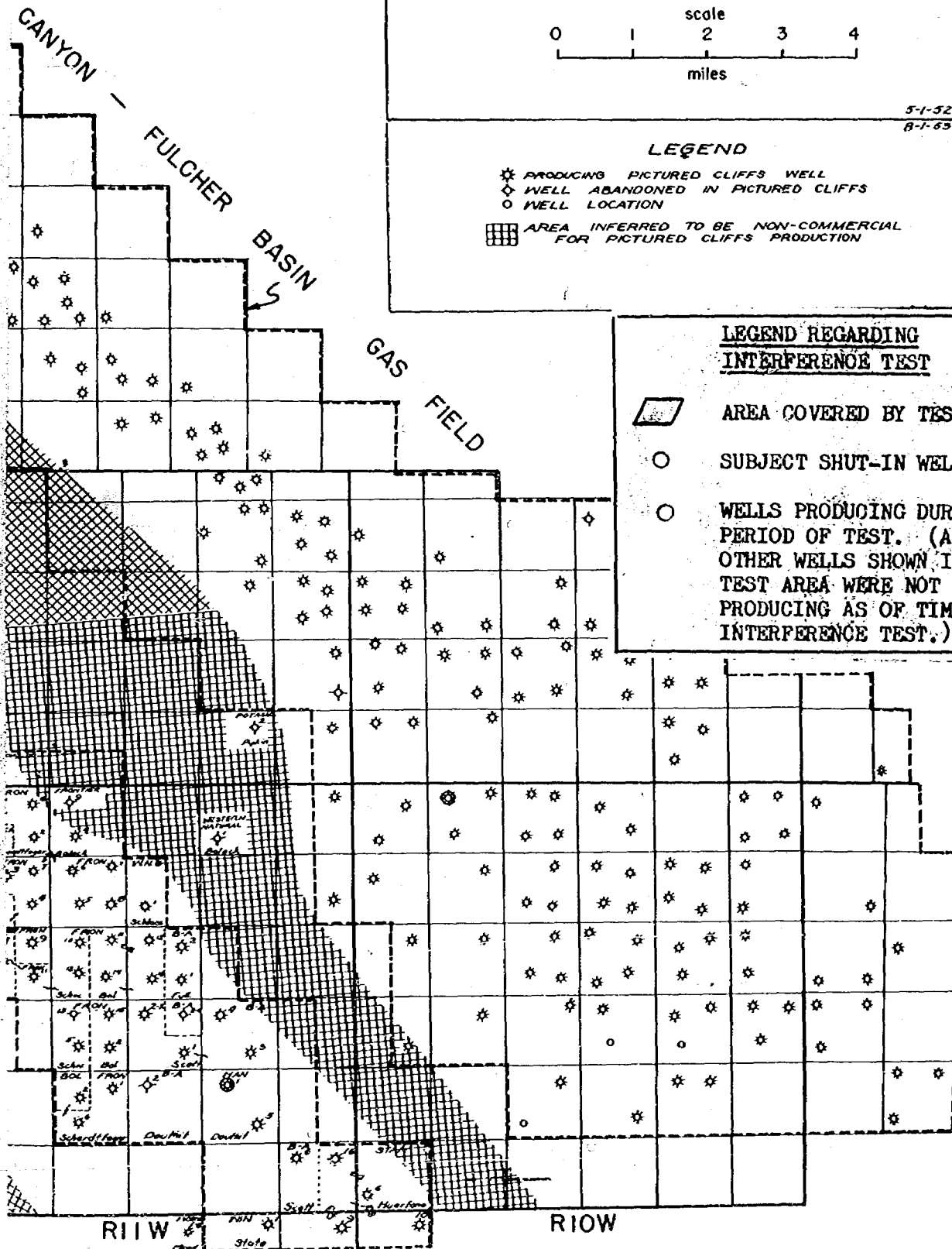
5-1-52 GREER
8-1-63 Rev. M.H.M.
A.A.

LEGEND

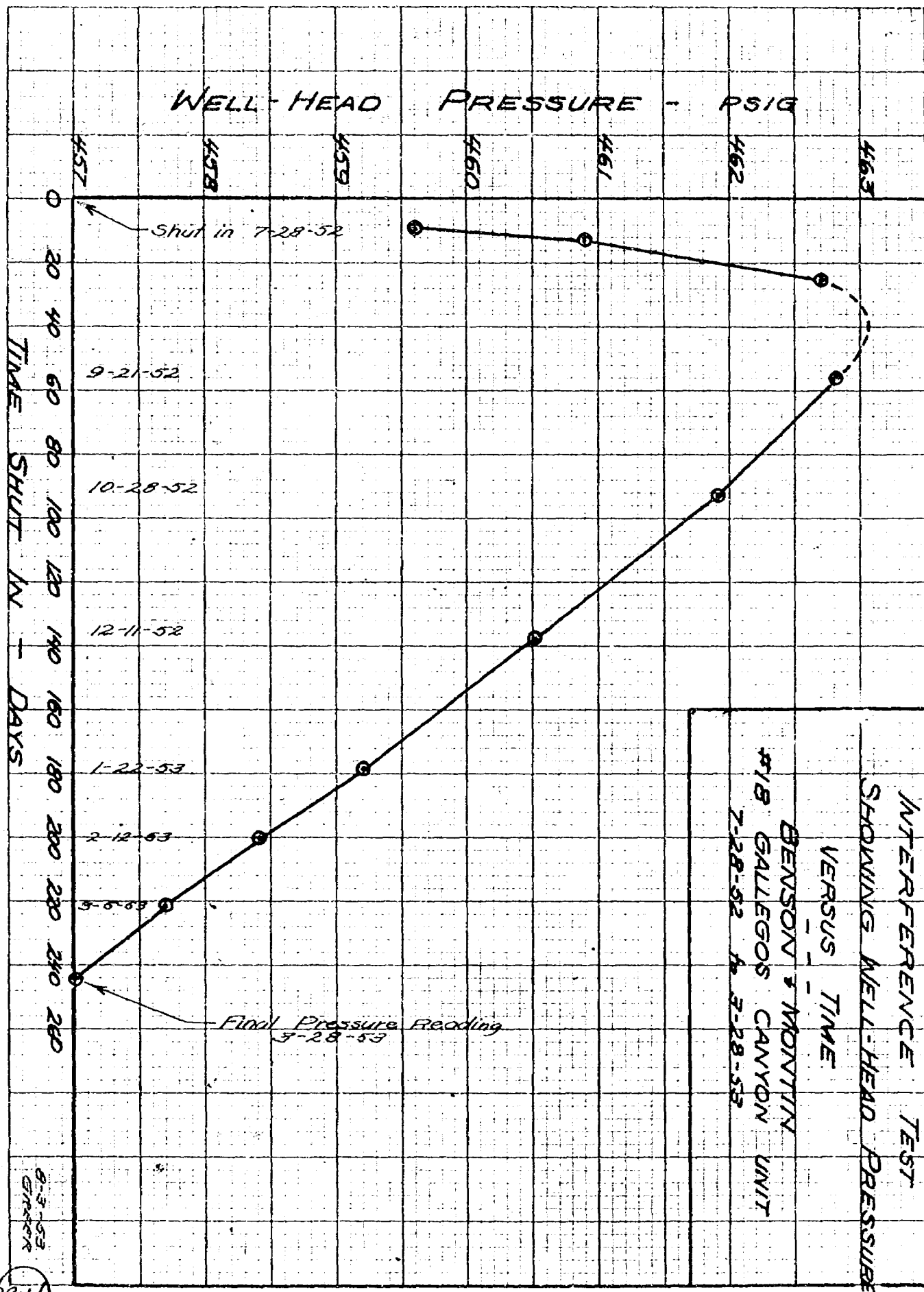
- * PRODUCING PICTURED CLIFFS WELL
- ◇ WELL ABANDONED IN PICTURED CLIFFS
- WELL LOCATION
- ▨ AREA INFERRED TO BE NON-COMMERCIAL FOR PICTURED CLIFFS PRODUCTION

LEGEND REGARDING INTERFERENCE TEST

- ▨ AREA COVERED BY TEST.
- SUBJECT SHUT-IN WELL.
- WELLS PRODUCING DURING PERIOD OF TEST. (ALL OTHER WELLS SHOWN IN TEST AREA WERE NOT PRODUCING AS OF TIME OF INTERFERENCE TEST.)



EX H.C.



Ex. H. (d)

11.0

(I-a)

BENSON-MONTIN
INTERFERENCE TEST NO. 3
GALLEGOS CANYON AREA
SAN JUAN COUNTY, NEW MEXICO
PICTURED CLIFFS FORMATION

DATE OF TEST: November 1952 to March 1953.

AREA OF TEST:

<u>Description</u>	<u>Approximate Area</u>
All Section 27, Twp. 28N, Rge. 12W	640 acres
" Section 28, Twp. 28N, Rge. 12W	640 "
" Section 33, Twp. 28N, Rge. 12W	640 "
" Section 34, Twp. 28N, Rge. 12W	640 "
TOTAL	2,560 acres

PRODUCING WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location (T-28N, R-12W)</u>	<u>Date of First Production into Pipe Line</u>
#4 Gallegos Canyon Unit	NE/4 Sec. 34	February, 1952
#11 Gallegos Canyon Unit	SW/4 Sec. 34	November, 1952
#16 Gallegos Canyon Unit	NE/4 Sec. 27	September, 1952
#17 Gallegos Canyon Unit	NE/4 Sec. 28	September, 1952

SHUT-IN WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location (T-28N, R-12W)</u>
#10 Gallegos Canyon Unit	SW/4 Sec. 33
#12 Gallegos Canyon Unit	NE/4 Sec. 33
#13 Gallegos Canyon Unit	SW/4 Sec. 27
#24 Gallegos Canyon Unit	SE/4 Sec. 34

DISTANCE FROM TEST WELL (G.C.U. #13) TO PRODUCING WELLS WITHIN TEST AREA:

3,750 feet to #4 Gallegos Canyon Unit
4,000 feet to #17 Gallegos Canyon Unit
4,750 feet to #16 Gallegos Canyon Unit
5,280 feet to #11 Gallegos Canyon Unit

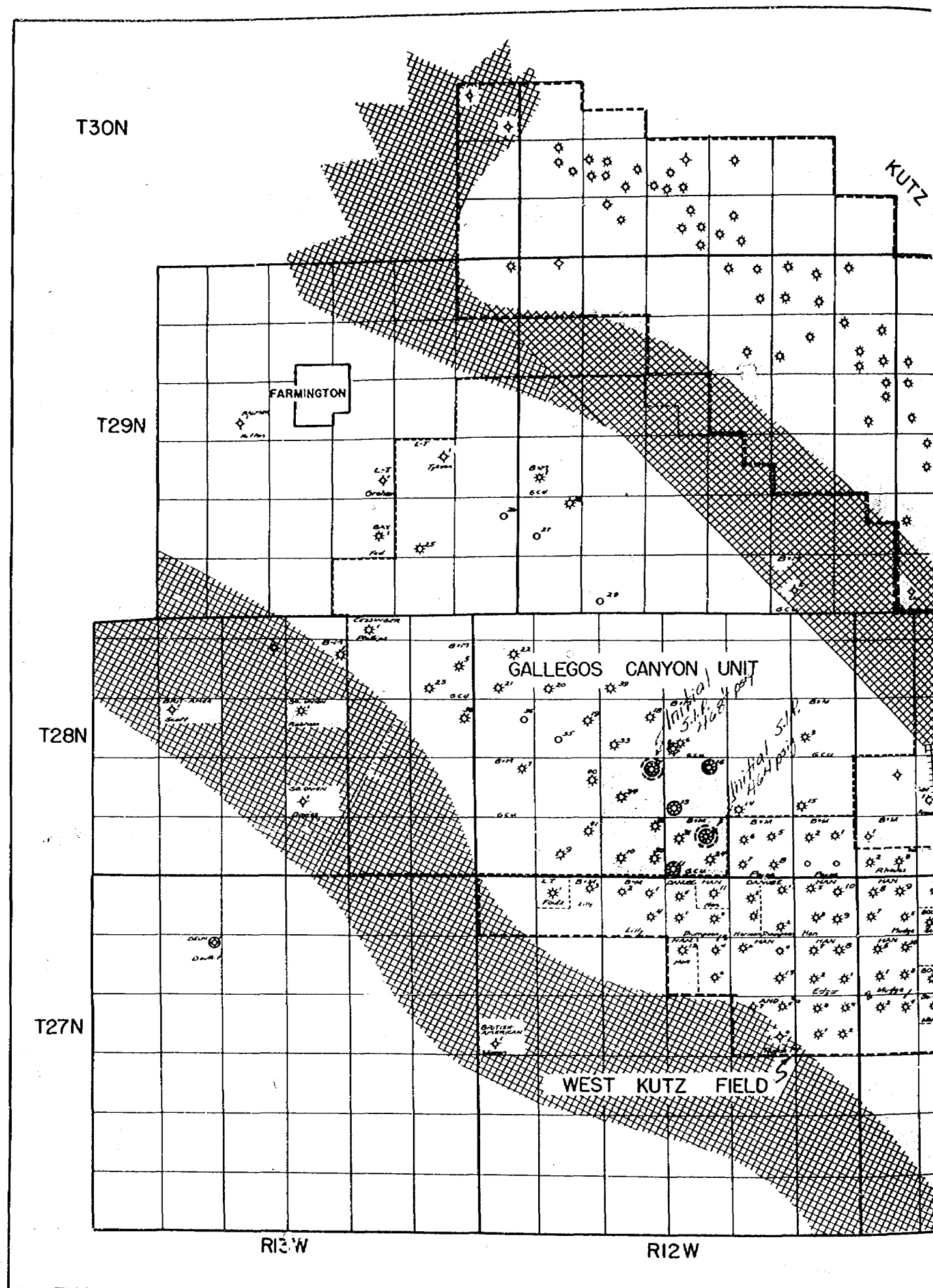
Ex I(a)

(16)

INTERFERENCE TEST OF
BENSON-MONTIN'S #13 GALLEGOS CANYON UNIT
SW/4 SECTION 27, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF WELL-HEAD PRESSURES

MEASURE- MENT NO.	DATE	TIME	CASINGHEAD PRESSURE psig	DAYS SHUT IN	REMARKS
1	11- 9-52	4:00 PM	-	0	Shut in.
2	11-13-52	-	447	4	Open 3 hours to take State Potential Test.
3	11-22-52	7:00 PM	457.0	13	B & M Dead Weight Gauge.
4	12- 3-52	3:00 PM	460.1	24	"
5	12-11-52	3:00 PM	460.7	32	"
6	12-30-52	4:30 PM	460.9	51	"
7	1-12-53	6:30 PM	460.6	64	"
8	1-22-53	3:30 PM	460.3	74	"
9	2- 3-53	4:00 PM	459.5	86	"
10	2-12-53	2:30 PM	458.8	95	"
11	3- 1-53	4:00 PM	458.0	112	"

E.I. (6)

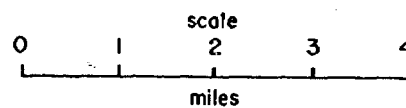


(I-c)

DATA ON PICTURED CLIFFS SAND

KUTZ CANYON - FULCHER BASIN, WEST KUTZ,
AND GALLEGOS CANYON AREAS

SAN JUAN COUNTY, NEW MEXICO



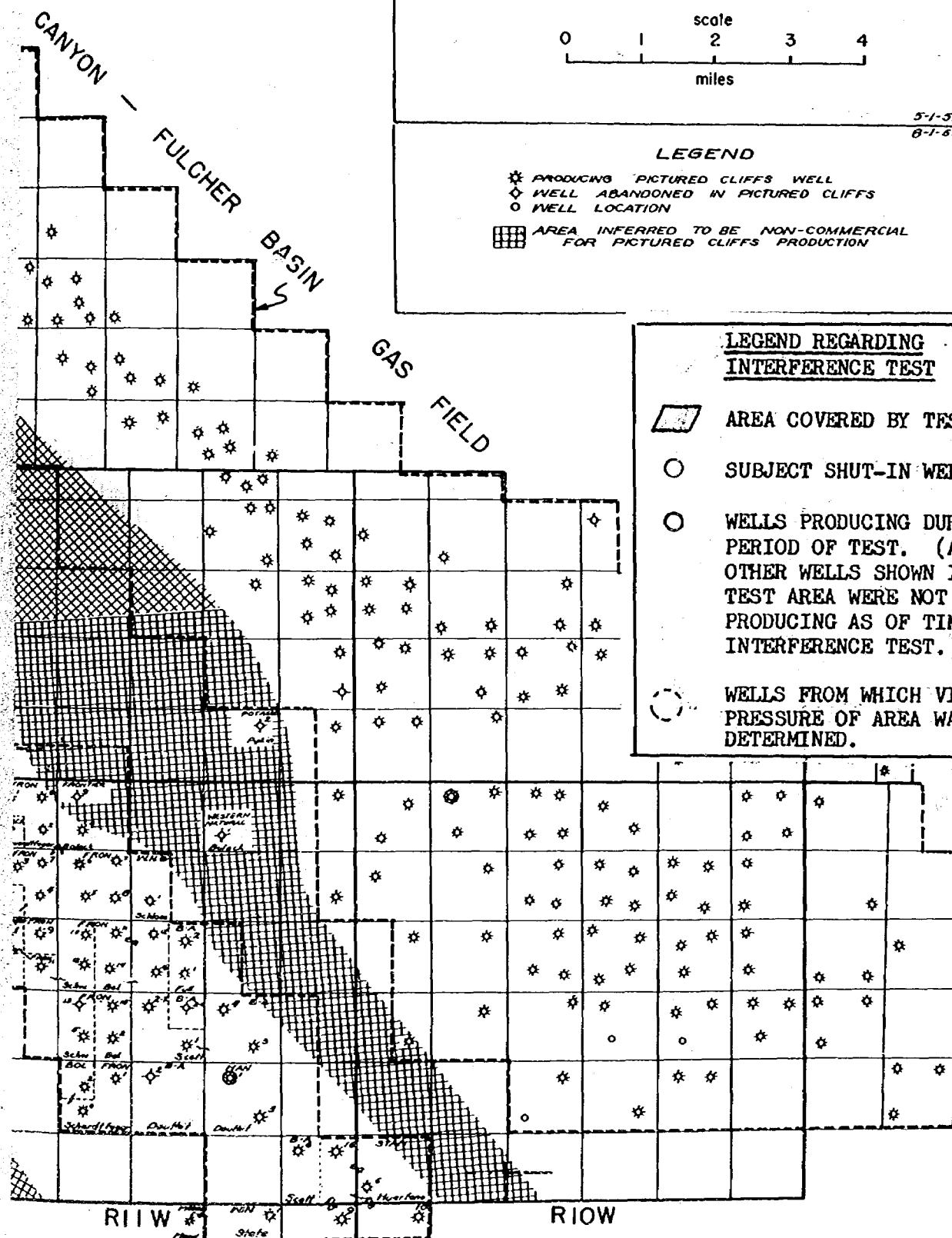
5-1-52 GREER
6-1-53 Rev. N.M.
AKA

LEGEND

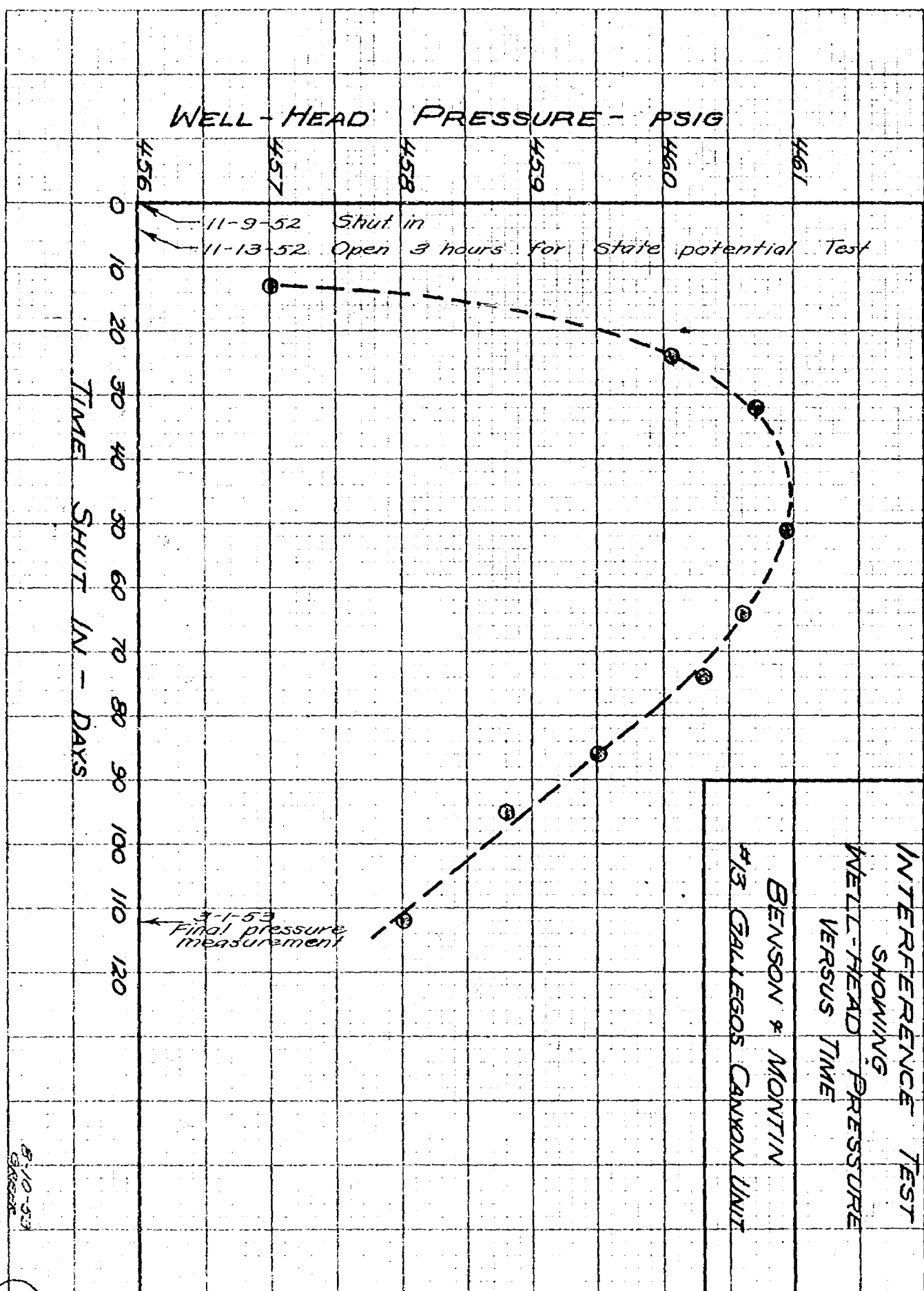
- * PRODUCING PICTURED CLIFFS WELL
- ◇ WELL ABANDONED IN PICTURED CLIFFS
- WELL LOCATION
- ▨ AREA INFERRED TO BE NON-COMMERCIAL FOR PICTURED CLIFFS PRODUCTION

LEGEND REGARDING INTERFERENCE TEST

- ▨ AREA COVERED BY TEST.
- SUBJECT SHUT-IN WELL.
- WELLS PRODUCING DURING PERIOD OF TEST. (ALL OTHER WELLS SHOWN IN TEST AREA WERE NOT PRODUCING AS OF TIME OF INTERFERENCE TEST.)
- WELLS FROM WHICH VIRGIN PRESSURE OF AREA WAS DETERMINED.



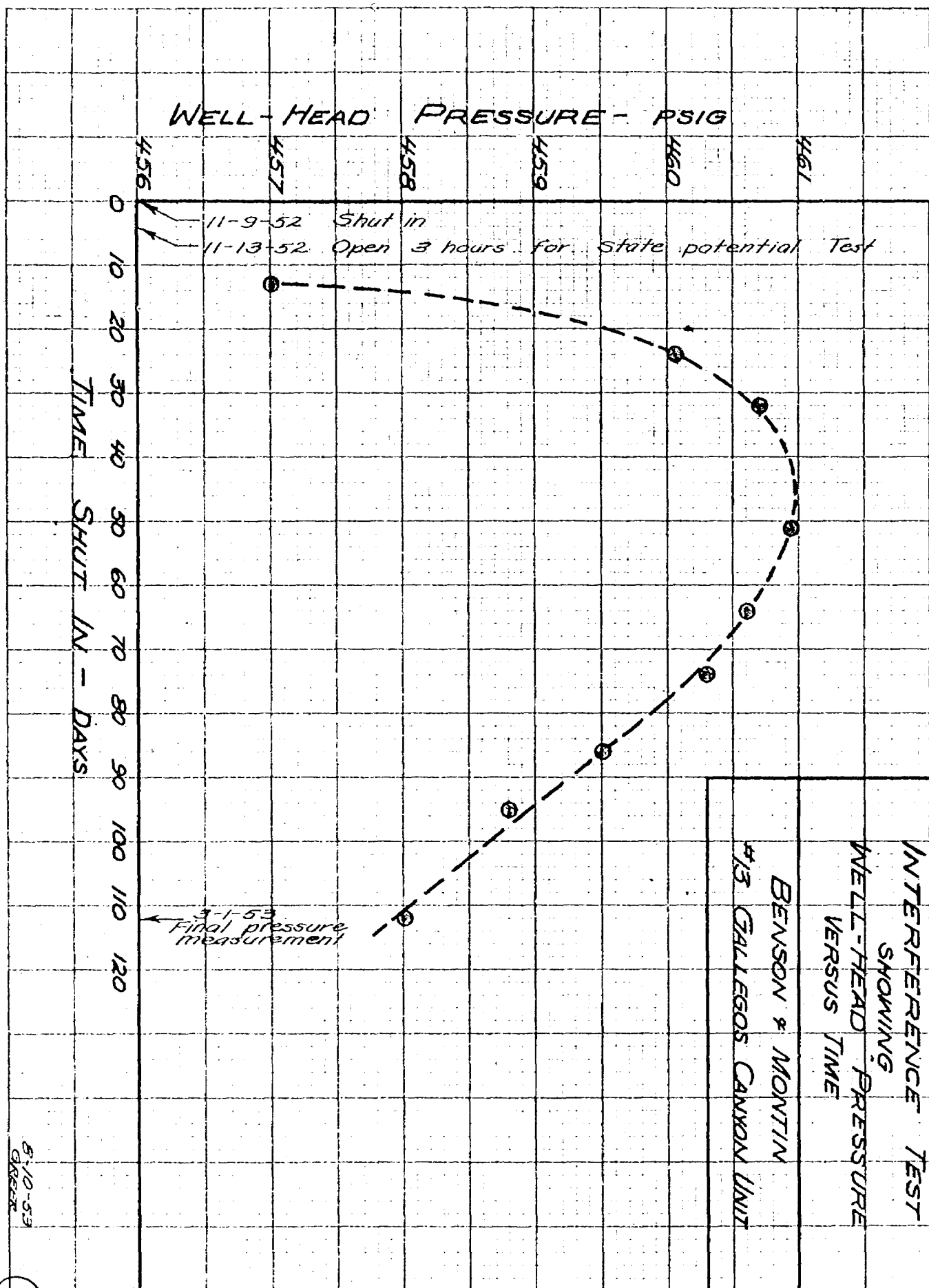
Ex IIC



EX I (2)

5-10-53
GSK

EX I



5-10-53
 GREGG

(I-1)

EX I (d)

J-a

BENSON-MONTIN
INTERFERENCE TEST NO. 4
GALLEGOS CANYON AREA
SAN JUAN COUNTY, NEW MEXICO
PICTURED CLIFFS FORMATION

DATE OF TEST: March, April, May, June, July, 1953.

AREA OF TEST:

<u>Description</u>	<u>Approximate Area</u>
All Section 26, Twp. 28N, Rge. 12W	640 acres
" Section 27, Twp. 28N, Rge. 12W	640 "
" Section 28, Twp. 28N, Rge. 12W	640 "
" Section 33, Twp. 28N, Rge. 12W	640 "
" Section 34, Twp. 28N, Rge. 12W	640 "
" Section 35, Twp. 28N, Rge. 12W	640 "
" Section 2, Twp. 27N, Rge. 12W	640 "
" Section 3, Twp. 27N, Rge. 12W	640 "
" Section 4, Twp. 27N, Rge. 12W	640 "
TOTAL	5,760 acres

PRODUCING WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u>	<u>Date of First Production into Pipe Line</u>
<u>Benson-Montin</u>		
#4 Gallegos Canyon Unit	NE/4 Sec. 34, T-28N, R-12W	February, 1952
#10 Gallegos Canyon Unit	SW/4 Sec. 33, T-28N, R-12W	March, 1953
#11 Gallegos Canyon Unit	SW/4 Sec. 34, T-28N, R-12W	November, 1952
#12 Gallegos Canyon Unit	NE/4 Sec. 33, T-28N, R-12W	March, 1953
#13 Gallegos Canyon Unit	SW/4 Sec. 27, T-28N, R-12W	March, 1953
#14 Gallegos Canyon Unit	SW/4 Sec. 26, T-28N, R-12W	November, 1952
#16 Gallegos Canyon Unit	NE/4 Sec. 27, T-28N, R-12W	September, 1952
#17 Gallegos Canyon Unit	NE/4 Sec. 28, T-28N, R-12W	September, 1952
#24 Gallegos Canyon Unit	SE/4 Sec. 34, T-28N, R-12W	March, 1953

Ex J(a)

5-6

INTERFERENCE TEST NO. 4 - CONTINUED

<u>Well</u>	<u>Location</u>	<u>Date of First Production into Pipe Line</u>
<u>Benson-Montin (contd.)</u>		
#5 Payne	NE/4 Sec. 35, T-28N, R-12W	December, 1952
#6 Payne	NW/4 Sec. 35, T-28N, R-12W	September, 1952
#7 Payne	SW/4 Sec. 35, T-28N, R-12W	September, 1952
#8 Payne	SE/4 Sec. 35, T-28N, R-12W	September, 1952
#1 Lilly	NE/4 Sec. 4, T-27N, R-12W	November, 1952
#2 Lilly	NW/4 Sec. 4, T-27N, R-12W	January, 1953
#4 Lilly	SE/4 Sec. 4, T-27N, R-12W	February, 1953
<u>Danube</u>		
#1 Thompson	NE/4 Sec. 2, T-27N, R-12W	February, 1952
#2 Thompson	SE/4 Sec. 2, T-27N, R-12W	February, 1952
#3 Thompson	SE/4 Sec. 3, T-27N, R-12W	February, 1952
#5 Thompson	NW/4 Sec. 3, T-27N, R-12W	May, 1952
#7 Thompson	SW/4 Sec. 3, T-27N, R-12W	February, 1952
#1 Harmon	SW/4 Sec. 2, T-27N, R-12W	February, 1952
#2 Harmon	NW/4 Sec. 2, T-27N, R-12W	February, 1952
<u>Hancock</u>		
#11 Hancock	NE/4 Sec. 3, T-27N, R-12W	July, 1952

SHUT-IN WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u>	<u>Nearest Producing Well</u>	<u>Distance to Nearest Producing Well</u>
Benson-Montin #30 G.C.U.	SE/4 33-28-12	#12 G.C.U.	1920'
Benson-Montin #31 G.C.U.	NW/4 34-28-12	#11 G.C.U.	2120'

E-4 J(4)

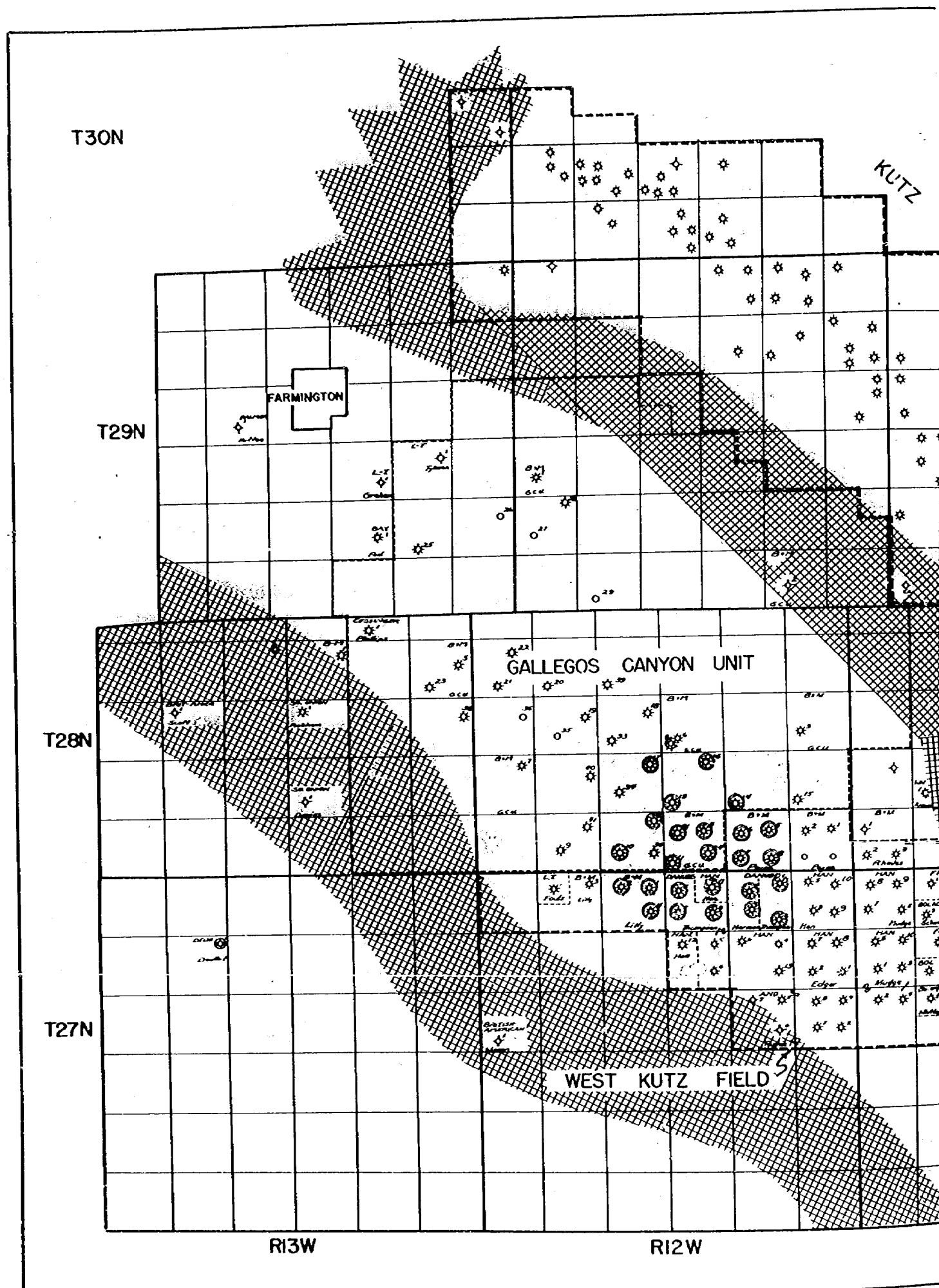
(J-c)

INTERFERENCE TEST OF
BENSON-MONTIN #31 GALLEGOS CANYON UNIT
NW/4 SECTION 34, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF WELL-HEAD PRESSURES

<u>MEASURE-</u> <u>MENT NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>CASINGHEAD</u> <u>PRESSURE</u> <u>(psig)</u>	<u>DAYS</u> <u>SHUT</u> <u>IN</u>	<u>REMARKS</u>
1	3-17-53	12:00 Noon	-	0	Shut in.
2	4- 3-53	-	443	17	Opened well 3 hours for State Potential test. Pressure measured with EPNG dead weight gauge.
3	4-23-53	6:00 PM	442.5	37	Used B & M dead- weight gauge.
4	5-12-53	3:30 PM	440.7	56	"
5	5-29-53	1:00 PM	437.9	73	"
6	6- 9-53	3:00 PM	436.2	84	"
7	7-11-53	4:30 PM	431.2	116	"

NOTE: Measurements #3 through #7 were made with Benson-Montin's dead weight gauge, which has a sensitivity of 1/10#. After the well was shut in at close of potential test on 4-3-53, it was not opened until after Measurement #7 on 7-11-53, at which time it was blown through the tubing for 5 minutes to determine if there was any fluid in the hole. This showed the well to be absolutely dry.

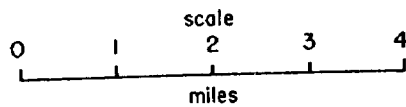
EX J (c)



DATA ON PICTURED CLIFFS SAND

KUTZ CANYON - FULCHER BASIN, WEST KUTZ,
AND GALLEGOS CANYON AREAS

SAN JUAN COUNTY, NEW MEXICO



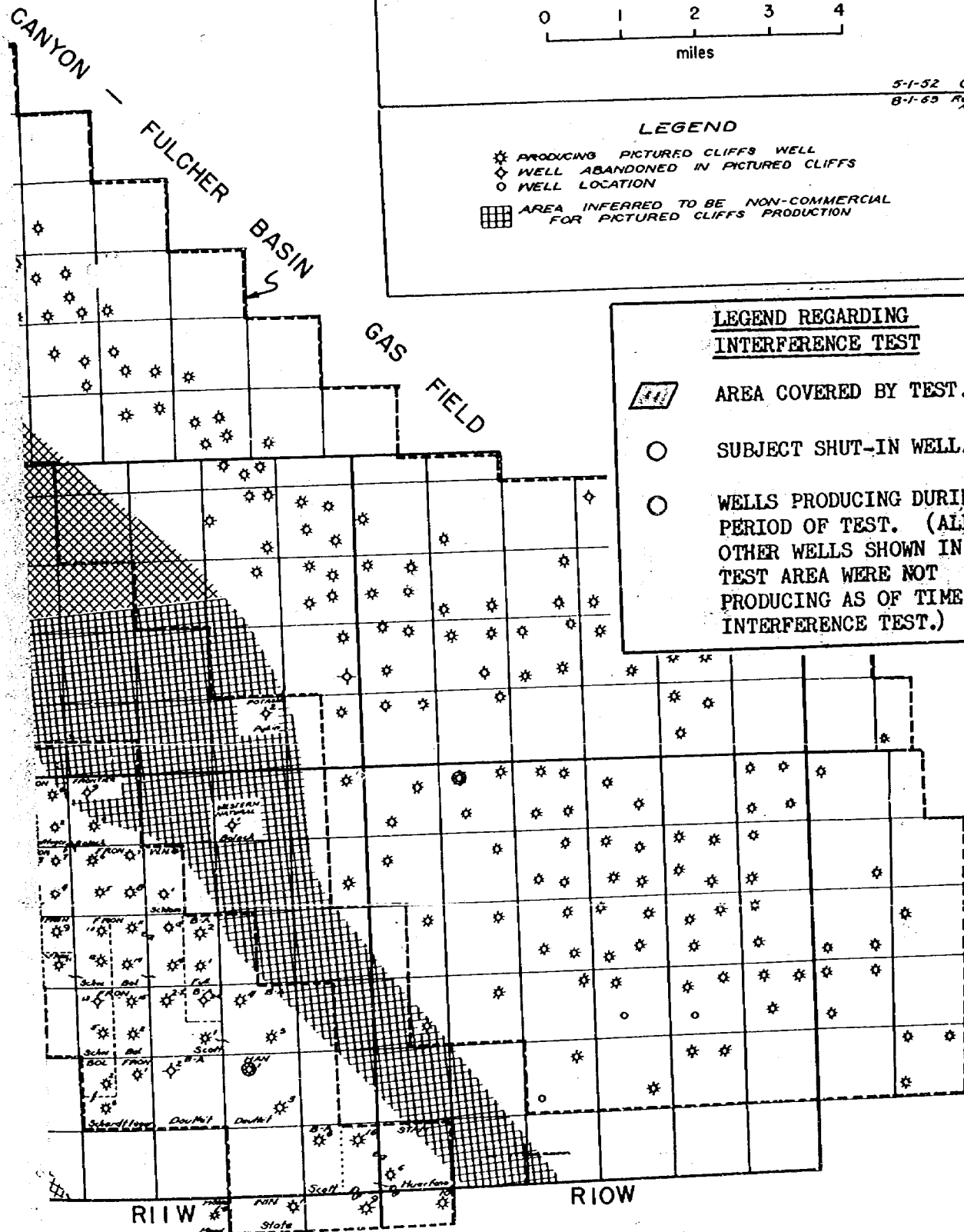
5-1-52 GREER
8-1-63 Rev. N. M. A. C.

LEGEND

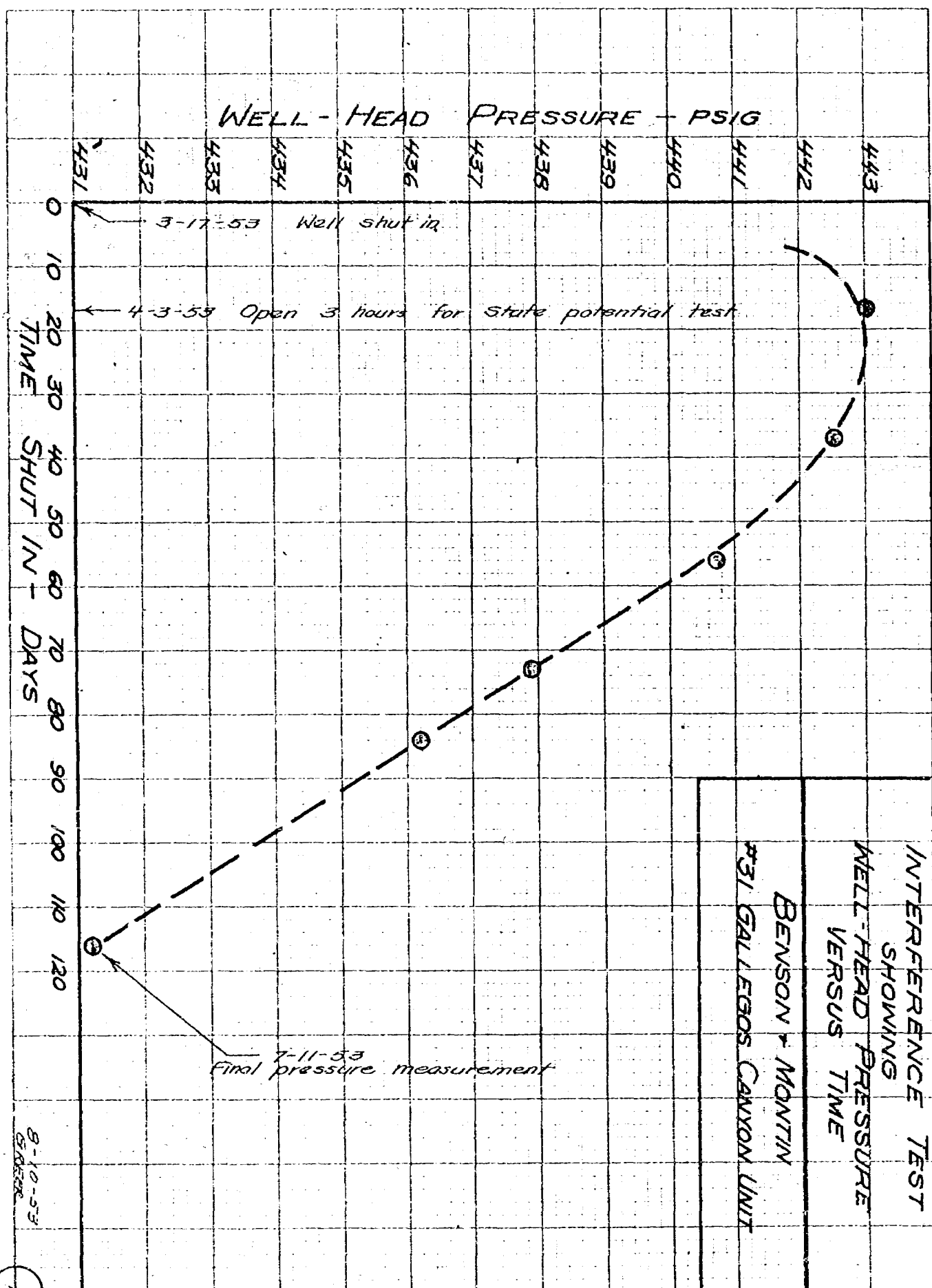
- ★ PRODUCING PICTURED CLIFFS WELL
- ◇ WELL ABANDONED IN PICTURED CLIFFS
- WELL LOCATION
- ▨ AREA INFERRED TO BE NON-COMMERCIAL FOR PICTURED CLIFFS PRODUCTION

LEGEND REGARDING INTERFERENCE TEST

- ▨ AREA COVERED BY TEST.
- SUBJECT SHUT-IN WELL.
- WELLS PRODUCING DURING PERIOD OF TEST. (ALL OTHER WELLS SHOWN IN TEST AREA WERE NOT PRODUCING AS OF TIME OF INTERFERENCE TEST.)



Ex. J. d.



$F \times \sqrt{t}$

52

Ka

BENSON-MONTIN
INTERFERENCE TEST NO. 5
GALLEGOS CANYON AREA
SAN JUAN COUNTY, NEW MEXICO
PICTURED CLIFFS FORMATION

DATE OF TEST: June, July, August, 1953

AREA OF TEST:

<u>Description</u>	<u>Approximate Area</u>
SW/2 Section 16, Twp. 28N, Rge. 12W	320 acres
SE/2 Section 17, Twp. 28N, Rge. 12W	320 "
SE/2 Section 19, Twp. 28N, Rge. 12W	320 "
All Section 20, Twp. 28N, Rge. 12W	640 "
All Section 21, Twp. 28N, Rge. 12W	640 "
SW/2 Section 22, Twp. 28N, Rge. 12W	320 "
NW/2 Section 27, Twp. 28N, Rge. 12W	320 "
All Section 28, Twp. 28N, Rge. 12W	640 "
All Section 29, Twp. 28N, Rge. 12W	640 "
NE/2 Section 30, Twp. 28N, Rge. 12W	320 "
NE/2 Section 32, Twp. 28N, Rge. 12W	320 "
NW/2 Section 33, Twp. 28N, Rge. 12W	320 "
TOTAL	5,120 acres

PRODUCING WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u> <u>(T-28N, R-12W)</u>	<u>Date of First Production</u> <u>into pipe line</u>
#6 Gallegos Canyon Unit	SW/4 Sec. 22	February, 1952
#7 Gallegos Canyon Unit	NE/4 Sec. 30	August, 1952
#17 Gallegos Canyon Unit	NE/4 Sec. 28	September, 1952
#18 Gallegos Canyon Unit	NE/4 Sec. 21	April, 1953

Ex K (a)

K-6

PRODUCING WELLS ON BOUNDARY OF TEST AREA:

<u>Well</u>	<u>Location</u> (T-28N, R-12W)	<u>Date of First Production</u> <u>into pipe line</u>
#10 Gallegos Canyon Unit	SW/4 Sec. 32	March, 1953
#12 Gallegos Canyon Unit	NE/4 Sec. 32	March, 1953
#13 Gallegos Canyon Unit	SW/4 Sec. 27	March, 1953
#16 Gallegos Canyon Unit	NE/4 Sec. 27	September, 1952
#20 Gallegos Canyon Unit	SW/4 Sec. 17	April, 1953

SHUT-IN WELLS WITHIN TEST AREA:

<u>Well</u>	<u>Location</u> (T-28N, R-12W)	<u>Nearest</u> <u>Producing</u> <u>Well</u>	<u>Distance to</u> <u>nearest</u> <u>producing well</u>
#19 Gallegos Canyon Unit	NE/4 Sec. 20	#20 G.C.U.	4,400 feet
#33 Gallegos Canyon Unit	SW/4 Sec. 21	#17 G.C.U.	3,850 "
#34 Gallegos Canyon Unit	SW/4 Sec. 28	#17 G.C.U.	3,740 "
#39 Gallegos Canyon Unit	SW/4 Sec. 16	#18 G.C.U.	4,300 "
#40 Gallegos Canyon Unit	NE/4 Sec. 29	#17 G.C.U.	5,000 "
#41 Gallegos Canyon Unit	NE/4 Sec. 32	# 9 G.C.U.	3,230 "

Ex. 1. (6)

K.C.

INTERFERENCE TEST OF
BENSON-MONTIN #33 GALLEGOS CANYON UNIT
SW/4 SECTION 21, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF SHUT-IN WELL-HEAD PRESSURES

<u>MEASUREMENT</u> <u>NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>CASINGHEAD</u> <u>PRESSURE</u> <u>(psig)</u>	<u>DAYS</u> <u>SHUT</u> <u>IN</u>	<u>REMARKS</u>
1	6-26-53	8:00 AM	0	0	Shut in
2	7-21-53	8:30 PM	459.0	25	
3	7-31-53	7:30 AM	459.1	35	
4	8- 5-53	6:00 PM	459.1	40	
5	8- 9-53	11:30 AM	458.85	44	8-8-53 well was blown into pipe line lateral for 5 minutes to purge it. This reading abnormally low because of blowing well. Installed locks on valves.
6	8-15-53	2:00 PM	459.0	50	
7	8-19-53	5:30 PM	458.7	54	
8	8-24-53	9:30 PM	458.55	59	
9	8-31-53	4:00 PM	458.45	66	
10	9-12-53	12:30 PM	457.5	78	Took State Potential Test.

NOTE: Measurements 2 through 10 were made with B & M dead weight gauge, which has a sensitivity of 1/10#. After Measurement No. 10 on 9-12-53 well was blown through tubing for 5 minutes to determine if there was any liquid in the well bore. This showed the well to be absolutely dry.

E+ K (C)

K-d

INTERFERENCE TEST OF
BENSON-MONTIN #34, GALLEGOS CANYON UNIT
SW/4 SECTION 28, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF SHUT-IN WELL-HEAD PRESSURES

<u>MEASUREMENT</u> <u>NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>CASINGHEAD</u> <u>PRESSURE</u> <u>(psig)</u>	<u>DAYS</u> <u>SHUT</u> <u>IN</u>	<u>REMARKS</u>
1	6-19-53	12:00 Noon	0	0	Shut in
2	6-29-53	-	458	10	Opened well for 3 hours for State Potential Test. Pressure measured with EPNG gauge.
3	7-11-53	5:30 PM	460.6	22	
4	7-21-53	9:00 PM	462.6	32	
5	7-31-53	8:30 AM	462.9	42	
6	8- 5-53	7:30 PM	462.5	47	Well blown on 8-5-53 for 5 minutes to purge lateral, causing this pressure to be abnormally low. Installed locks on valves.
7	8- 9-53	12:00 Noon	463.1	51	
8	8-15-53	2:30 PM	463.3	57	
9	8-19-53	6:30 PM	463.4	61	
10	8-24-53	10:30 PM	463.3	66	
11	8-31-53	4:30 PM	463.3	73	
12	9-12-53	4:00 PM	462.9	85	

NOTE: Measurements #3 through #12 were made with B & M's dead weight gauge, which has a sensitivity of 1/10#. After the well was shut in at close of potential test on 6-29-53 it was not opened again until after Measurement #12 on 9-12-53, with the exception of being inadvertently opened on 8-5-53 for 5 minutes. After Measurement #12 the well was blown through the tubing for 5 minutes to determine if there was any liquid in the well bore. This showed the well to be absolutely dry.

Ex K (43)

(K-4)

INTERFERENCE TEST OF
BENSON-MONTIN #40 GALLEGOS CANYON UNIT
NE/4 SECTION 29, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
SHOWING
RECORD OF SHUT-IN WELL-HEAD PRESSURES

<u>MEASUREMENT</u> <u>NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>WELL-HEAD</u> <u>PRESSURE</u> (psig)	<u>DAYS</u> <u>SHUT</u> <u>IN</u>	<u>REMARKS</u>
1	7- 9-53	12:00 Noon	0	0	Shut in.
2	7-21-53	8:00 PM	457.4	12	
3	7-31-53	7:00 AM	459.9	22	
4	8- 5-53	6:30 PM	461.0	27	
5	8- 9-53	11:15 AM	461.1	31	Well was blown for 5 minutes on 8-7-53. This pressure is low as a result. Installed locks on valves.
6	8-15-53	1:30 PM	461.75	37	
7	8-19-53	6:00 PM	462.15	41	
8	8-24-53	11:00 PM	462.25	46	
9	8-31-53	4:15 PM	462.4	53	
10	9-12-53	12:15 PM	462.3	65	Took State Potential Test.

NOTE: Measurements #2 through #10 were taken with B & M dead weight gauge, which has a sensitivity of 1/10#. After Measurement #10 the well was blown through the tubing for 5 minutes to determine if there was any liquid in the well bore. This showed the well to be absolutely dry.

Ex K(e)

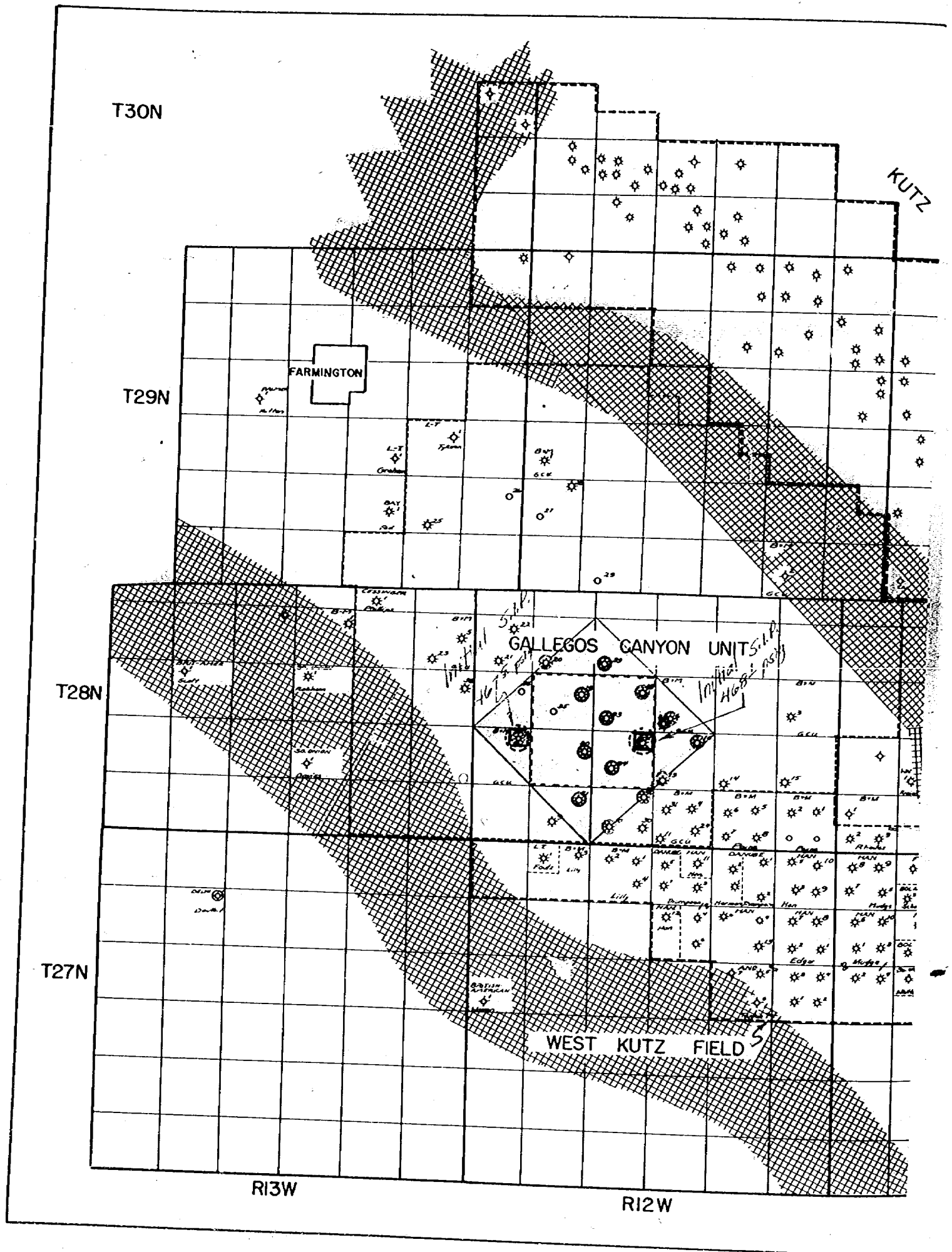
(K-6)

INTERFERENCE TEST OF
BENSON-MONTIN #41 GALLEGOS CANYON UNIT
NE/4 SECTION 31, TWP. 28N, RGE. 12W
SAN JUAN COUNTY, NEW MEXICO
RECORD OF SHUT-IN WELL HEAD PRESSURES

<u>MEASUREMENT NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>CASINGHEAD PRESSURE (psig)</u>	<u>DAYS SHUT IN</u>	<u>REMARKS</u>
1	6-12-53	4:00 PM	0	0	Shut in.
2	6-26-53	-	457	14	Well opened for 3 hours to take State Potential Test. Pressure measured with EPNG gauge.
3	7-11-53	6:00 PM	462.3	29	
4	7-21-53	10:00 PM	463.0	39	
5	7-31-53	9:00 AM	463.0	49	
6	8- 5-53	8:00 PM	463.05	54	
7	8- 9-53	12:00 Noon	463.05	58	
8	9-12-53	4:15 PM	462.4	92	

NOTE: Measurements #2 through #8 were taken with B & M dead weight gauge, which has a sensitivity of 1/10#. After closing in the well at completion of potential test on 6-26-53, the well was not opened until after Measurement #8, at which time it was blown through the tubing for 5 minutes to determine if there was any liquid in the well bore. This showed the well to be absolutely dry.

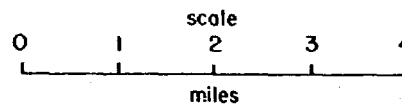
EX K(F)



DATA ON PICTURED CLIFFS SAND

KUTZ CANYON - FULCHER BASIN, WEST KUTZ,
AND GALLEGOS CANYON AREAS

SAN JUAN COUNTY, NEW MEXICO



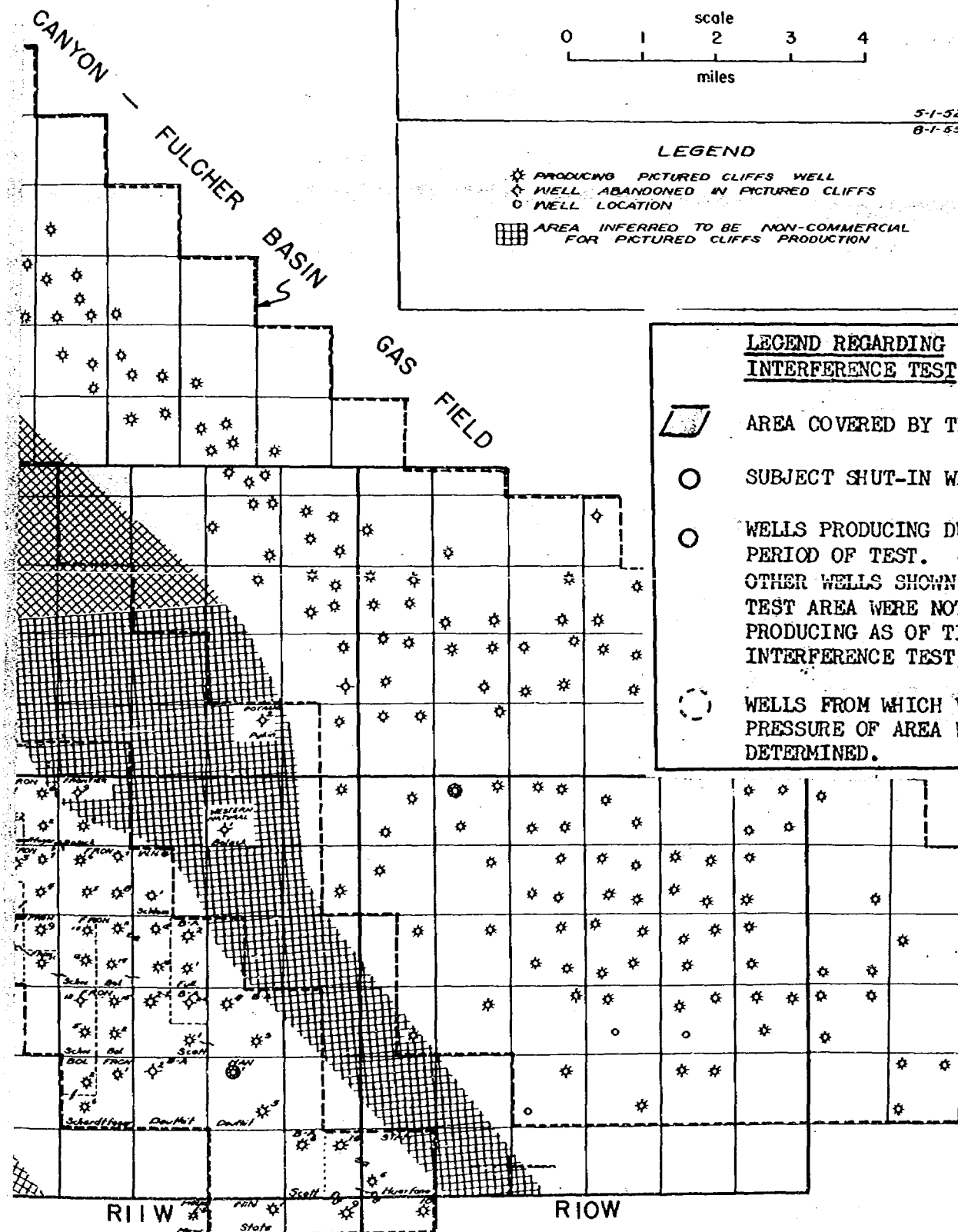
5-1-52 GREER
8-1-53 Rev. N. H. H. Area

LEGEND

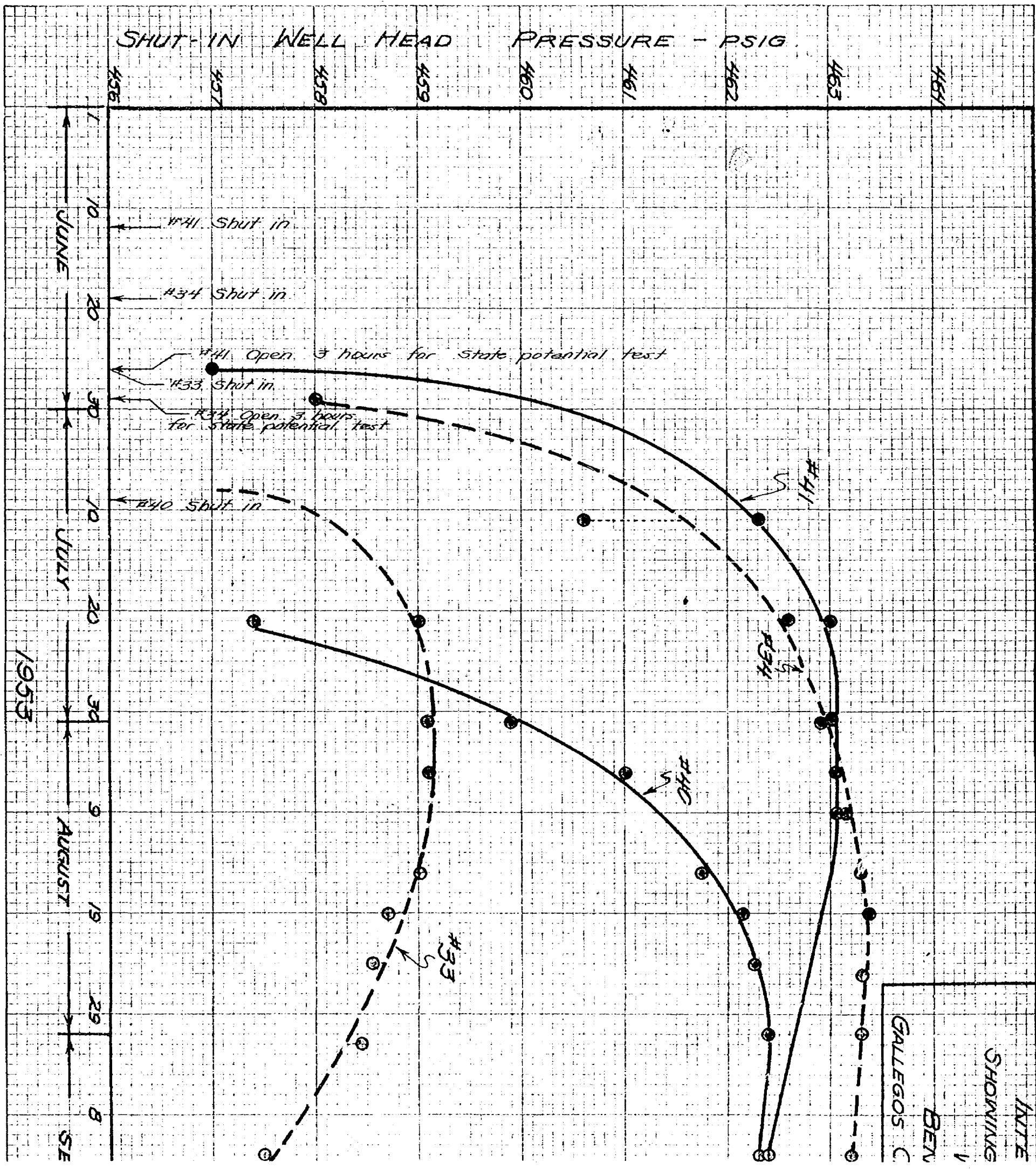
- ★ PRODUCING PICTURED CLIFFS WELL
- ◊ WELL ABANDONED IN PICTURED CLIFFS
- WELL LOCATION
- ▨ AREA INFERRED TO BE NON-COMMERCIAL FOR PICTURED CLIFFS PRODUCTION

LEGEND REGARDING INTERFERENCE TEST

- ▨ AREA COVERED BY TEST.
- SUBJECT SHUT-IN WELL.
- WELLS PRODUCING DURING PERIOD OF TEST. (ALL OTHER WELLS SHOWN IN TEST AREA WERE NOT PRODUCING AS OF TIME OF INTERFERENCE TEST).
- WELLS FROM WHICH VIRGIN PRESSURE OF AREA WAS DETERMINED.



Ey K(12)



(K-4)

REFERENCE TEST

WELL - HEAD PRESSURE

VERSUS TIME

SON and MONTIN

ANYON UNIT 33, 34, 40, 41

18	
17	
9-24-53	
6162	

CORE LABORATORIES, INC.



Petroleum Reservoir Engineering

COMPANY ELSON AND SUTHER DATE ON DEC. 1, 1951 FILE NO. 12-7 (3)
 WELL REARDED GARDEN UNIT NO. 2 DATE OFF DEC. 1, 1951 ENGRS. A.O. SUTHER
 FIELD WYOMING FORMATION PICTURE CLIFFS ELEV. 1329' 13
 COUNTY SAN JUAN STATE N.M. DRLG. FLD. WATER BAY AND CORES 12-7 (3) COV.
 LOCATION SLO. 24-2351-2352 REMARKS

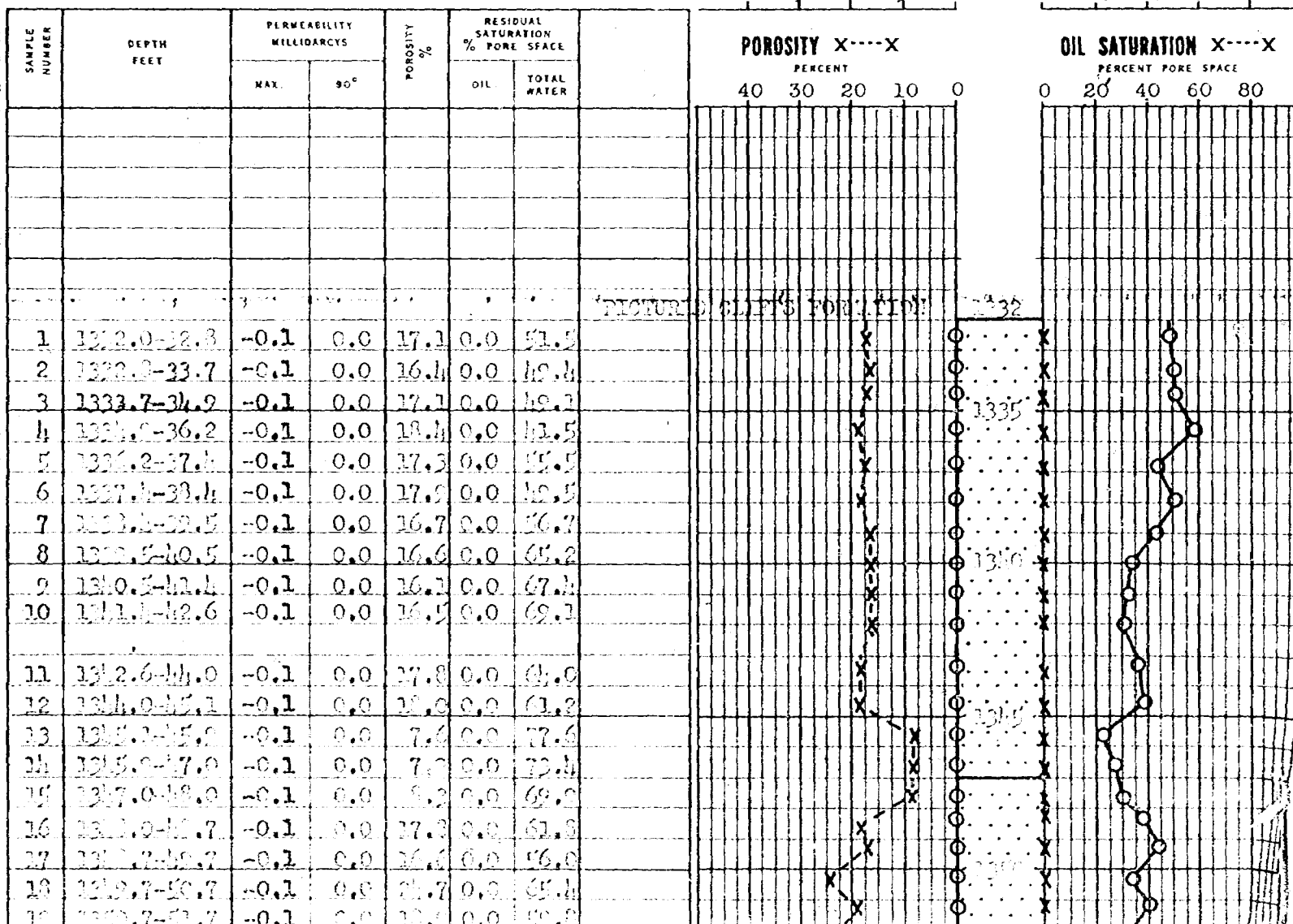
Special Analysis CORE REPORT

SAND LIMESTONE CONGLOMERATE CHERT
 SHALE DOLOMITE

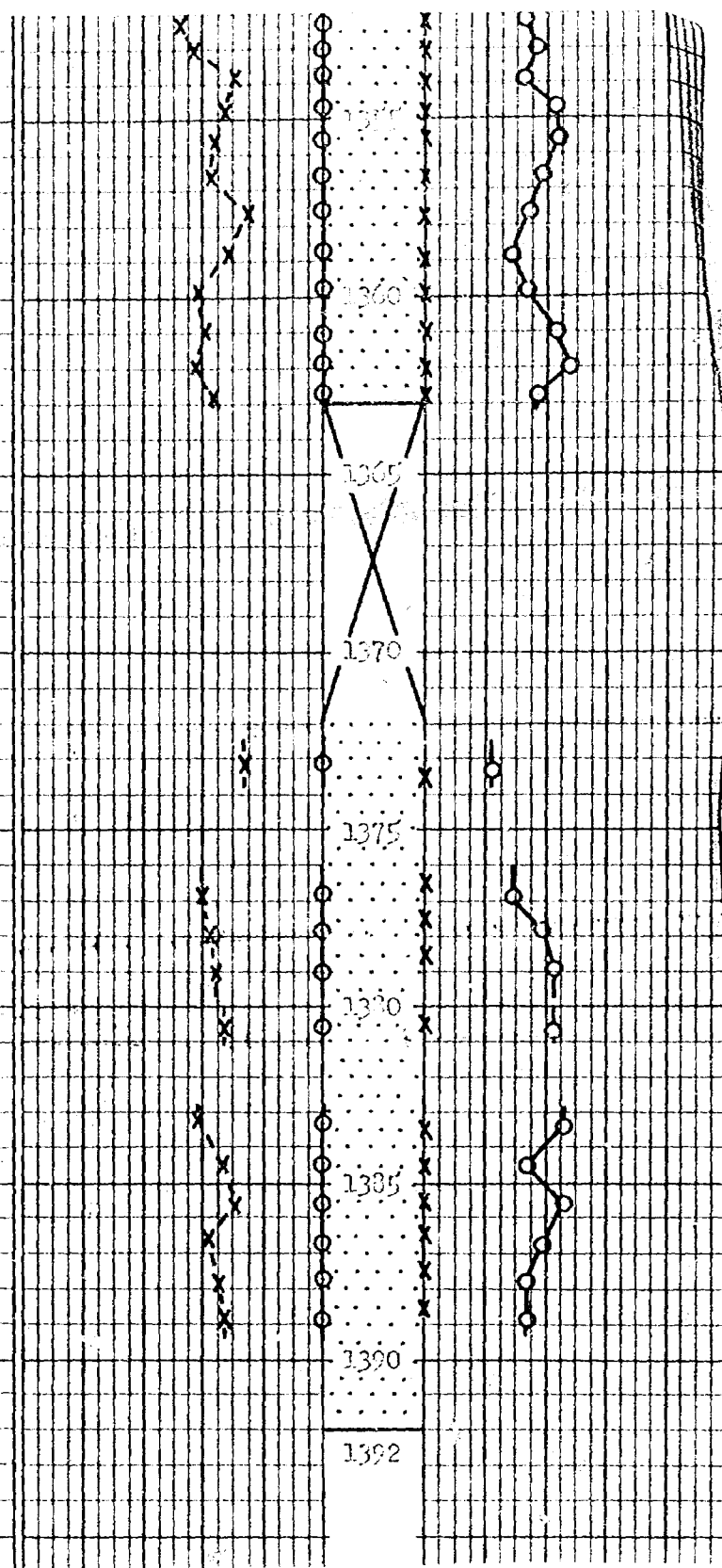
These data are for information only and are not to be used for any purpose other than that for which they were collected. The data are the property of Core Laboratories, Inc. and are not to be used for any other purpose without the written consent of Core Laboratories, Inc.

PERMEABILITY, Maximum
 MILLIDARCY
 20 15 10 5 0

TOTAL WATER
 PERCENT PORE SPACE
 80 60 40 20 0



20	1312.0-16.0	-0.1	0.0	12.1	0.0	71.4
21	1312.0-16.1	-0.1	0.0	12.1	0.0	71.4
22	1312.1-16.2	-0.1	0.0	12.1	0.0	67.2
23	1312.2-16.3	-0.1	0.0	12.1	0.0	67.0
24	1312.1-16.0	-0.1	0.0	12.1	0.0	66.0
25	1312.0-17.0	-0.1	0.0	12.2	0.0	62.2
26	1317.0-18.2	-0.1	0.0	12.1	0.0	61.0
27	1313.2-18.2	-0.1	0.0	15.4	0.0	70.9
28	1317.0-60.5	-0.1	0.0	10.2	0.0	66.3
29	1300.5-61.0	-0.1	0.0	12.1	0.0	66.4
30	1301.6-62.2	-0.1	0.0	11.1	0.0	62.8
31	1302.2-63.0	-0.1	0.0	12.0	0.0	62.0
32	1312.5-73.7	-0.1	0.0	12.7	0.0	73.0
33	1316.2-77.2	-0.1	0.0	12.9	0.0	70.8
34	1317.2-78.4	-0.1	0.0	12.4	0.0	61.8
35	1318.4-79.6	-0.1	0.0	17.5	0.0	57.3
36	1330.0-81.1	-0.1	0.0	16.1	0.0	57.7
37	1322.8-83.8	-0.1	0.0	20.6	0.0	51.5
38	1383.8-85.1	-0.1	0.0	16.2	0.0	66.7
39	1325.1-85.9	-0.1	0.0	14.1	0.0	54.4
40	1325.9-87.4	-0.1	0.0	18.6	0.0	61.6
41	1327.4-88.3	-0.1	0.0	17.2	0.0	66.0
42	1388.3-89.3	-0.1	0.0	16.9	0.0	65.3



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

December 27, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Special Core Analysis
Gallegos Canyon Unit No. 2 Well
West Kutz Field
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the Pictured Cliffs formation in the subject well have been sampled and quick-frozen by a representative of Core Laboratories, Inc., and later analyzed in our Worland, Wyoming laboratory by special analysis methods. Results of the analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Special analysis performed on the samples includes measurements of maximum permeability, 90° from the maximum, porosity and liquid saturations.

Chloride determinations were made from every fifth foot of formation and are reported in parts per million of pore water on page one.

It is believed that the formation from 1332 to 1389.3 feet would possibly be gas productive after shooting with nitroglycerin.

Average data for the zone, 1332 to 1389.3 feet, are presented on page two.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (PB)
J. D. Harris,
District Engineer

JDH:aa

Benson & Montin
Gallegos Canyon Unit No. 2 Well
West Kutz Field
San Juan County, New Mexico

Page: 1 of 2
File: WL-87 S

Chloride Determinations

<u>Sample Number</u>	<u>Depth: Feet</u>	<u>cc AgN03</u>	<u>PPM Pore Water</u>
4	1334.9-36.2	4.6	49,100
9	1340.5-41.4	3.6	30,300
14	1345.9-47.0	1.9	29,500
19	1350.7-51.7	4.3	31,200
24	1355.1-56.0	4.1	34,200
29	1360.5-61.6	4.9	36,400
32	1372.5-73.7	4.6	46,200
34	1377.3-78.4	3.9	28,200
37	1382.8-83.8	3.8	27,100
41	1387.4-88.3	3.7	27,100

CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS

Page 2 of 2
 File WL-87 S
 Well Gallegos Canyon Unit
No. 2

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	1332.0-1389.3			
% CORE RECOVERY	84			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	43.2			
AVERAGE PERMEABILITY MILLIDARCYS	Max.: < 0.1 90°: 0.0			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION	Max.: 2.1 90°: 0.0			
AVERAGE POROSITY, PERCENT	17.0			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	61.5			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	61.5			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				

CALCULATED RECOVERABLE OIL { Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLs. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLs. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLs. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

J D Harris (pg)
 J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representation, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.



Petroleum Reservoir Engineering

COMPANY BRUNN & SONEN DATE 9/4 - 9/6/51 FILE ENH-21 FO
 WELL GALLAGHER SANDHILL UNIT # 2 CORES CONVENTIONAL ANALYSTS LV
 FIELD ETIDCAT FORMATION PICTURED CLIFFS ELEVATION 5380' IB
 COUNTY SAN JUAN DRIG. FLUID WATER BASE MUD LOCATION SDR. 35-29N-12W
 STATE NEW MEXICO REMARKS SERVICES # 5 & # 1

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, they are made. The interpretations or opinions expressed are those of the staff of Core Laboratories, Inc. and are not to be construed as a warranty or representation as to the productivity, proper operation, or profitability of any oil, gas or other material well or field in connection with which such report is made or relied upon.

CORE ANALYSIS AND
INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCS	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PROD.
				OIL	TOTAL WATER	
1	1334.0	0.7	17.0	0.0	54.1	*
2	1336.0	2.8	21.5	0.0	41.8	GAS
3	1342.0	4.8	21.2	0.0	34.9	GAS
4	1350.0	4.3	23.3	0.0	61.4	*
5	1354.0	8.7	25.7	0.0	61.1	*

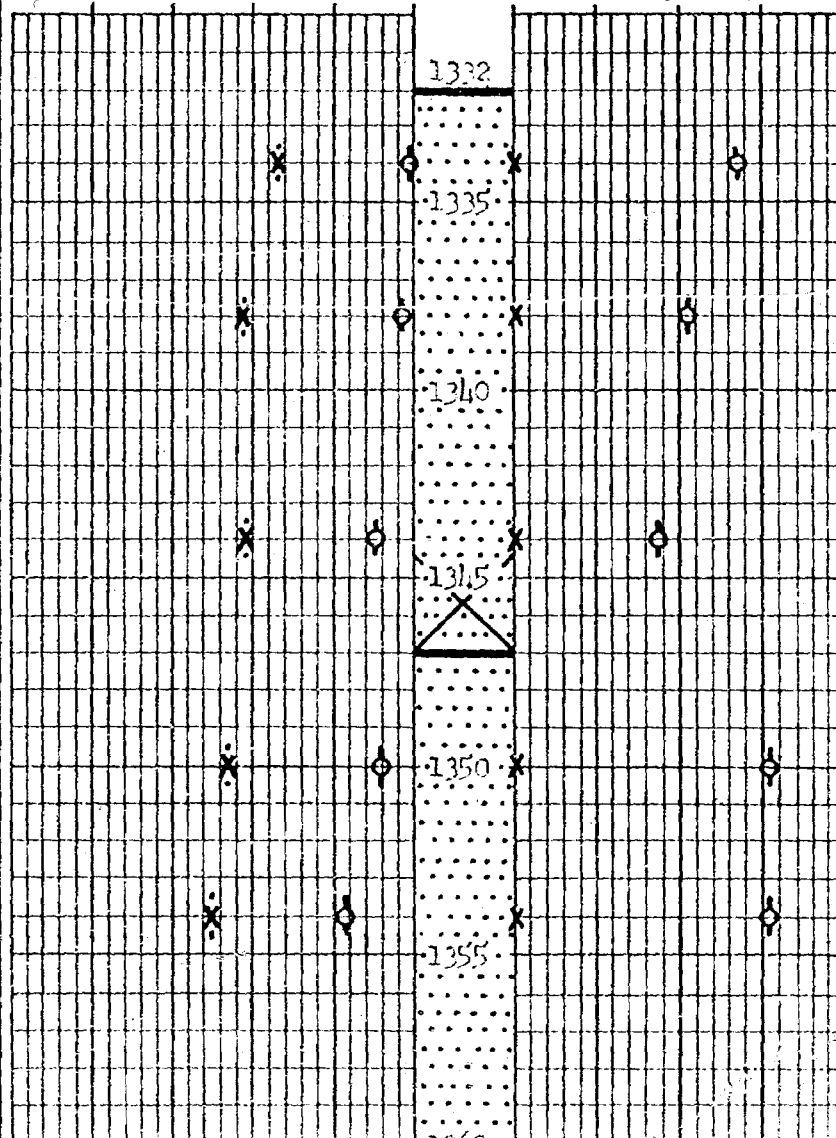
COMPLETION COREGRAPH

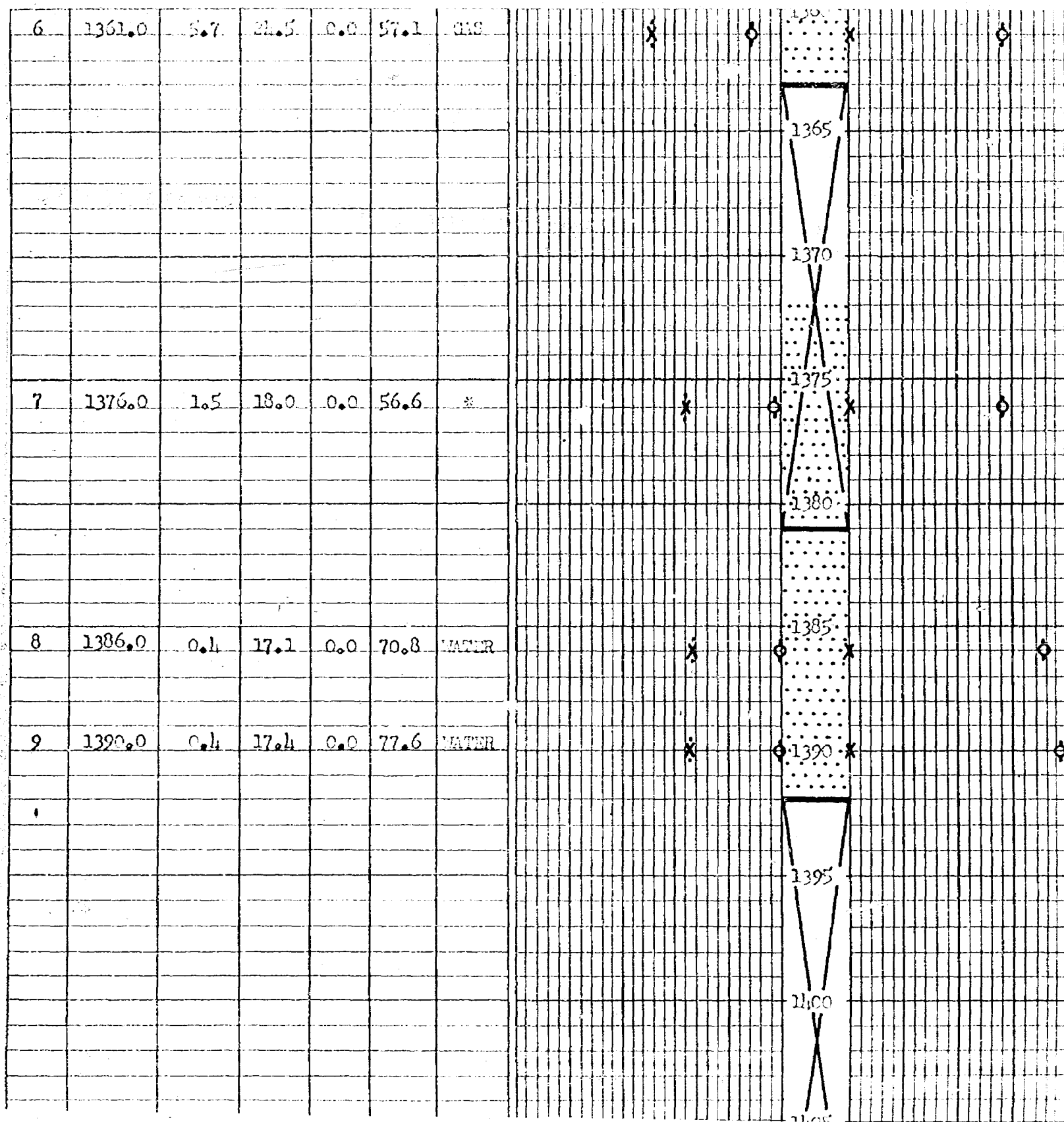
PERMEABILITY $\circ$ — $\circ$
MILLIDARCSTOTAL WATER $\circ$ — $\circ$
PERCENT PORE SPACE

10 30 20 10 0

POROSITY X---X
PERCENTOIL SATURATION X---X
PERCENT PORE SPACE

40 30 20 10 0 0 20 40 60





Station	Time	Lat	Long	Alt	Temp	Wind	Clouds	Pressure	Humidity	Visibility	Remarks
10	1130.0	0.6	20.0	0.0	64.5	*					
11	1133.0	0.4	20.7	0.0	53.6	*					
12	1136.0	1.3	23.2	0.0	64.6	*					
13	1140.0	1.1	22.9	0.0	64.2	*					
14	1145.0	5.3	24.2	0.0	64.1	*					
15	1148.0	1.0	16.7	0.0	56.2	*					

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

October 12, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer

Subject: Core Analysis
Gallegos Canyon Unit No. 2 Well
Wildcat
San Juan County, New Mexico

Gentlemen:

Conventional cores from the subject well in the Pictured Cliffs formation have been sampled and quick-frozen by a representative of Benson & Montin and analyzed in our Farmington, New Mexico laboratory. Results of analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Sand analyzed from 1334 to 1361 feet is interpreted to be very low capacity gas productive.

Sand analyzed from 1376 to 1448 feet is interpreted to be primarily water productive.

Skip sampling of the core precludes the possibility of a definite interpretation of results. It is recommended that a sample of core be taken from each foot to obtain more accurate data.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J. D. Harris (pg)
J. D. Harris,
District Engineer

JDH:aa



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY	DIAMOND AND MOUNTAIN	DATE ON	OCT. 1, 1951	FILE NO.	W-38 (3)
WELL	GULL BOY DIAMOND WELL NO. 1	DATE OFF	NOV. 9, 1951	ENGRS.	H.O. ALBERT
FIELD	WEST WYOM.	FORMATION	TECTONIC CLINTS	ELEV.	5800' 12
COUNTY	SAN JUAN	STATE	N.M.	DRLG. FLD.	WATER BASE AND CORES DIAMOND COBY.
LOCATION	SEC. 24-TOWNSHIP 12S	REMARKS			

Special Analysis:

CORE REPORT

SAND

LIMESTONE

CONGLOMERATE

CHERT

SHALE

DOLOMITE 

PERMEABILITY, Maximum O—O

MILLIDARCYS

20 15 10 5 0

TOTAL WATER 0-0

PERCENT PORE SPACE

80 60 40 20

POROSITY X---X

PERCENT

40 30 20 10 0

OIL SATURATION X---X

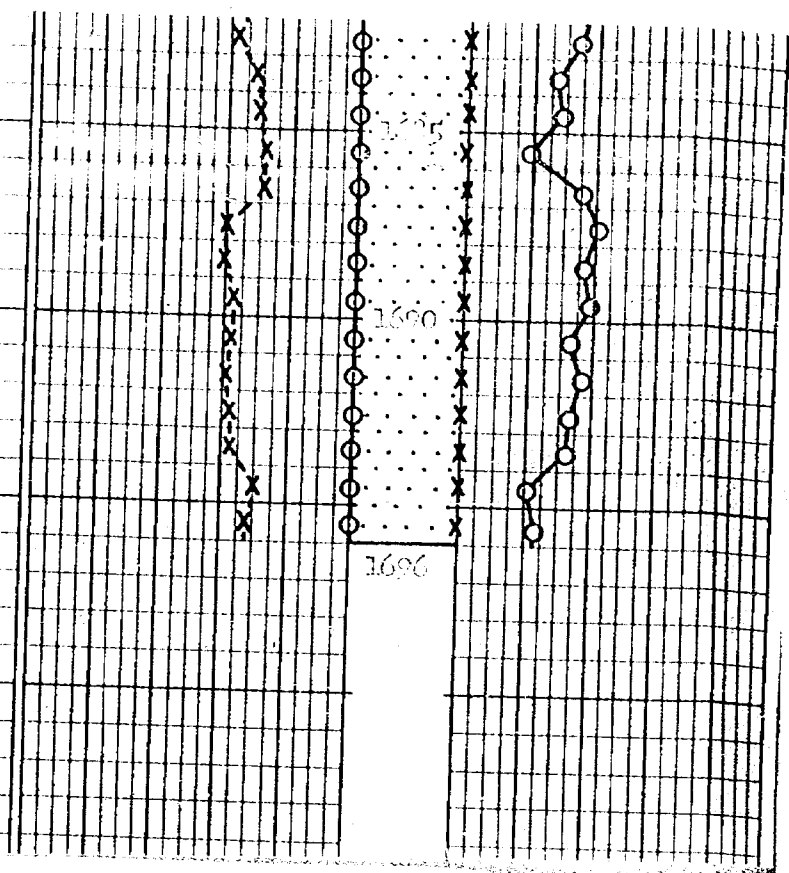
PERCENT PORE SPACE

0 20 40 60 80

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY'S		POROSITY %	RESIDUAL SATURATION % PORE SPACE	
		MAX	90°		OIL	TOTAL WATER
1	1668.0-69.1	-0.1	0.0	16.2	0.0	72.5
2	1669.1-70.2	-0.1	0.0	21.6	0.0	63.5
3	1670.3-71.0	-0.1	0.0	15.3	0.0	62.7
4	1671.0-72.2	-0.1	0.0	18.6	0.0	65.0
5	1675.0-76.0	-0.1	0.0	5.1	0.0	58.2
6	1676.0-76.8	-0.1	0.0	7.1	0.0	76.1
7	1677.3-78.2	-0.1	0.0	16.0	0.0	68.5

PICURED OILS FUEL TIE

8	1611.0-11.0	-0.1	0.0	15.3	0.0	66.0
9	1611.0-11.4	-0.1	0.0	15.4	0.0	71.5
10	1611.0-11.2	-0.1	0.0	15.4	0.0	77.0
11	1611.0-11.2	0.2	0.0	15.3	0.0	77.4
12	1611.0-11.2	-0.1	0.0	15.4	0.0	77.4
13	1611.0-11.3	-0.1	0.0	20.0	0.0	59.2
14	1617.0-17.2	-0.1	0.0	20.0	0.0	62.2
15	1622.0-22.0	-0.1	0.0	22.2	0.0	66.7
16	1620.0-21.1	-0.1	0.0	21.2	0.0	66.3
17	1621.1-22.3	-0.1	0.0	15.0	0.0	63.6
18	1622.2-23.3	-0.1	0.0	15.3	0.0	66.4
19	1623.3-24.1	-0.1	0.0	13.9	0.0	67.6
20	1624.1-25.0	-0.1	0.0	15.0	0.0	70.5
21	1625.0-26.0	-0.1	0.0	15.7	0.0	76.4



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

December 27, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Special Core Analysis
Gallegos Canyon Unit No. 3 Well
West Kutz Field
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the subject well in the Pictured Cliffs formation have been sampled and quick-frozen by a representative of Core Laboratories, Inc. and analyzed in our Worland, Wyoming laboratory by special analysis methods. Water base mud was used as the drilling fluid.

Special analysis performed on the samples includes measurements of maximum permeability, 90 degrees from the maximum, porosity and liquid saturations.

Chloride determinations were made from every fifth foot of formation and are reported in parts per million of pore water on page one.

It is believed that this formation from 1668 to 1696 feet would possibly be gas productive after shooting with nitroglycerin.

Average data for the zone, 1668 to 1696 feet, are presented on page two.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J. D. Harris (pg)
J. D. Harris,
District Engineer

JDH:aa

Benson & Montin
Gallegos Canyon Unit No. 3 Well
West Kutz Field
San Juan County, New Mexico

Page: 1 of 2
File : WL-88 S

Chloride Determinations

<u>Sample Number</u>	<u>Depth: Feet</u>	<u>cc AgNO3</u>	<u>PPM Pore Water</u>
4	1671.0-72.2	6.0	41,200
7	1680.8-82.1	9.3	73,900
14	1687.8-88.9	7.0	45,100
19	1693.3-94.1	6.5	41,800

CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS

Page 2 of 2
 File WL-88 S
 Well Gallegos Canyon Unit
 No. 3

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	1668.0-1695.0			
% CORE RECOVERY	100			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	21.2			
AVERAGE PERMEABILITY MILLIDARCYs	Max: <0.1 90°: 0.0			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION	Max: 2.1 90°: 0.0			
AVERAGE POROSITY, PERCENT	16.6			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	68.9			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	68.9			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				
CALCULATED RECOVERABLE OIL		{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.		
BY NATURAL OR GAS EXPANSION, BBLs. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLs. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLs. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

J. D. Harris (PE)

J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM

SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE

ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representation, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

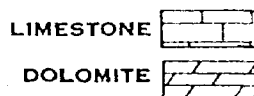


CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY WILLIAMS-SOFT CORP. DATE ON NOV. 21, 1971 FILE NO. 11-16 (3)
WELL WILLIAMS-SOFT CORP. NO. 4 DATE OFF NOV. 21, 1971 ENGRS. R.C. JOHNSON
FIELD WILLIAMS-SOFT FORMATION WILLIAMS-SOFT ELEV.
COUNTY SAN JUAN STATE N.M. DRLG. FLD. WILLIAMS-SOFT CORES WILLIAMS-SOFT
LOCATION W.C. 22-1201-2201 REMARKS NOV. 10, 2

Special Analysis
CORE REPORT



THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF CORE LABORATORIES, INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CORE LABORATORIES, INC.

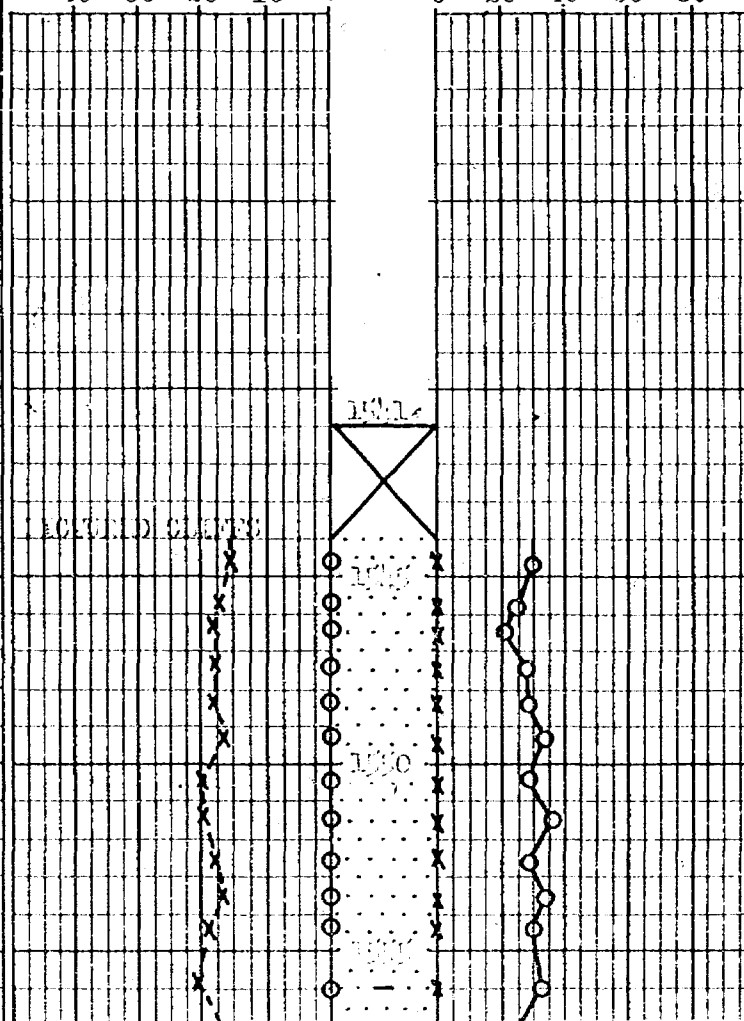
PERMEABILITY, Maximum $\bigcirc-\bigcirc$
MILLIDARCYs
20 15 10 5 0

TOTAL WATER $\bigcirc-\bigcirc$
PERCENT PORE SPACE
80 60 40 20 0

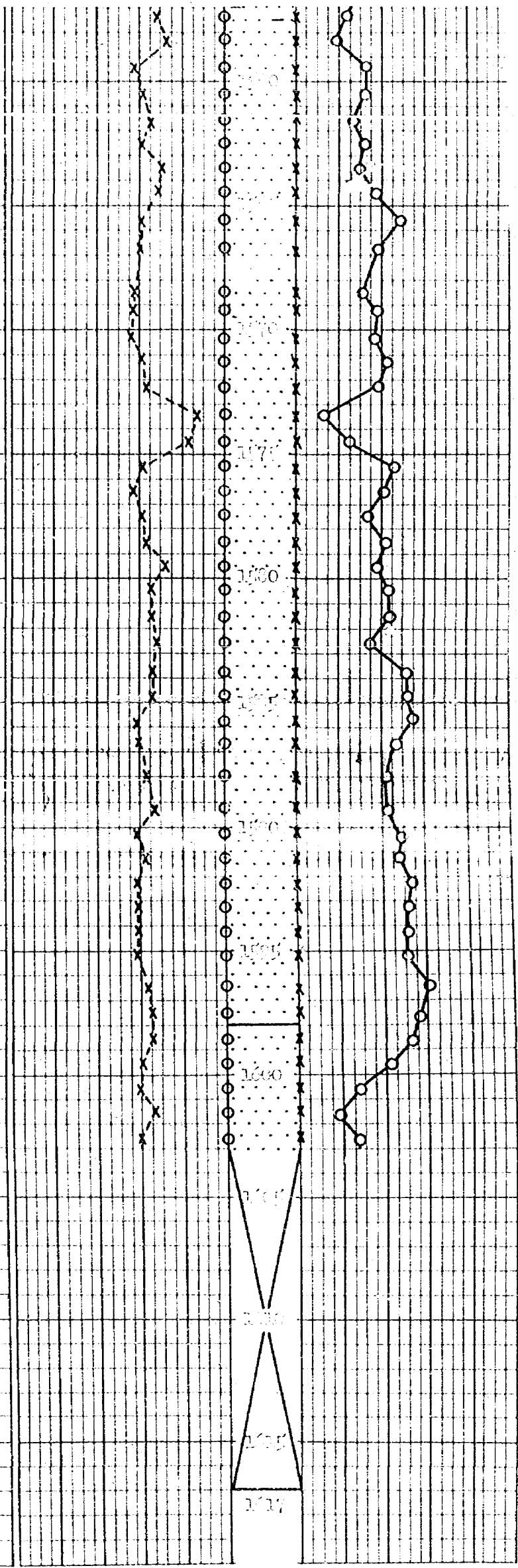
POROSITY $\times-\times-\times$
PERCENT
40 30 20 10 0

OIL SATURATION $\times-\times-\times$
PERCENT PORE SPACE
0 20 40 60 80

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs		POROSITY %	RESIDUAL SATURATION % PORE SPACE	
		MAX.	90°		OIL	TOTAL WATER
1	1511.3-1512.2	-0.01	-0.01	14.3	0.0	10.3
2	1512.3-1513.2	-0.01	-0.01	17.0	0.0	75.4
3	1513.3-1514.2	-0.01	-0.01	17.7	0.0	72.7
4	1514.3-1515.2	-0.01	-0.01	17.6	0.0	72.3
5	1515.3-1516.2	-0.01	-0.01	18.1	0.0	72.3
6	1516.3-1517.2	-0.01	-0.01	16.4	0.0	66.5
7	1517.3-1518.2	-0.01	-0.01	12.0	0.0	71.2
8	1518.3-1519.2	-0.01	-0.01	19.0	0.0	64.3
9	1519.3-1520.2	-0.01	-0.01	17.7	0.0	73.2
10	1520.3-1521.2	-0.01	-0.01	16.6	0.0	65.7
11	1521.3-1522.2	-0.01	-0.01	21.3	0.0	70.5
12	1522.3-1523.2	-0.01	-0.01	20.5	0.0	67.3



15	1577.7-17.6	-0.1	-0.02	17.6	0.0171.7
16	1577.6-18.2	-0.01	-0.02	18.2	0.0171.7
17	1577.5-18.8	-0.1	-0.02	18.8	0.0171.7
18	1577.4-19.4	-0.01	-0.02	19.4	0.0171.7
19	1577.3-20.0	-0.1	-0.02	20.0	0.0171.7
20	1577.2-20.6	-0.01	-0.02	20.6	0.0171.7
21	1577.1-21.2	-0.01	-0.02	21.2	0.0171.7
22	1577.0-21.8	-0.1	-0.02	21.8	0.0171.7
23	1576.9-22.4	-0.1	-0.02	22.4	0.0171.7
24	1576.8-23.0	-0.1	-0.02	23.0	0.0171.7
25	1576.7-23.6	-0.01	-0.02	23.6	0.0171.7
26	1576.6-24.2	-0.1	-0.02	24.2	0.0171.7
27	1576.5-24.8	-0.1	-0.02	24.8	0.0171.7
28	1576.4-25.4	-0.1	-0.02	25.4	0.0171.7
29	1576.3-26.0	-0.1	-0.02	26.0	0.0171.7
30	1576.2-26.6	-0.1	-0.02	26.6	0.0171.7
31	1576.1-27.2	-0.01	-0.02	27.2	0.0171.7
32	1576.0-27.8	-0.01	-0.02	27.8	0.0171.7
33	1575.9-28.4	-0.01	-0.02	28.4	0.0171.7
34	1575.8-29.0	-0.01	-0.02	29.0	0.0171.7
35	1575.7-29.6	-0.01	-0.02	29.6	0.0171.7
36	1575.6-30.2	-0.01	-0.02	30.2	0.0171.7
37	1575.5-30.8	-0.01	-0.02	30.8	0.0171.7
38	1575.4-31.4	-0.01	-0.02	31.4	0.0171.7
39	1575.3-32.0	-0.01	-0.02	32.0	0.0171.7
40	1575.2-32.6	-0.01	-0.02	32.6	0.0171.7
41	1575.1-33.2	-0.01	-0.02	33.2	0.0171.7
42	1575.0-33.8	-0.01	-0.02	33.8	0.0171.7
43	1574.9-34.4	-0.01	-0.02	34.4	0.0171.7
44	1574.8-35.0	-0.01	-0.02	35.0	0.0171.7
45	1574.7-35.6	-0.01	-0.02	35.6	0.0171.7
46	1574.6-36.2	-0.01	-0.02	36.2	0.0171.7
47	1574.5-36.8	-0.01	-0.02	36.8	0.0171.7
48	1574.4-37.4	-0.01	-0.02	37.4	0.0171.7
49	1574.3-38.0	-0.01	-0.02	38.0	0.0171.7
50	1574.2-38.6	-0.01	-0.02	38.6	0.0171.7
51	1574.1-39.2	-0.01	-0.02	39.2	0.0171.7
52	1574.0-39.8	-0.01	-0.02	39.8	0.0171.7
53	1573.9-40.4	-0.01	-0.02	40.4	0.0171.7
54	1573.8-41.0	-0.01	-0.02	41.0	0.0171.7
55	1573.7-41.6	-0.01	-0.02	41.6	0.0171.7
56	1573.6-42.2	-0.01	-0.02	42.2	0.0171.7



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

January 4, 1952

Benson and Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Special Core Analysis
Gallegos Canyon Unit No. 4 Well
West Kutz Field
San Juan County, New Mexico

Gentlemen;

Diamond conventional cores from the Pictured Cliffs formation in the subject well have been sampled and quick-frozen by a representative of Core Laboratories, Inc. and later analyzed in our Worland, Wyoming laboratory by special analysis methods. Results of the analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Special analysis performed on the samples includes measurements of maximum permeability, 90° to the maximum, porosity and liquid saturations.

Chloride determinations were made from approximately every fifth foot of formation and are reported in parts per million of pore water on page one.

It is believed that the formation from 1544 to 1603 feet would possibly be gas productive after shooting with nitroglycerin. Average data for the zone, 1544 to 1603 feet, are presented on page two.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (pg)
J. D. Harris,
District Engineer

JDH:pe

Benson and Montin
Gallegos Canyon Unit No. 4 Well
West Kutz Field
San Juan County, New Mexico

Page: 1 of 2
File: WL-86 S

Chloride Determinations

<u>Sample Number</u>	<u>Depth: Feet</u>	<u>cc AgNO₃</u>	<u>PPM Pore Water</u>
1	1544	3.3	27,000
6	1549	4.0	30,800
11	1554	4.4	28,200
16	1560	3.8	25,500
22	1567	5.3	35,600
27	1572	4.2	31,900
31	1577	4.1	25,800
36	1582	2.9	25,600
41	1587	3.7	27,900
46	1592	5.4	45,700
51	1597	5.7	61,500
56	1602	7.9	44,000

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

Page 2 of 2File WL-86 SWell Gallegos Canyon Unit No. 4

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	1544.0-1603.0			
% CORE RECOVERY	100			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	59.0			
AVERAGE PERMEABILITY MILLIDARCYS	Max: <0.01 90°: <0.01			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION				
AVERAGE POROSITY, PERCENT	17.9			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	62.5			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	58			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				

CALCULATED RECOVERABLE OIL

{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLs. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLs. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLs. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

NOTE:

(1) REFER TO ATTACHED LETTER.

(2) REDUCTION IN PRESSURE FROM

SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(3) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(4) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE

ORIGINAL SATURATION PRESSURE.

(5) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representation, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

J. D. Harris (pg)
J. D. Harris



COMPANY	BARON & MONTAN	DATE	9/24/51	FILE	FBI-2493
WELL	CALLEGOS CANYON UNIT # 1	CORES	DIAMOND	ANALYSTS	JW
FIELD	WILCOAT	FORMATION	PICTURED CLIFFS	ELEVATION	5610'
COUNTY	SAN JUAN	DRIG. FLUID	WATER BASE MUD	LOCATION	SAC. 34-28N-12W
STATE	N.M.	REMARKS	SERVICE # 5		

These analyses, opinions and interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations, opinions expressed represent the best judgment of Crivé Laboratories, Inc. (all errors and omissions excepted); but Crivé Laboratories, Inc. and its officers and employees assume no responsibility for any loss or damage, or for any liability or for the productivity, proper operation, or profitability of any oil, gas or other material well or sand in connection with which this report is used or relied upon.

CORE ANALYSIS AND INTERPRETATION

COMPLETION COREGRAPH

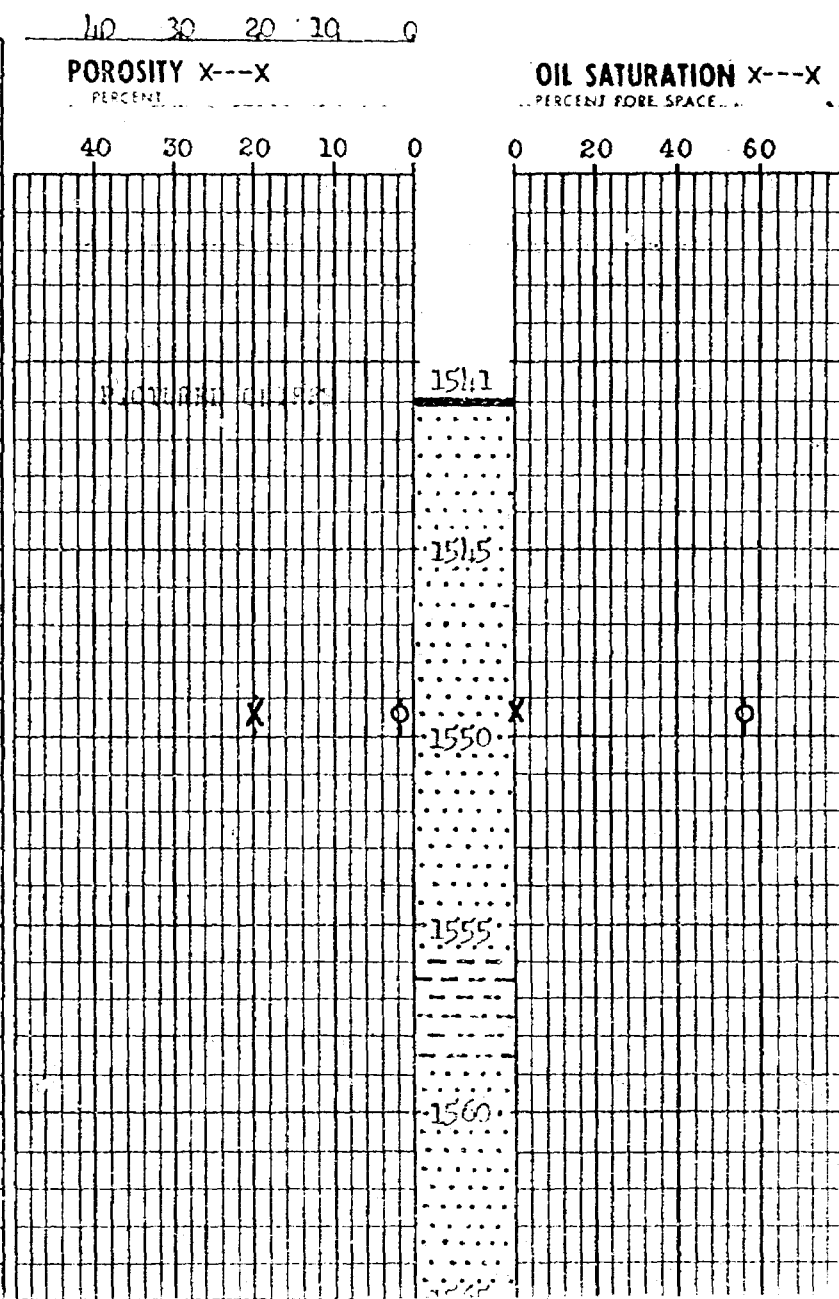
PERMEABILITY

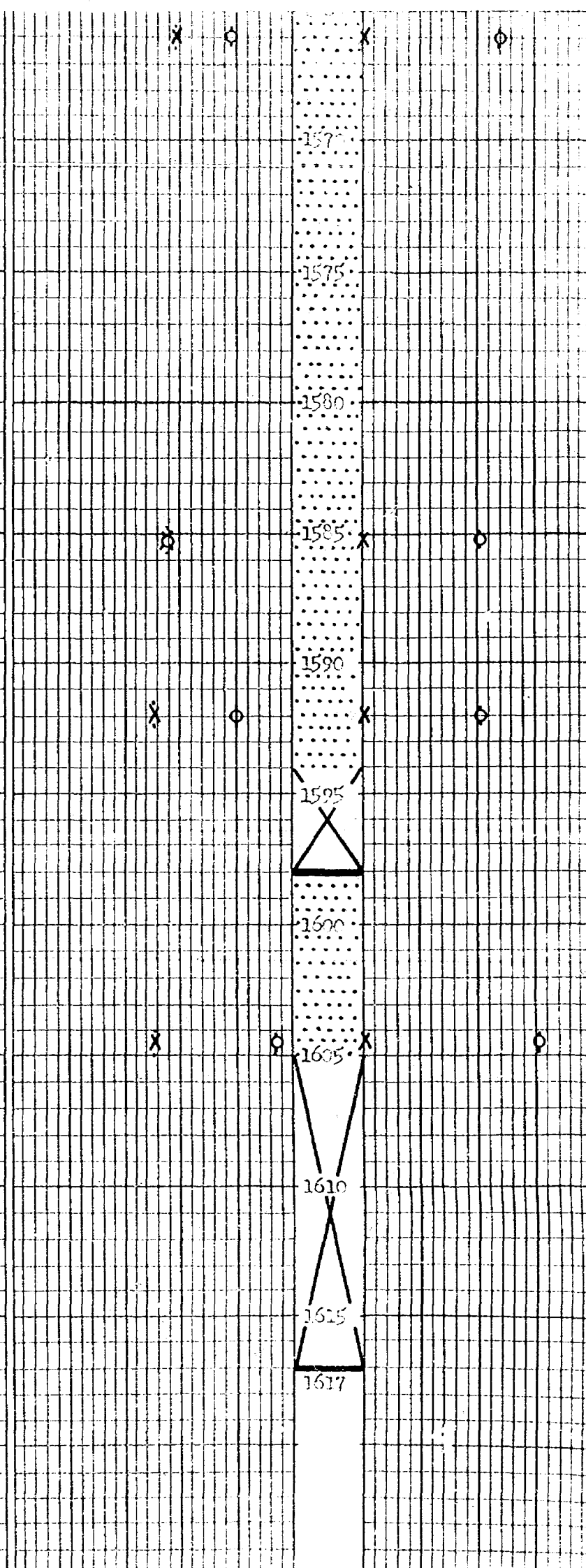
TOTAL WATER
PERCENT PORE SPACE

POROSITY X---X
PERCENT

OIL SATURATION X---X
PERCENT PORE SPACE

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PROD
				OIL	TOTAL WATER	
1	1549.4	1.9	20.2	0.0	56.9	+



[illegible]

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

October 30, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Core Analysis
Gallegos Canyon Unit No. 4 Well
Wildcat
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the subject well in the Pictured Cliffs formation have been sampled and quick-frozen by a representative of Benson & Montin and later analyzed in our Farmington, New Mexico laboratory. Results of analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Sand analyzed from 1549 to 1605 feet is interpreted to be primarily low capacity, gas productive.

Special analysis is being performed on large segments of the core from this well and will be presented in a separate report.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (pg)

J. D. Harris,
District Engineer

JDH:aa



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY BRIDGES AND MORTON DATE ON Oct. 10, 1951 FILE NO. 11-24 (9)
 WELL WILLIAMSON 3-11-11-10-5 DATE OFF Dec. 10, 1951 ENGRS. J.C. BROWN
 FIELD WEST 13-11-11 FORMATION WILLIAMSON ELEV. 1377.0
 COUNTY ONEIDA STATE N.Y. DRLG. FLD. WILLIAMSON CORES 1377.0-1377.0
 LOCATION ONEIDA 13-11-11-10-5 REMARKS SEE PAGE 10, 2

Special Analysis

CORE REPORT

SAND

LIMESTONE

CONGLOMERATE

CHERT

SHALE

DOLOMITE

This report is based on the data furnished by the client and is not to be used for any other purpose without the written consent of Core Laboratories, Inc. The data furnished by the client is assumed to be correct and is not to be used for any other purpose without the written consent of Core Laboratories, Inc. The data furnished by the client is assumed to be correct and is not to be used for any other purpose without the written consent of Core Laboratories, Inc.

PERMEABILITY, Maximum $\bigcirc-\bigcirc$

MILLIDARCY 20 15 10 5 0

TOTAL WATER $\bigcirc-\bigcirc$

PERCENT PORE SPACE 80 60 40 20 0

POROSITY $\times-\times-\times$

PERCENT 40 30 20 10 0

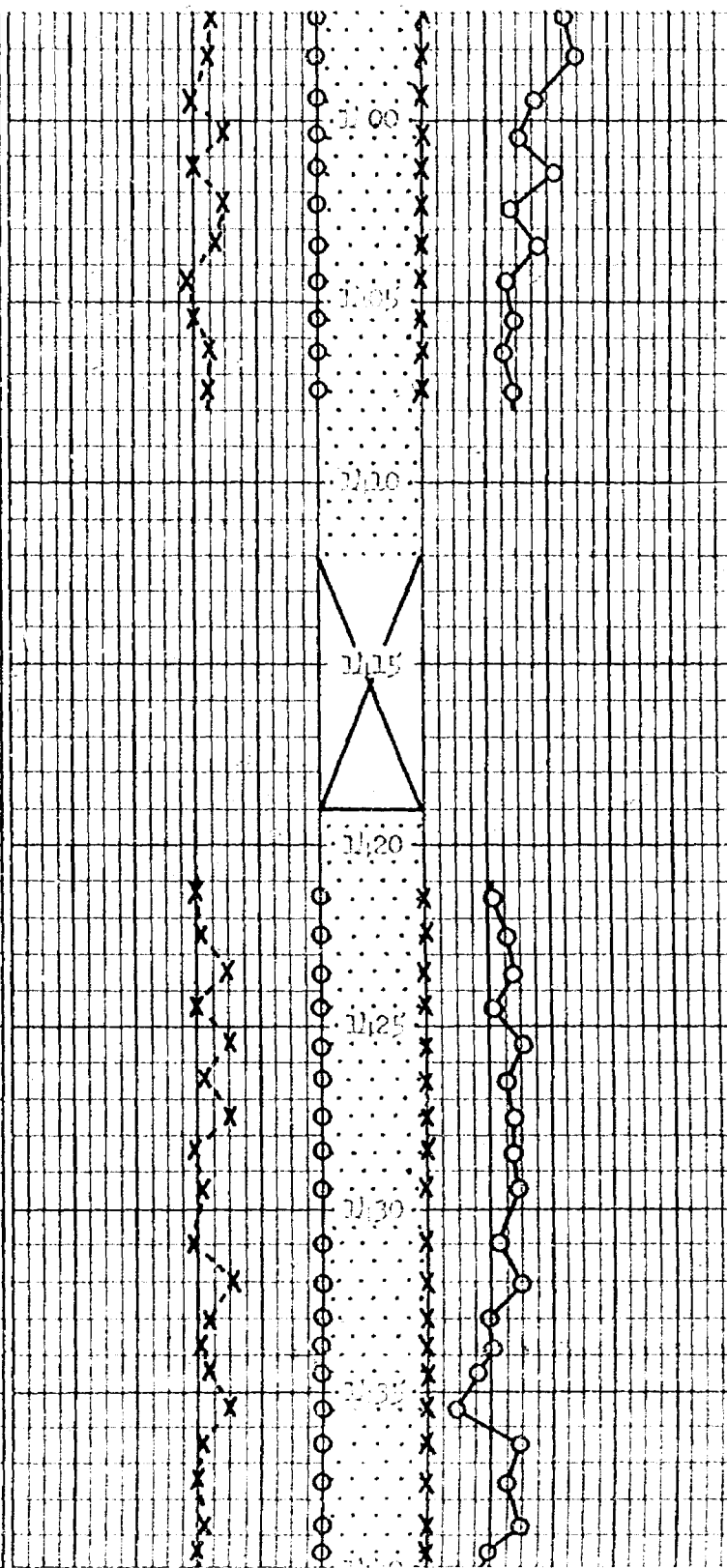
OIL SATURATION $\times-\times-\times$

PERCENT PORE SPACE 0 20 40 60 80

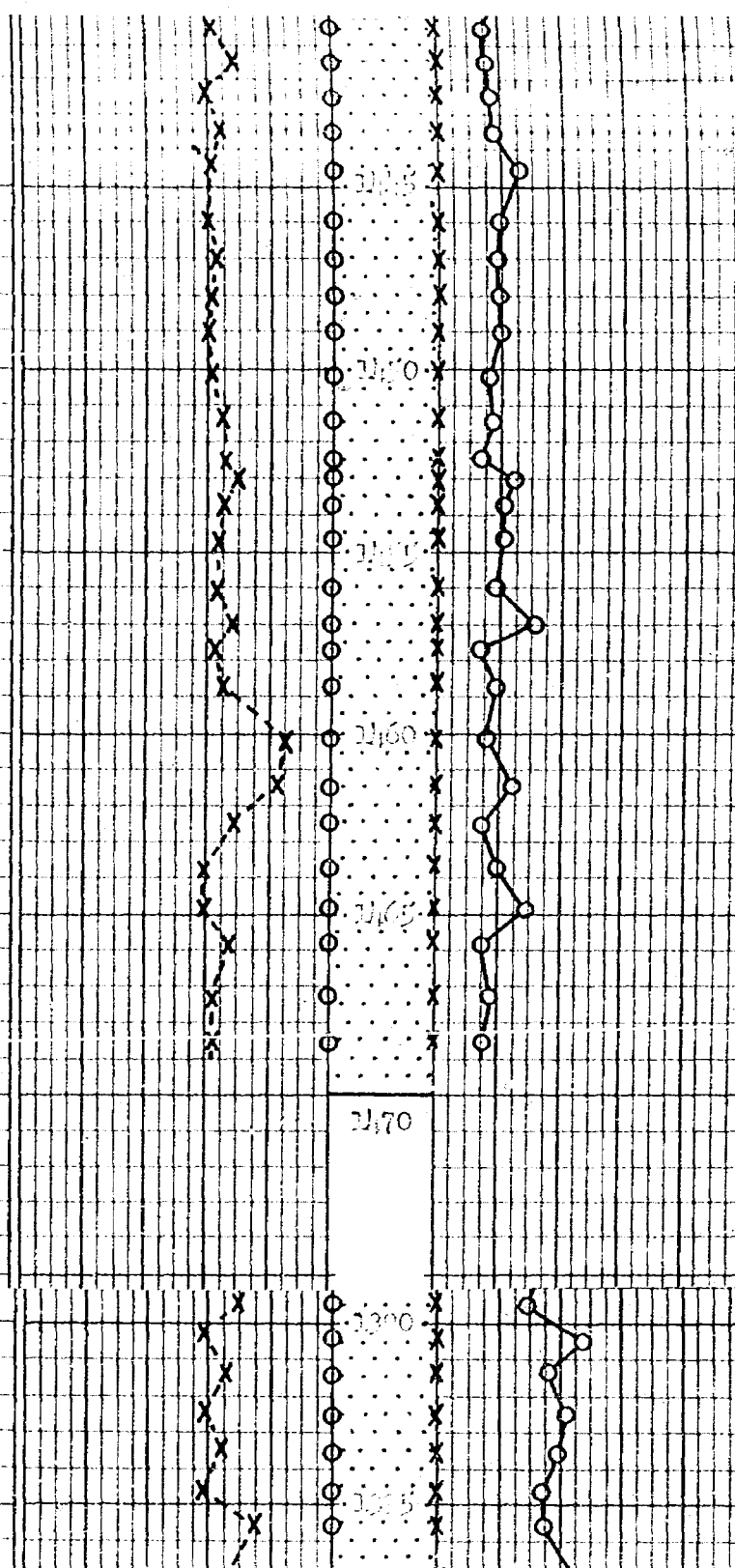
SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY		POROSITY %	RESIDUAL SATURATION % PORE SPACE		TOTAL WATER	POROSITY	OIL SATURATION
		MAX.	90°		OIL	TOTAL WATER			
1	1377.0-78.0	-0.01	-0.01	17.5	0.0	17.5			
2	1377.0-78.0	-0.01	-0.01	20.2	0.0	20.2			
3	1378.0-80.2	-0.01	-0.01	17.7	0.0	17.7			
4	1380.2-81.0	-0.01	-0.01	16.4	0.0	16.4			
5	1381.0-82.4	-0.01	-0.01	17.2	0.0	17.2			
6	1382.4-83.4	-0.01	-0.01	17.7	0.0	17.7			
7	1383.4-84.2	-0.01	-0.01	14.2	0.0	14.2			
8	1384.2-85.4	-0.01	-0.01	14.2	0.0	14.2			
9	1385.4-86.7	-0.01	-0.01	17.6	0.0	17.6			
10	1386.7-87.8	-0.01	-0.01	20.2	0.0	20.2			
11	1387.8-89.0	-0.01	-0.01	14.3	0.0	14.3			
12	1389.0-90.2	-0.01	-0.01	15.3	0.0	15.3			
13	1390.2-90.8	-0.01	-0.01	20.5	0.0	20.5			
14	1390.8-91.7	-0.01	-0.01	17.4	0.0	17.4			
15	1391.7-92.4	-0.01	-0.01	20.7	0.0	20.7			
16	1393.0-93.1	-0.01	-0.01	20.7	0.0	20.7			
17	1393.1-93.0	-0.01	-0.01	20.7	0.0	20.7			
18	1393.0-93.4	-0.01	-0.01	18.7	0.0	18.7			

1	121.3-122.1	-0.01	-0.01	27.1	0.0	12.4
20	121.3-122.1	-0.01	-0.01	27.1	0.0	12.4
21	122.3-123.1	-0.01	-0.01	28.7	0.0	13.2
22	123.3-124.1	-0.01	-0.01	29.5	0.0	14.0
23	124.3-125.1	-0.01	-0.01	30.3	0.0	14.8
24	125.3-126.1	-0.01	-0.01	31.7	0.0	15.6
25	126.3-127.1	-0.01	-0.01	32.3	0.0	16.4
26	127.3-128.1	-0.01	-0.01	33.3	0.0	17.2
27	128.3-129.1	-0.01	-0.01	34.3	0.0	18.0
28	129.3-130.1	-0.01	-0.01	35.3	0.0	18.8
29	130.3-131.1	-0.01	-0.01	36.3	0.0	19.6

30	131.3-132.1	-0.01	-0.01	37.3	0.0	20.4
31	132.3-133.1	-0.01	-0.01	38.3	0.0	21.2
32	133.3-134.1	-0.01	-0.01	39.3	0.0	22.0
33	134.3-135.1	-0.01	-0.01	40.3	0.0	22.8
34	135.3-136.1	-0.01	-0.01	41.3	0.0	23.6
35	136.3-137.1	-0.01	-0.01	42.3	0.0	24.4
36	137.3-138.1	-0.01	-0.01	43.3	0.0	25.2
37	138.3-139.1	-0.01	-0.01	44.3	0.0	26.0
38	139.3-140.1	-0.01	-0.01	45.3	0.0	26.8
39	140.3-141.1	-0.01	-0.01	46.3	0.0	27.6
40	141.3-142.1	-0.01	-0.01	47.3	0.0	28.4
41	142.3-143.1	-0.01	-0.01	48.3	0.0	29.2
42	143.3-144.1	-0.01	-0.01	49.3	0.0	30.0
43	144.3-145.1	-0.01	-0.01	50.3	0.0	30.8
44	145.3-146.1	-0.01	-0.01	51.3	0.0	31.6
45	146.3-147.1	-0.01	-0.01	52.3	0.0	32.4
46	147.3-148.1	-0.01	-0.01	53.3	0.0	33.2
47	148.3-149.1	-0.01	-0.01	54.3	0.0	34.0
48	149.3-150.1	-0.01	-0.01	55.3	0.0	34.8



48	1112.0-112.0	-0.01	-0.01	19.4	0.0	61.6
49	1112.0-113.0	-0.01	-0.01	19.4	0.0	61.6
50	1112.0-114.0	-0.01	-0.01	19.4	0.0	61.6
51	1112.0-115.0	-0.01	-0.01	19.4	0.0	61.6
52	1112.0-116.0	-0.01	-0.01	19.4	0.0	61.6
53	1112.0-117.0	-0.01	-0.01	19.4	0.0	61.6
54	1112.0-118.0	-0.01	-0.01	19.4	0.0	61.6
55	1112.0-119.0	-0.01	-0.01	19.4	0.0	61.6
56	1112.0-120.0	-0.01	-0.01	19.4	0.0	61.6
57	1112.0-121.0	-0.01	-0.01	19.4	0.0	61.6
58	1112.0-122.0	-0.01	-0.01	19.4	0.0	61.6
59	1112.0-123.0	-0.01	-0.01	19.4	0.0	61.6
60	1112.0-124.0	-0.01	-0.01	19.4	0.0	61.6
61	1112.0-125.0	-0.01	-0.01	19.4	0.0	61.6
62	1112.0-126.0	-0.01	-0.01	19.4	0.0	61.6
63	1112.0-127.0	-0.01	-0.01	19.4	0.0	61.6
64	1112.0-128.0	-0.01	-0.01	19.4	0.0	61.6
65	1112.0-129.0	-0.01	-0.01	19.4	0.0	61.6
66	1112.0-130.0	-0.01	-0.01	19.4	0.0	61.6
67	1112.0-131.0	-0.01	-0.01	19.4	0.0	61.6
68	1112.0-132.0	-0.01	-0.01	19.4	0.0	61.6
69	1112.0-133.0	-0.01	-0.01	19.4	0.0	61.6
70	1112.0-134.0	-0.01	-0.01	19.4	0.0	61.6
71	1112.0-135.0	-0.01	-0.01	19.4	0.0	61.6
72	1112.0-136.0	-0.01	-0.01	19.4	0.0	61.6
73	1112.0-137.0	-0.01	-0.01	19.4	0.0	61.6
74	1112.0-138.0	-0.01	-0.01	19.4	0.0	61.6
75	1112.0-139.0	-0.01	-0.01	19.4	0.0	61.6
76	1112.0-140.0	-0.01	-0.01	19.4	0.0	61.6
77	1112.0-141.0	-0.01	-0.01	19.4	0.0	61.6
78	1112.0-142.0	-0.01	-0.01	19.4	0.0	61.6
79	1112.0-143.0	-0.01	-0.01	19.4	0.0	61.6
80	1112.0-144.0	-0.01	-0.01	19.4	0.0	61.6
81	1112.0-145.0	-0.01	-0.01	19.4	0.0	61.6
82	1112.0-146.0	-0.01	-0.01	19.4	0.0	61.6
83	1112.0-147.0	-0.01	-0.01	19.4	0.0	61.6
84	1112.0-148.0	-0.01	-0.01	19.4	0.0	61.6
85	1112.0-149.0	-0.01	-0.01	19.4	0.0	61.6
86	1112.0-150.0	-0.01	-0.01	19.4	0.0	61.6
87	1112.0-151.0	-0.01	-0.01	19.4	0.0	61.6
88	1112.0-152.0	-0.01	-0.01	19.4	0.0	61.6
89	1112.0-153.0	-0.01	-0.01	19.4	0.0	61.6
90	1112.0-154.0	-0.01	-0.01	19.4	0.0	61.6
91	1112.0-155.0	-0.01	-0.01	19.4	0.0	61.6
92	1112.0-156.0	-0.01	-0.01	19.4	0.0	61.6
93	1112.0-157.0	-0.01	-0.01	19.4	0.0	61.6
94	1112.0-158.0	-0.01	-0.01	19.4	0.0	61.6
95	1112.0-159.0	-0.01	-0.01	19.4	0.0	61.6
96	1112.0-160.0	-0.01	-0.01	19.4	0.0	61.6
97	1112.0-161.0	-0.01	-0.01	19.4	0.0	61.6
98	1112.0-162.0	-0.01	-0.01	19.4	0.0	61.6
99	1112.0-163.0	-0.01	-0.01	19.4	0.0	61.6
100	1112.0-164.0	-0.01	-0.01	19.4	0.0	61.6



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS
January 4, 1952

Benson and Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Special Core Analysis
Gallegos Canyon Unit No. 5 Well
West Kutz Field
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the Pictured Cliffs formation in the subject well have been sampled and quick-frozen by a representative of Core Laboratories, Inc., and later analyzed in our Worland, Wyoming laboratory by special analysis methods. Results of the analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Special analysis performed on the samples includes measurements of maximum permeability, 90° from the maximum, porosity and liquid saturations.

Chloride determinations were made from approximately every five feet of formation and are reported in parts per million of pore water on page one.

It is believed that the formation from 1377.0 to 1469.1 feet would possibly be gas productive after shooting with nitroglycerin. Average data for the zone, 1377.0 to 1469.1 feet, are presented on page two.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (pg)
J. D. Harris,
District Engineer

JDH:pe

Benson and Montin
Gallegos Canyon Unit No. 5 Well
West Kutz Field
San Juan County, New Mexico

Page: 1 of 2
File: WL-94 S

Chloride Determinations

<u>Sample Number</u>	<u>Depth: Feet</u>	<u>cc AgNO₃</u>	<u>PPM Pore Water</u>
1	1377	2.0	14,200
5	1381	2.4	17,700
10	1388	3.2	22,200
15	1392	2.4	16,050
19	1397	2.7	23,400
24	1402	3.6	27,000
29	1407	6.6	44,600
35	1426	4.5	27,100
40	1432	3.1	27,100
45	1436	3.3	20,500
50	1441	4.1	26,800
55	1447	5.7	31,200
60	1452	3.3	18,200
65	1456	2.9	22,500
70	1462	4.4	27,000
74	1467	3.0	16,520

CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS

Page 2 of 2
 File WL-94 S
 Well Gallegos Canyon Unit No. 5

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	1377.0-1469.1			
% CORE RECOVERY	92			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	79.7			
AVERAGE PERMEABILITY MILLIDARCYS	Max: <0.01 90°: <0.01			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION				
AVERAGE POROSITY, PERCENT	17.8			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	72.9			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	71			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				

CALCULATED RECOVERABLE OIL { Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLs. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLs. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLs. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM

SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE

ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representation, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

J. D. Harris (pg)
 J. D. Harris



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY HONOLULU, HAWAII DATE 10/1/51 FILE 11-1-26PC
WELL KAHUNA, KAHUNA, HAWAII CORES 11-1-26PC ANALYSTS 11-1-26PC
FIELD KAHUNA FORMATION KAHUNA ELEVATION 11-1-26PC
COUNTY KAHUNA DRG. FLUID WATER BASED LOCATION 11-1-26PC
STATE KAHUNA REMARKS 11-1-26PC

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CORE ANALYSIS AND INTERPRETATION

COMPLETION COREGRAPH

PERMEABILITY $\circ-\circ$
MILLIDARCS

TOTAL WATER $\circ-\circ$
PERCENT PORE SPACE

10 30 20 10 0

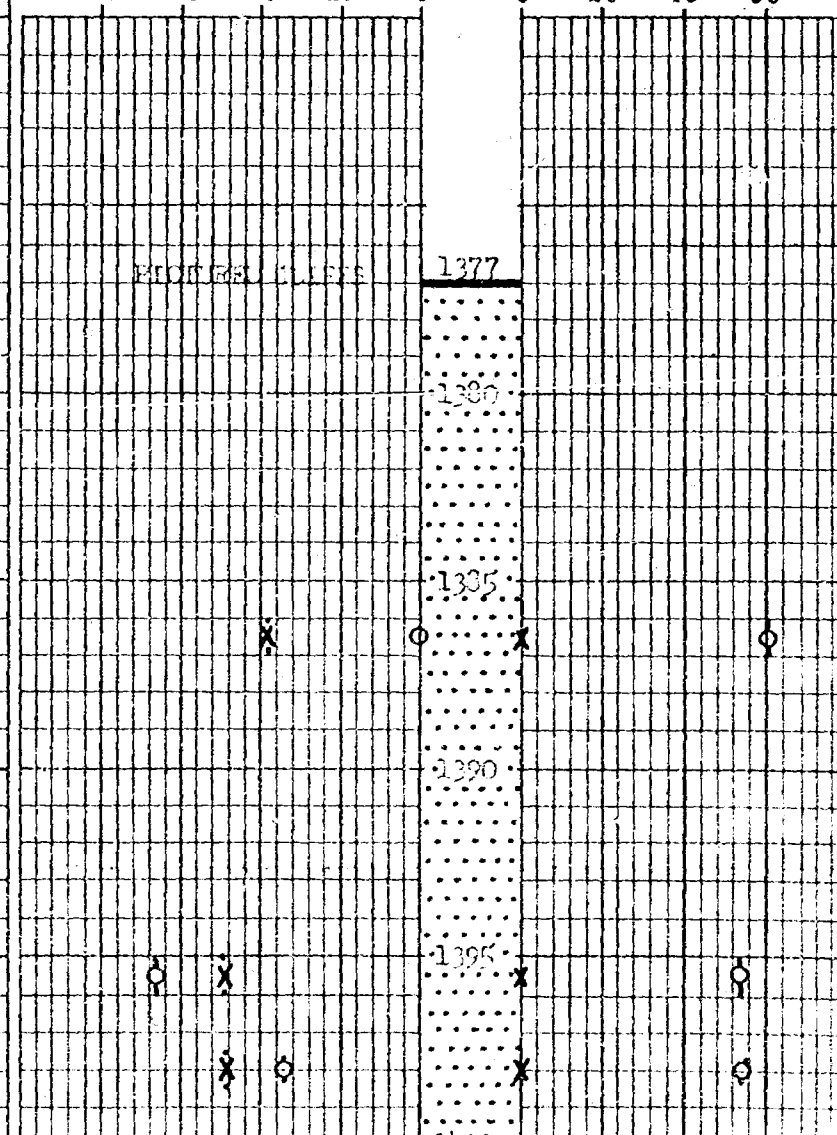
POROSITY X---X
PERCENT

OIL SATURATION X---X
PERCENT PORE SPACE

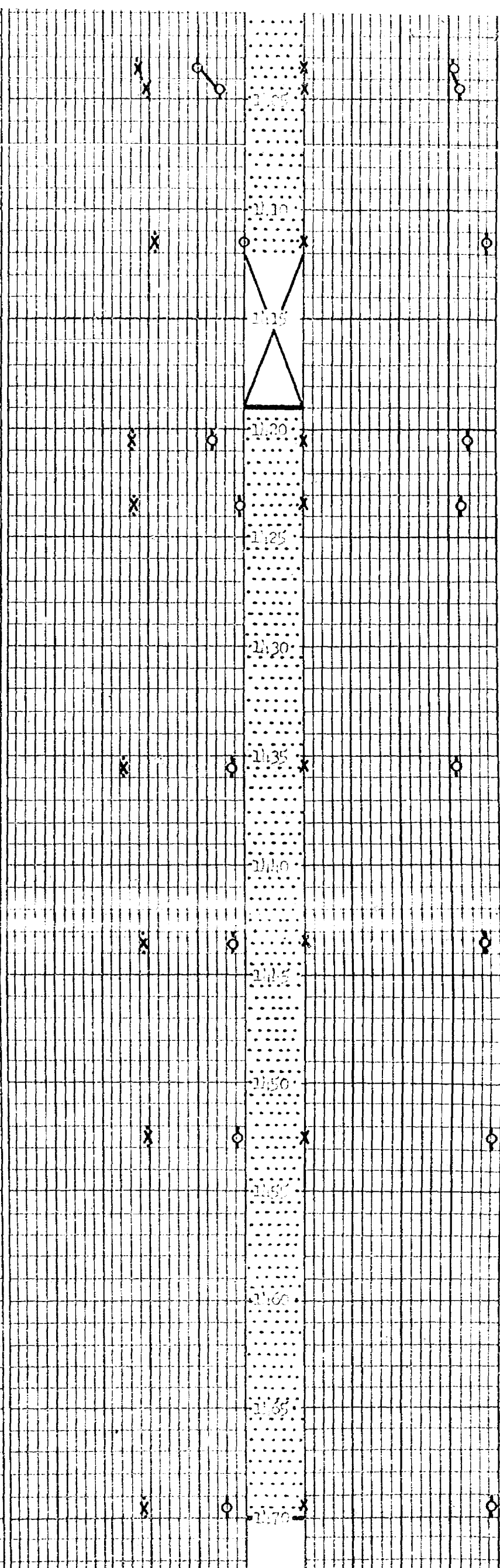
40 30 20 10 0

0 20 40 60

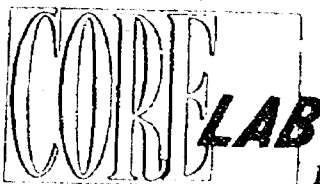
SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCS	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PROD.
				OIL	TOTAL WATER	
1	1386.5	0.0	19.3	0.0	60.6	
2	1395.5	33	21.5	0.0	53.9	GAS
3	1398.0	17	21.2	0.0	51.6	GAS



4	1103.5	10	22.1	0.0	62.5	*
5	1104.5	5.2	20.2	0.0	61.1	*
6	1111.5	0.0	19.2	0.0	73.0	
7	1120.5	6.1	23.7	0.0	67.6	*
8	1123.5	0.7	23.1	0.0	65.5	*
9	1135.5	2.5	25.2	0.0	62.3	*
10	1143.5	2.5	21.6	0.0	73.7	WATER
11	1152.5	1.9	20.6	0.0	76.2	WATER
12	1162.5	1.0	21.8	0.0	77.1	WATER



CORE LABORATORIES, INC.



Petroleum Reservoir Engineering

COMPANY BORGES & SUTHERLAND

DATE 10/17/81

FILE 13-28N-13W

WELL STARRAT

CORES CONCRETE

ANALYSTS ---

FIELD STARRAT

FORMATION POURNOU QUARTZ

ELEVATION ---

COUNTY SAN JUAN

DRIG. FLUID WATER BASED MUD

LOCATION 13-28N-13W

STATE NEW MEXICO

REMARKS SERVICE # 5

These analyses, opinions or interpretations are based on observations and material supplied by the client, to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted). But Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representation as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE ANALYSIS AND INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCS	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PROD.
				OIL	TOTAL WATER	
1	1386.5	0.0	19.3	0.0	62.6	
2	1395.5	33	24.5	0.0	53.9	GAS
3	1398.0	17	21.2	0.0	54.6	GAS

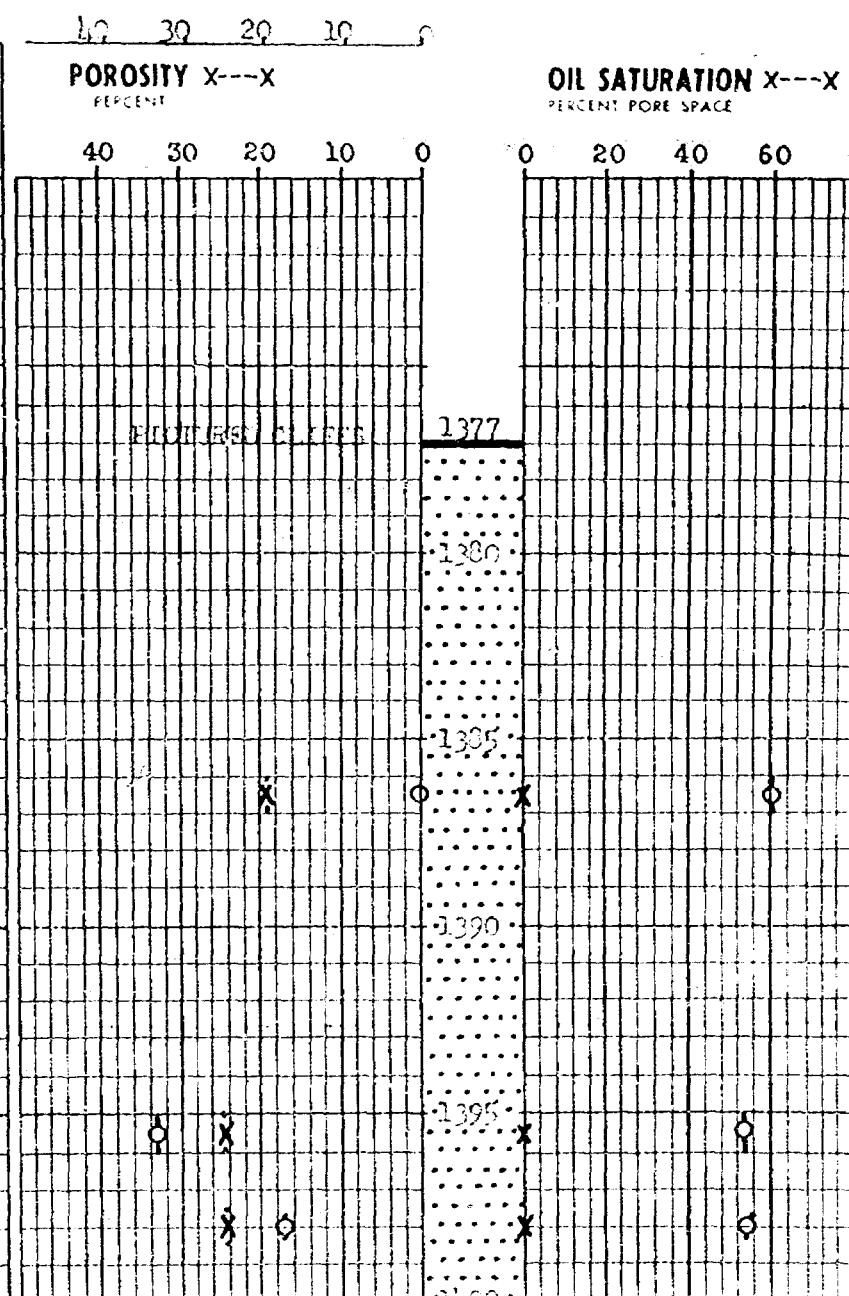
COMPLETION COREGRAPH

PERMEABILITY MILLIDARCS

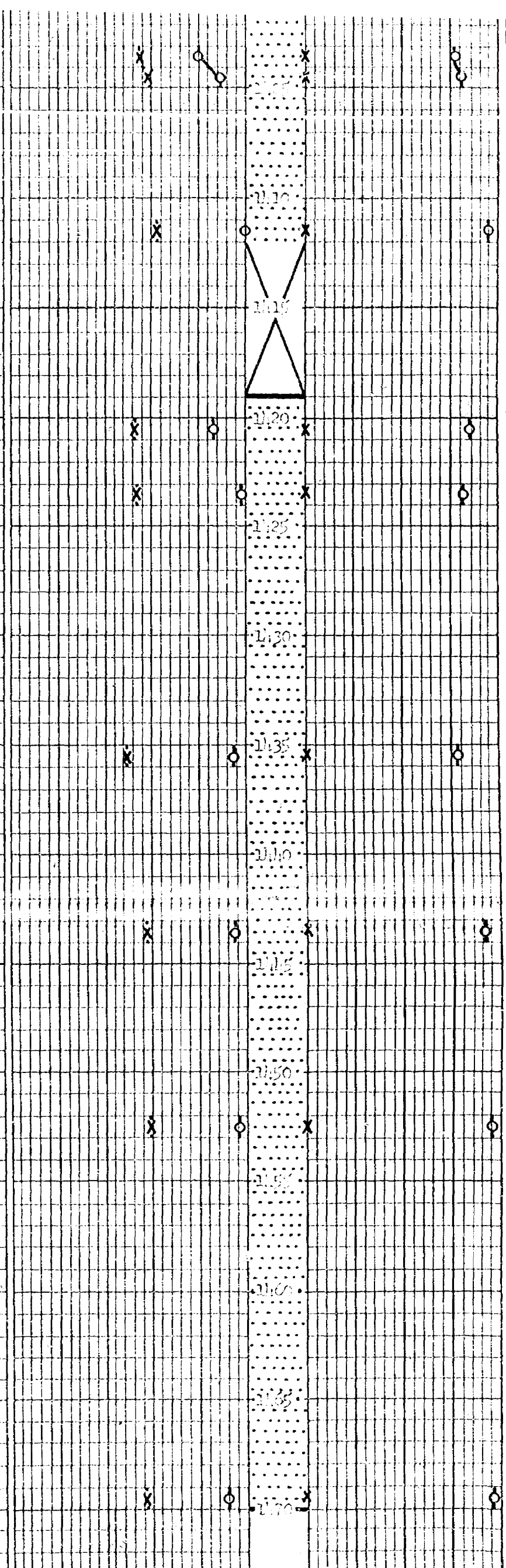
TOTAL WATER PERCENT PORE SPACE

POROSITY PERCENT

OIL SATURATION PERCENT PORE SPACE



4	1102.5	10	22.4	0.0	62.5	*
5	1104.5	5.2	20.2	0.0	61.1	*
6	1111.5	0.0	19.2	0.0	73.0	
7	1120.5	6.4	23.7	0.0	67.6	*
8	1123.5	0.7	23.1	0.0	65.5	*
9	1135.5	2.5	25.2	0.0	62.3	*
10	1143.5	2.5	21.6	0.0	73.7	WATER
11	1152.5	1.7	20.6	0.0	76.2	WATER
12	1162.5	4.0	21.9	0.0	77.1	WATER



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering
DALLAS, TEXAS

October 30, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Core Analysis
Gallegos Canyon Unit No. 5 Well
Wildcat
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the subject well in the Pictured Cliffs formation have been sampled and quick-frozen by a representative of Benson & Montin and later analyzed in our Farmington, New Mexico laboratory. Results of analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Skip sampling of the core limits the interpretation of results; however, large segments of the core from this well have been taken and special analysis is being performed on these cores. Results will be presented in a separate report when analysis is completed. Samples analyzed and shown in this report appear to be gas productive from 1395 to 1436 feet.

Sand analyzed from 1443 to 1470 feet shows a definite increase in per cent water saturation and will probably show some water-cut on production. It is recommended that completion in this well be limited to the sand above 1436 feet.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J. D. Harris (PE)

J. D. Harris,
District Engineer

JDH:aa



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

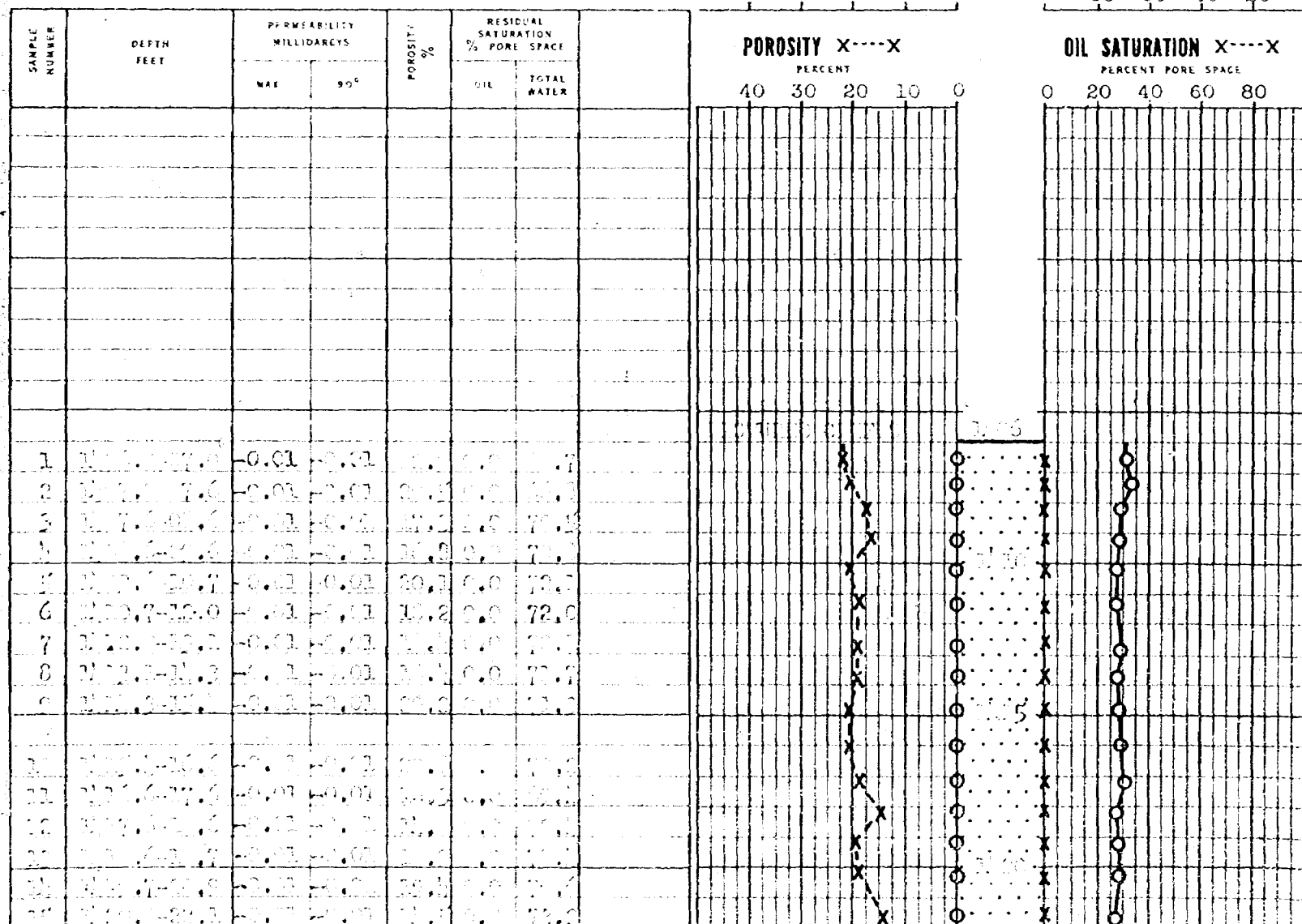
COMPANY AMERICAN OIL FIELD DATE ON OCT. 10, 1951 FILE NO. 1-47 (15)
WELL 1-47 (15) DATE OFF OCT. 10, 1951 ENGRS. A.O. SMITH
FIELD 1-47 (15) FORMATION 1-47 (15) ELEV. 1-47 (15)
COUNTY 1-47 (15) STATE 1-47 (15) DRLG. FLD. 1-47 (15) CORES 1-47 (15)
LOCATION 1-47 (15) REMARKS 1-47 (15)

Special Analysis
CORE REPORT

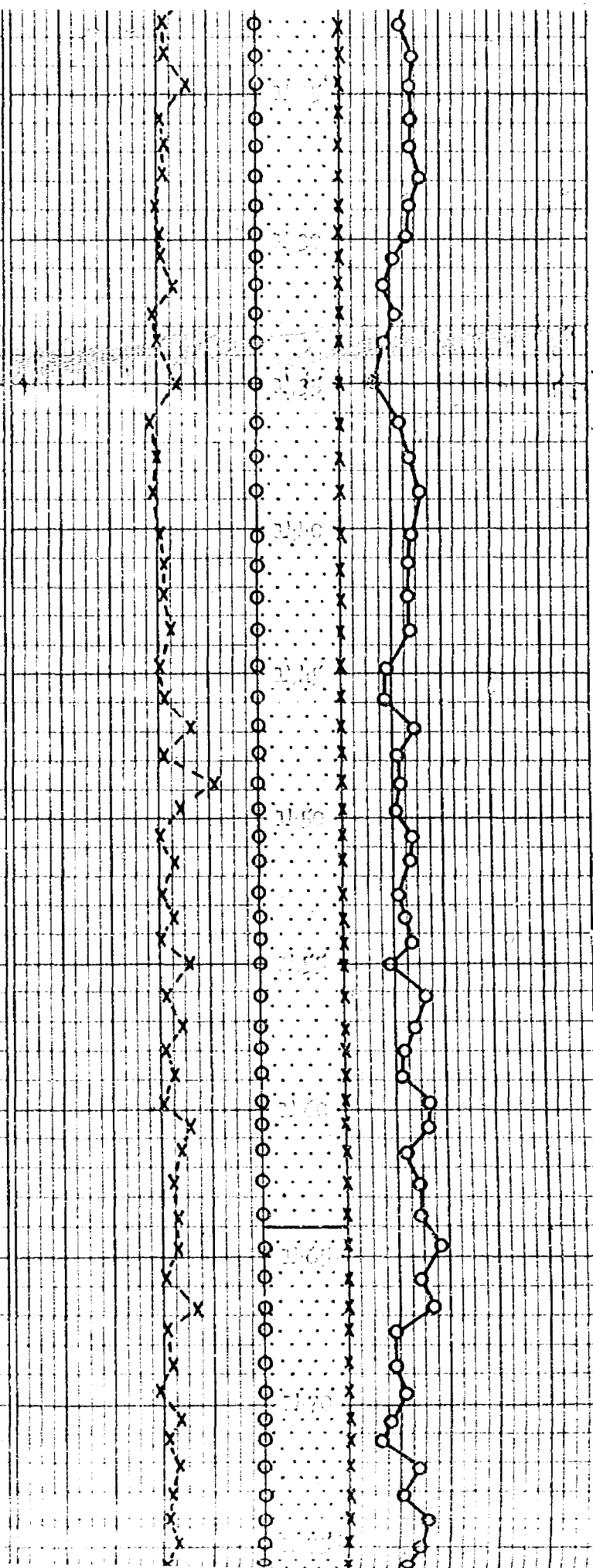
SAND LIMESTONE CONGLOMERATE CHERT
SHALE DOLOMITE

PERMEABILITY, Maximum MILLIDARCY

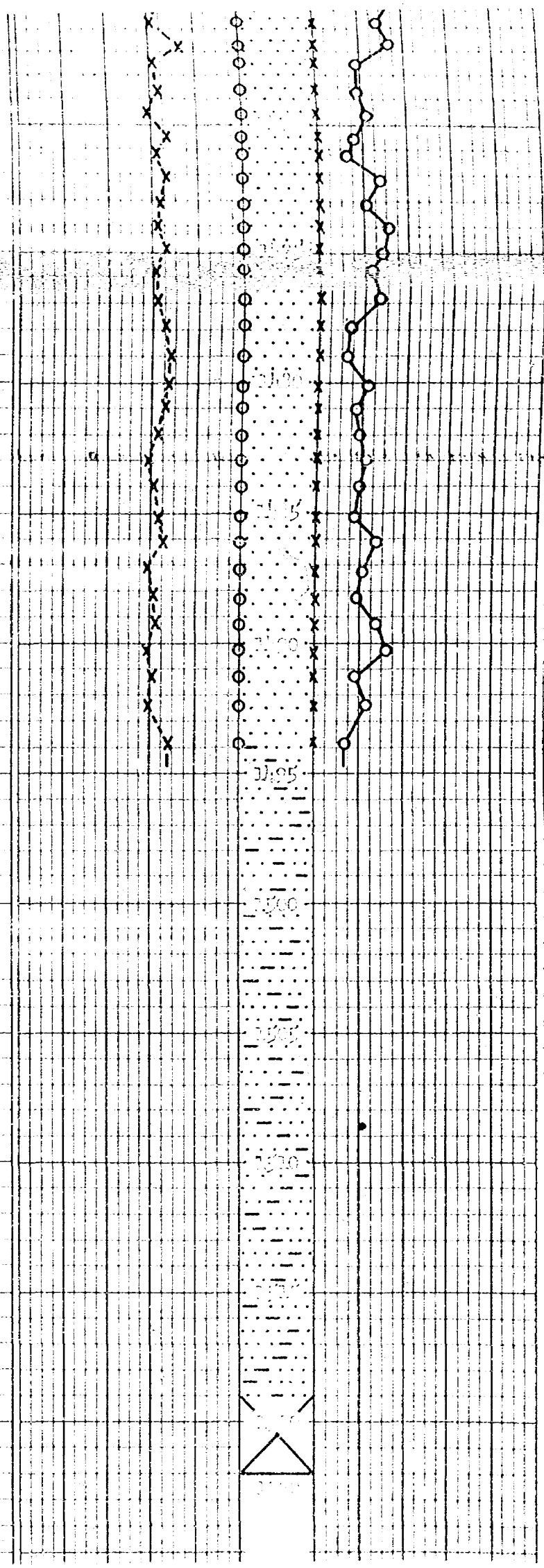
TOTAL WATER PERCENT PORE SPACE



16	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
17	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
18	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
19	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
20	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
21	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
22	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
23	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
24	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
25	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
26	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
27	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
28	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
29	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
30	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
31	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
32	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
33	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
34	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
35	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
36	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
37	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
38	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
39	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
40	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
41	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
42	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
43	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
44	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
45	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
46	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
47	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
48	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
49	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
50	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
51	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
52	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
53	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
54	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
55	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
56	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
57	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
58	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
59	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
60	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
61	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
62	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
63	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
64	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
65	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
66	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
67	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1
68	11.1.1-11.1.1	-0.01	-0.01	11.1	0.0	11.1



67	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
68	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
69	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
70	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
71	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
72	1177.2-77.2	-0.01	-0.01	17.2	0.0	77.2
73	1179.7-80.5	-0.02	-0.02	16.6	0.0	80.5
74	1180.4-81.5	-0.02	-0.02	17.1	0.0	81.5
75	1181.4-82.4	-0.02	-0.02	18.3	0.0	82.4
76	1182.4-83.5	-0.02	-0.02	20.5	0.0	83.5
77	1183.4-84.6	-0.02	-0.02	22.3	0.0	84.6
78	1184.4-85.6	-0.02	-0.02	24.0	0.0	85.6
79	1185.4-86.6	-0.02	-0.02	27.0	0.0	86.6
80	1186.4-87.0	-0.02	-0.02	29.7	0.0	87.0
81	1187.4-88.2	-0.02	-0.02	32.0	0.0	88.2
82	1188.4-89.3	-0.02	-0.02	33.5	0.0	89.3
83	1189.4-90.0	-0.02	-0.02	36.2	0.0	90.0
84	1190.4-91.0	-0.02	-0.02	37.2	0.0	91.0
85	1191.4-92.0	-0.02	-0.02	38.5	0.0	92.0
86	1192.4-93.2	-0.02	-0.02	39.7	0.0	93.2



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

January 4, 1952

Benson and Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Special Core Analysis
Gallegos Canyon Unit No. 7 Well
West Kutz Field
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the Pictured Cliffs formation in the subject well have been sampled and quick-frozen by a representative of Core Laboratories, Inc. and later analyzed in our Worland, Wyoming laboratory by special analysis methods. Results of the analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Special analysis performed on the samples includes measurements of maximum permeability, 90° from the maximum, porosity and liquid saturations.

Chloride determinations were made on approximately every fifth foot of formation and are reported in parts per million of pore water on page one of the report.

It is believed that the formation from 1406 to 1494.8 feet would possibly be gas productive after shooting with nitroglycerin. Average data for the zone, 1406 to 1494.8 feet, are presented on page two.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (pg)

J. D. Harris,
District Engineer

JDH:aa

Benson and Montin
Gallegos Canyon Unit No. 7 Well
West Kutz Field
San Juan County, New Mexico

Page: 1 of 2
File: WL-95 S

Chloride Determinations

<u>Sample Number</u>	<u>Depth: Feet</u>	<u>cc AgNO₃</u>	<u>PPM Pore Water</u>
5	1410	3.5	19,700
9	1415	4.4	25,000
14	1420	4.0	24,000
19	1425	3.0	17,700
22	1429	2.8	16,050
25	1431	3.9	23,600
29	1436	3.4	16,900
32	1440	5.2	31,100
35	1444	4.8	31,300
44	1452	5.5	30,100
49	1457	3.1	24,800
55	1462	4.2	28,000
62	1470	2.4	12,390
69	1476	3.5	19,500
74	1481	4.8	28,600
78	1486	4.4	25,000
83	1490	5.5	32,600

CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS

Page 2 of 2File WL-95 SWell Gallegos Canyon Unit No. 7

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	1406.0-1494.8			
% CORE RECOVERY	100			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	88.8			
AVERAGE PERMEABILITY MILLIDARCYS	Max: <0.1 90° : <0.1			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION				
AVERAGE POROSITY, PERCENT	18.1			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	74.8			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	73			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				

CALCULATED RECOVERABLE OIL

{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLs. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLs. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLs. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM

SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE

ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representation, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

J. D. Harris (pg)
 J. D. Harris



COMPANY	AMERICAN	DATE	10/15/51	FILE	AMH-30FC
WELL	GALLAGHER CANYON UNIT - 7	CORES	DIAMOND	ANALYSTS	L.N.V.
FIELD	WILCOAT	FORMATION	PICTURED CLIFFS	ELEVATION	
COUNTY	SAN JUAN	DRIG. FLUID	WATER BASE MUD	LOCATION	SPC. 30-28N-12W
STATE	NEW MEXICO	REMARKS	SERVICE # 5		

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CORE ANALYSIS AND INTERPRETATION

COMPLETION COREGRAPH

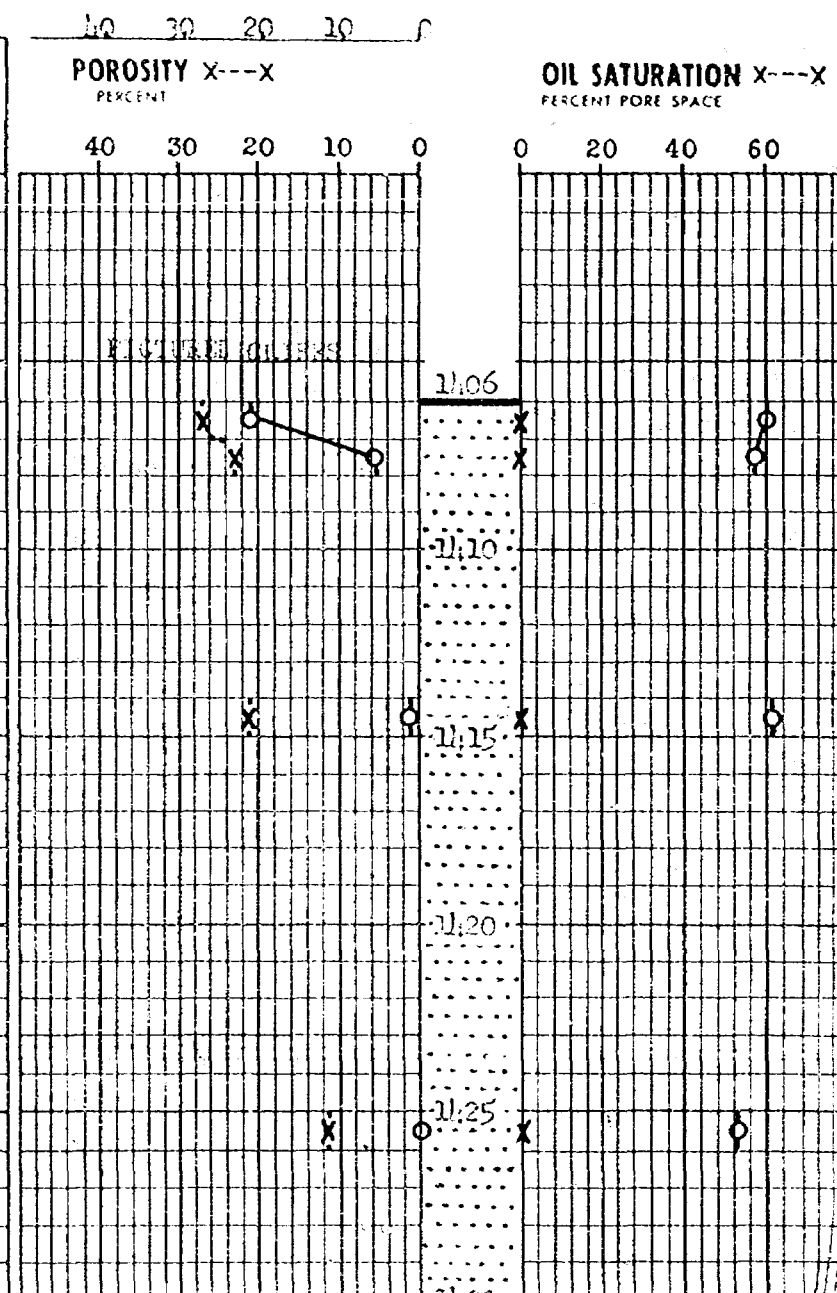
PERMEABILITY

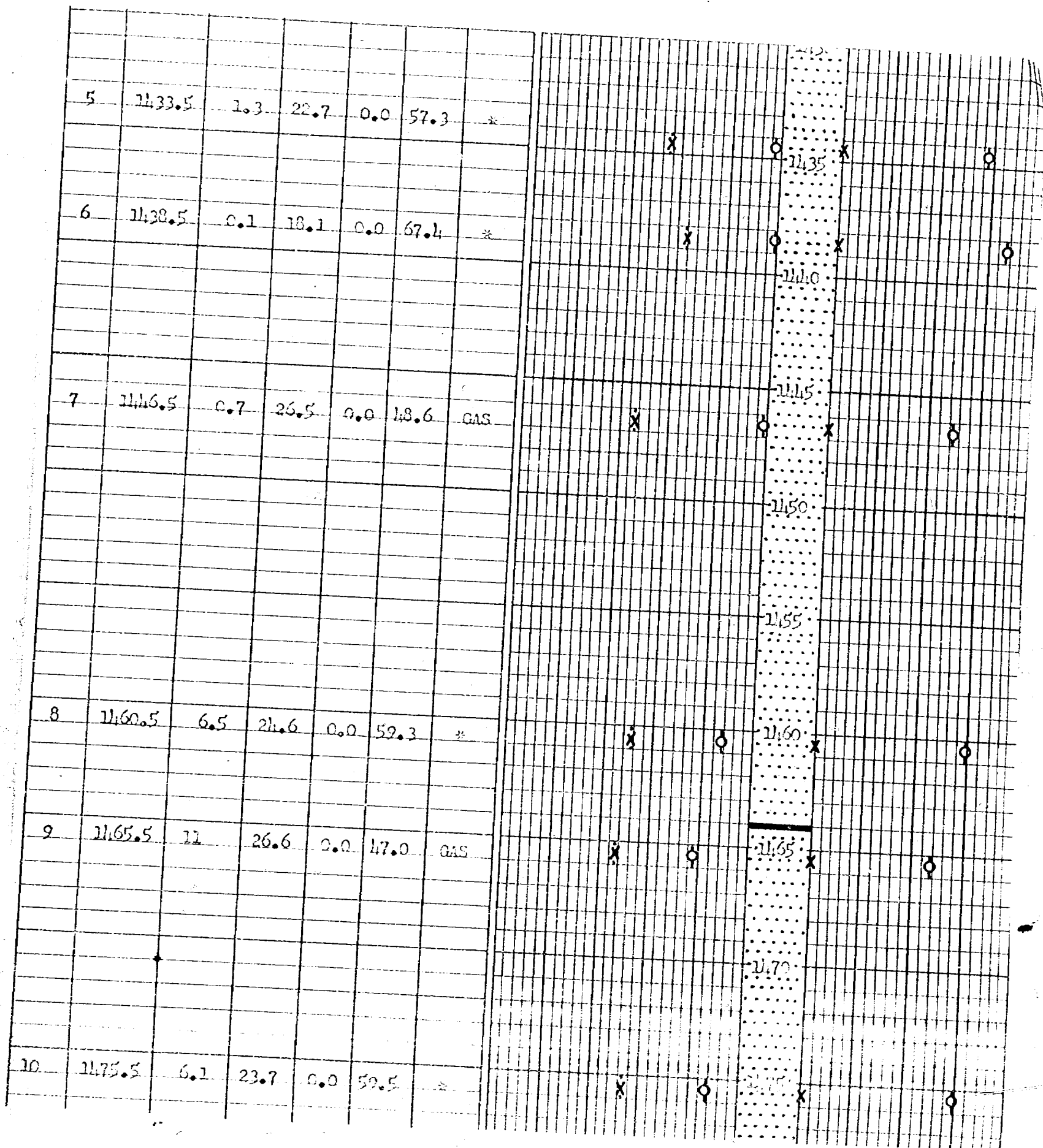
TOTAL WATER ○—○
PERCENT PORE SPACE

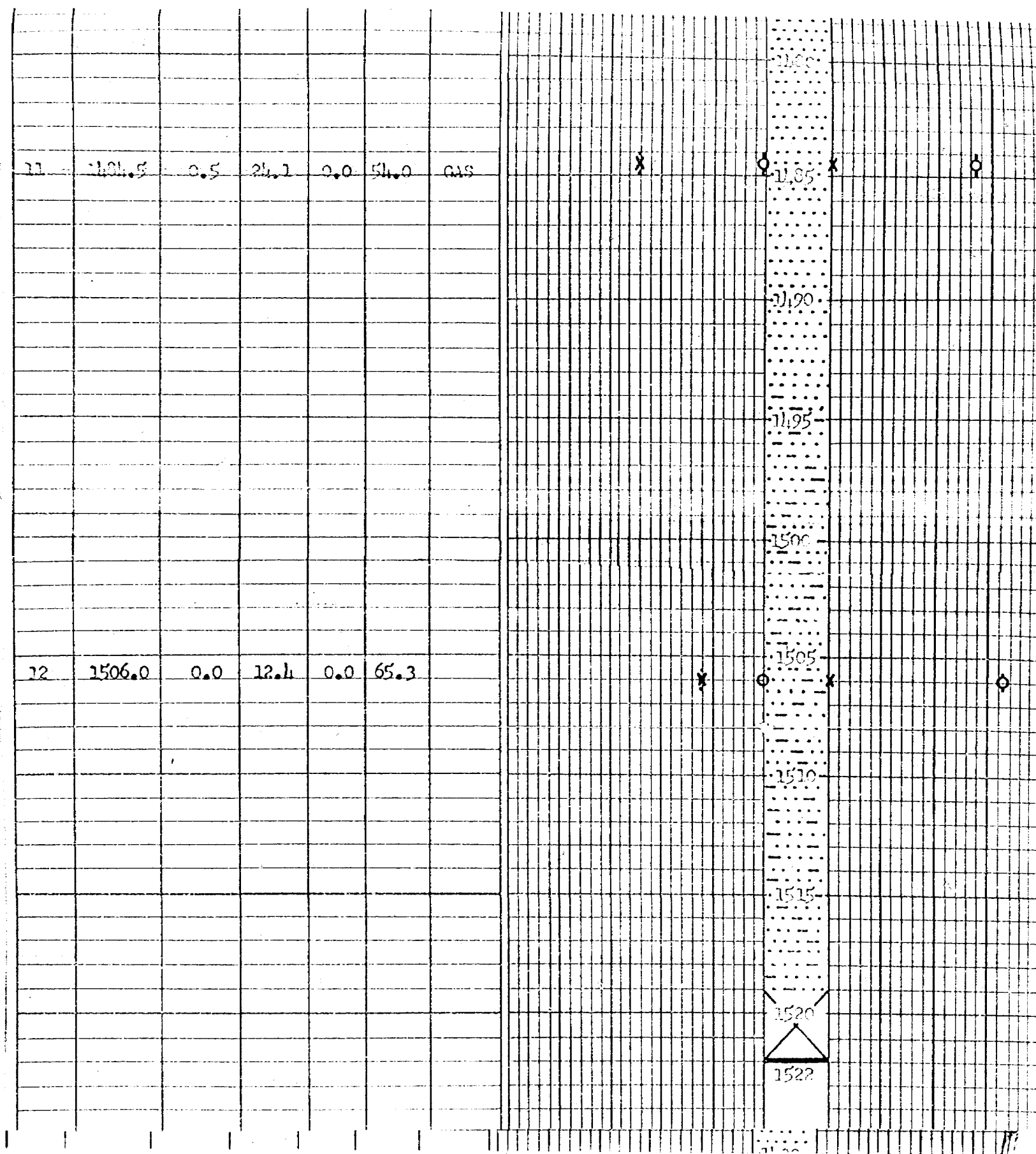
POROSITY X---X
PERCENT

OIL SATURATION X---X
PERCENT PORE SPACE

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCS	POROSITY %	RESIDUAL LIQUID SATURATION % PORE SPACE		PROBABLE PROD.
				OIL	TOTAL WATER	
1	1106.5	21	27.0	0.0	60.0	GAS
2	1108.0	5.9	23.0	0.0	57.8	*
3	1111.5	1.3	21.5	0.0	61.3	*
4	1125.5	0.0	11.5	0.0	53.0	







CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

October 30, 1951

Benson & Montin
Box 337
Aztec, New Mexico

Attention: Mr. A. R. Greer, Jr.

Subject: Core Analysis
Gallegos Canyon Unit No. 7 Well
Wildcat
San Juan County, New Mexico

Gentlemen:

Diamond conventional cores from the subject well in the Pictured Cliffs formation have been sampled and quick-frozen by a representative of Benson & Montin and later analyzed in our Farmington, New Mexico laboratory. Results of analysis are presented in tabular and graphical form on the attached Coregraph. Water base mud was used as the drilling fluid.

Sand analyzed from 1406 to 1485 feet is interpreted to be primarily low capacity, gas productive. The points indicated by an asterisk on the Coregraph show higher water saturations than are normal and might possibly show some water-cut on production.

Special analysis is being performed on large segments of the core from this well and will be presented in a separate report.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J. D. Harris (pg)
J. D. Harris,
District Engineer

JDH:aa