ATOKA GRAYBURG FIELD
EDDY COUNTY, NEW MEXICO

KEWANEE OIL COMPANY
MAY, 1964

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ATOKA GRAYBURG FIELD

EDDY COUNTY, NEW MEXICO

INTRODUCTION

This report has been prepared for presentation to the New Mexico Oil Conservation Commission in support of Kewanee's application to waterflood in this field. All pertinent information relative to Kewanee's waterflood application is included herein.

LOCATION

The Atoka Grayburg field is located in Sections 13 and 14, of Township 18 South, Range 26 East, Eddy County, New Mexico. The oil productive area encompasses approximately 325 acres.

GEOLOGY

The Grayburg Atoka Field produces from the Premier Sand of the Grayburg Formation in the Guadalupian Series of Permian Age. The Grayburg formation consists of dolomites, sandstones, anhydrites and red shales.

The Premier Sand is generally fine grained, gray quartz with considerable dolomitic cementing material. Although this sand covers a wide area in Southeastern New Mexico, it exhibits extremely low porosity and permeability for the most part.

The oil producing reservoir is characterized by improved porosity and permeability due to a reduced amount of dolomitic material. A stratigraphic trap was instrumental in the accumulation of oil as both porosity and permeability pinchouts are evident.

DEVELOPMENT

Initial completion in the Atoka Grayburg field was Kewanee's Leavitt No. 1 completed as Jones and Arthur's Classen No. 1 on July 22, 1956.

Seven additional wells have established production in the Premier Sand. Reservoir limits are fairly well defined by Atoka San Andres wells drilled in the area.

Figure I, attached, indicates the productive limits of the field, as established by well logs and core data.

The eight wells in the Atoka Grayburg field have produced 171,550 barrels of oil to January 1, 1964. Current production is approximately 470 barrels per month, or less than two barrels per day per well. Kewanee's seven wells averaged 1.5 barrels oil per day per well during December, 1963. Exhibit B attached is a graphical presentation of the performance of this field since the completion of the discovery well.

RESERVOIR

The Premier Sand in the Atoka Grayburg Field includes 325 acres with an average net effective pay thickness of 4.8 feet, containing 1,553 acre feet. Average porosity was determined to be 18.5 percent, and

average permeability 96.8 millidarcies. Connate water saturation is estimated to be 31 percent.

The oil originally in place in this reservoir was approximately 1,400,000 barrels.

PRIMARY PERFORMANCE

The primary performance has been typical of a solution gas drive mechanism for a highly under-saturated crude oil. The predicted ultimate primary recovery of approximately 13 percent of the oil in place is indicative of the low energy available for the expulsion of oil.

PREDICTED SECONDARY PERFORMANCE

The ultimate recovery from this reservoir should be increased by 290,000 barrels by waterflooding as proposed by Kewanee.

Kewanee's prediction is based on the injection of 1,000 barrels of water per day over a period of seven years.

Water injected will be produced water from the Atoka San Andres field supplemented by fresh water from the shallow Artesian Basin. A maximum injection pressure of 1,000 psi is anticipated.

The water injection wells will be completed to confine the injection water to the oil productive interval of the Premier Sand. Exhibit C indicates the completion method proposed for Leavitt No. 13W.

SUMMARY

Kewanee concludes that the Atoka Grayburg is an economically

attractive waterflood prospect. Oil will be recovered by waterflooding that would be unrecoverable by primary means and it is in the interests of Conservation that waterflooding be initiated in this field. Kewanee respectfully requests the Commission's favorable consideration of this application.

Leavitt #13
330 FSL. & 330 FEL.
SE/4 of NW/4
Section 13, T-18-S, R-26-E

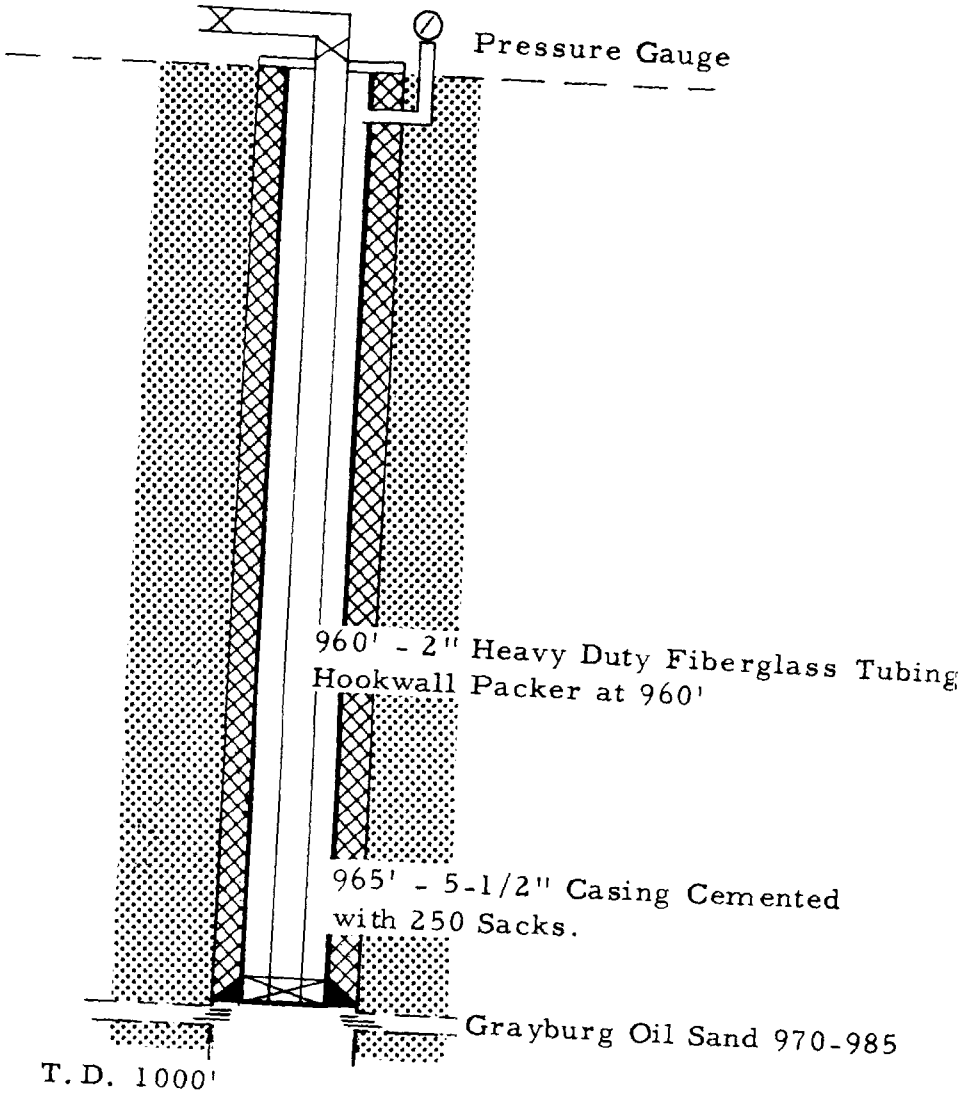

Exhibit C
Proposed Water Input Well

KEWANEE OIL COMPANY
ATOKA-GRAYBURG FIELD
EDDY COUNTY, NEW MEXICO

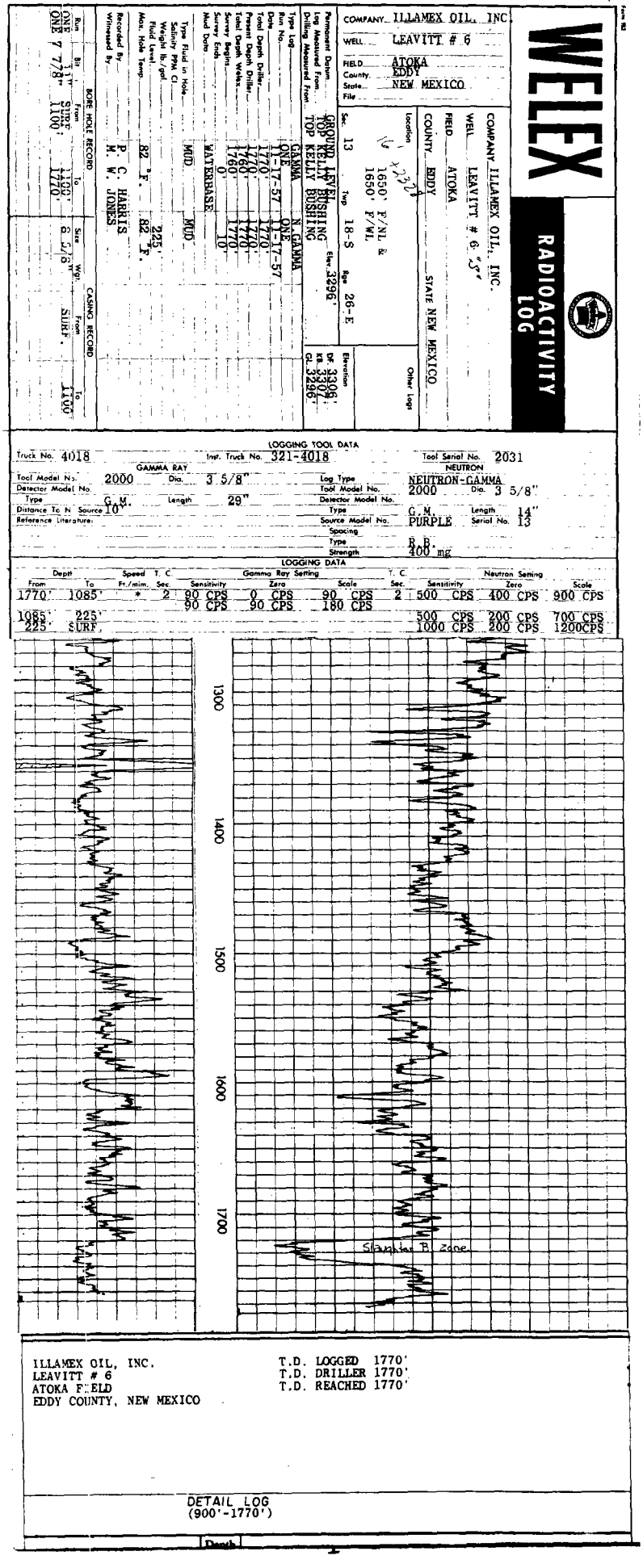

EXHIBIT D

TYPICAL LOG - ATOKA FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT E

ATOKA GRAYBURG FIELD

WELL DATA

Well No.	Date	Oil (Barrels)	Water (Barrels)	Time (Hours)
Leavitt #1	5-8-64	0.74	Trace	3-1/2
Leavitt #3	5-8-64	0.25	Trace	3
Leavitt #7	5-9-64	1.24	Trace	3
Leavitt #10	5-11-64	0.75	0.99	4
Leavitt #11	5-11-64	0.99	0.99	2-1/2
Leavitt #12	5-9-64	1.24	0.50	3-1/2
Fanning #3	5-9-64	0.84	0	4

R 26 E

R 27 E

T 18 S

T 18 S

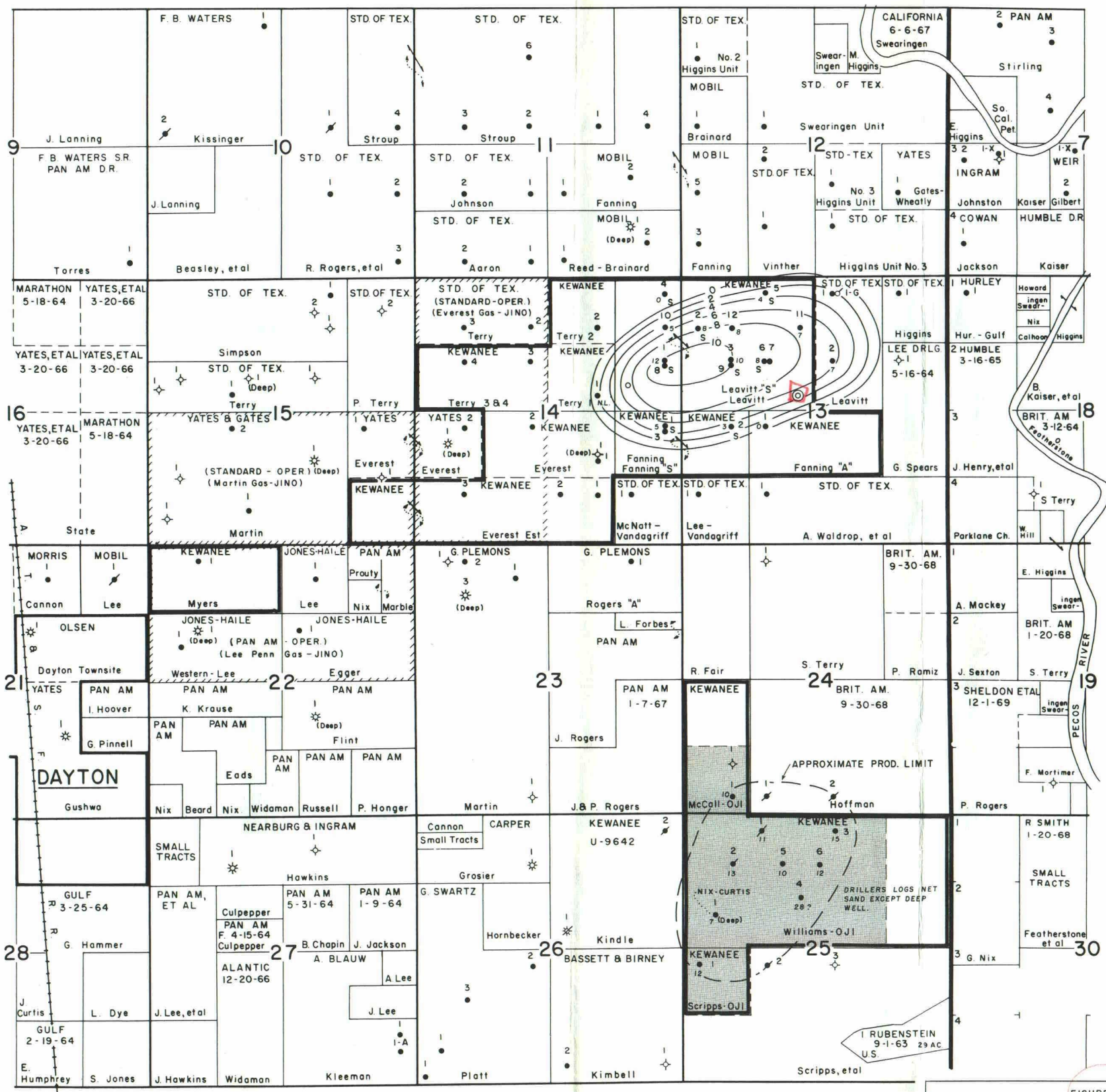

FIGURE I

DAYTON GRAYBURG FIELD

APPROXIMATE PRODUCTIVE AREA & NET PAY

PROPOSED UNIT AREA

LEGEND

- LOCATION
- OIL WELL
- DRY HOLE
- GAS WELL
- ABD OIL WELL
- ABD GAS WELL
- WATER INPUT WELL
- WTR SUPPLY WELL
- SALT WTR. DISPOSAL

KEWANEE OIL COMPANY

LEAVITT AREA

EDDY COUNTY, NEW MEXICO

DIVISION: WEST TEXAS

DISTRICT: MALJAMAR

SCALE: 1" = 1000'

500 0 660 1320 2640

Drawn: E.G.F.

Traced:

Checked: K.E.G.

Date 3-2-64

REVISED

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R 26 E

R 27 E

T 18 S

T 18 S

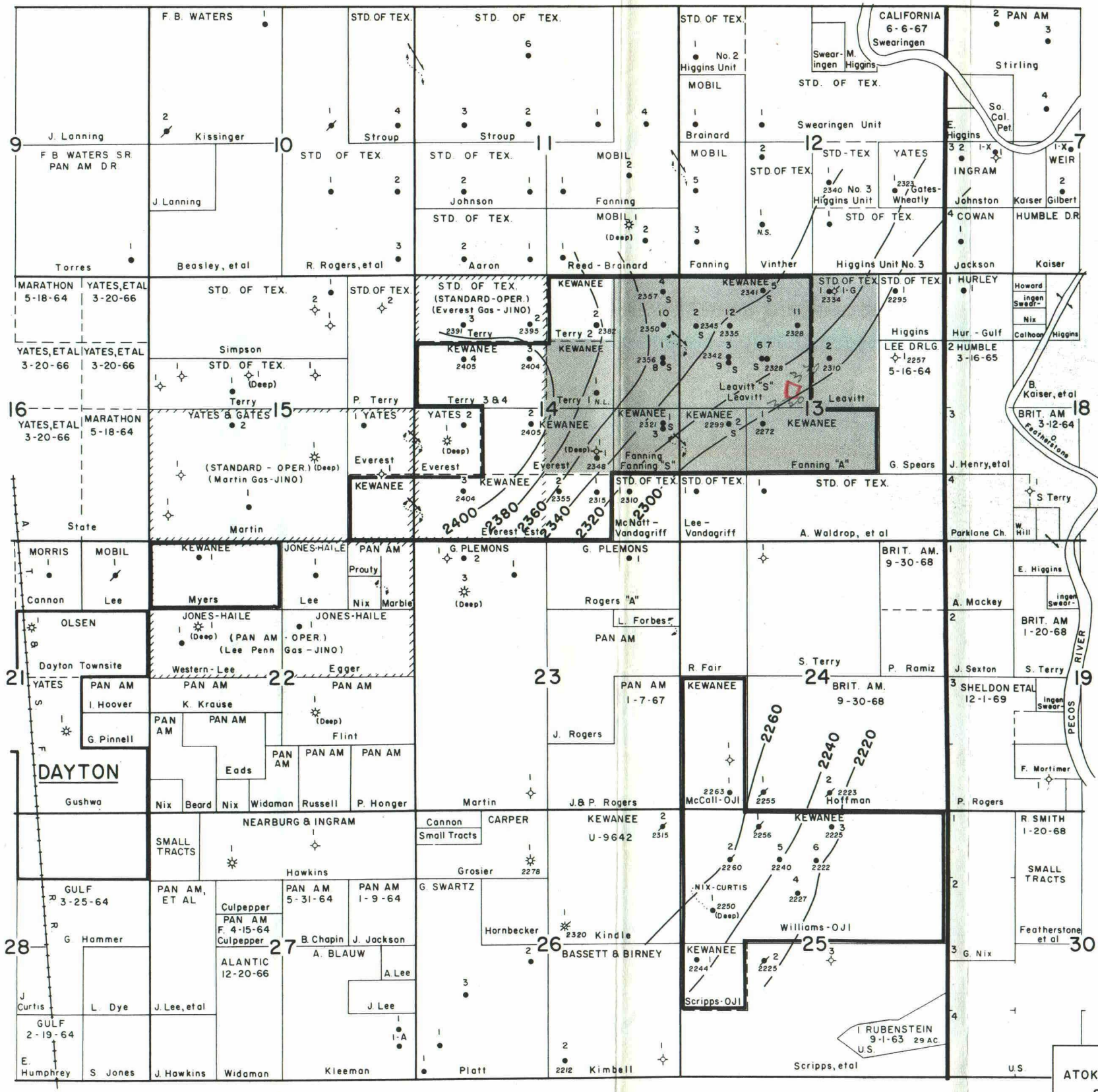

FIGURE II

ATOKA GRAYBURG FIELD

STRUCTURE MAP

Top of Pay - Premier Sand

CONTOUR INTERVAL-20'

PROPOSED UNIT AREA

LEGEND

- LOCATION
- OIL WELL
- DRY HOLE
- GAS WELL
- ABD. OIL WELL
- ABD. GAS WELL
- WATER INPUT WELL
- WTR. SUPPLY WELL
- SALT WTR. DISPOSAL

KEWANEE OIL COMPANY

LEAVITT AREA

EDDY COUNTY, NEW MEXICO

DIVISION: WEST TEXAS

DISTRICT: MALJAMAR

SCALE: 1" = 1000'

500 0 660 1320 2640

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FIGURE III

ATOKA GRAYBURG FIELD

PREDICTED SECONDARY RECOVERY

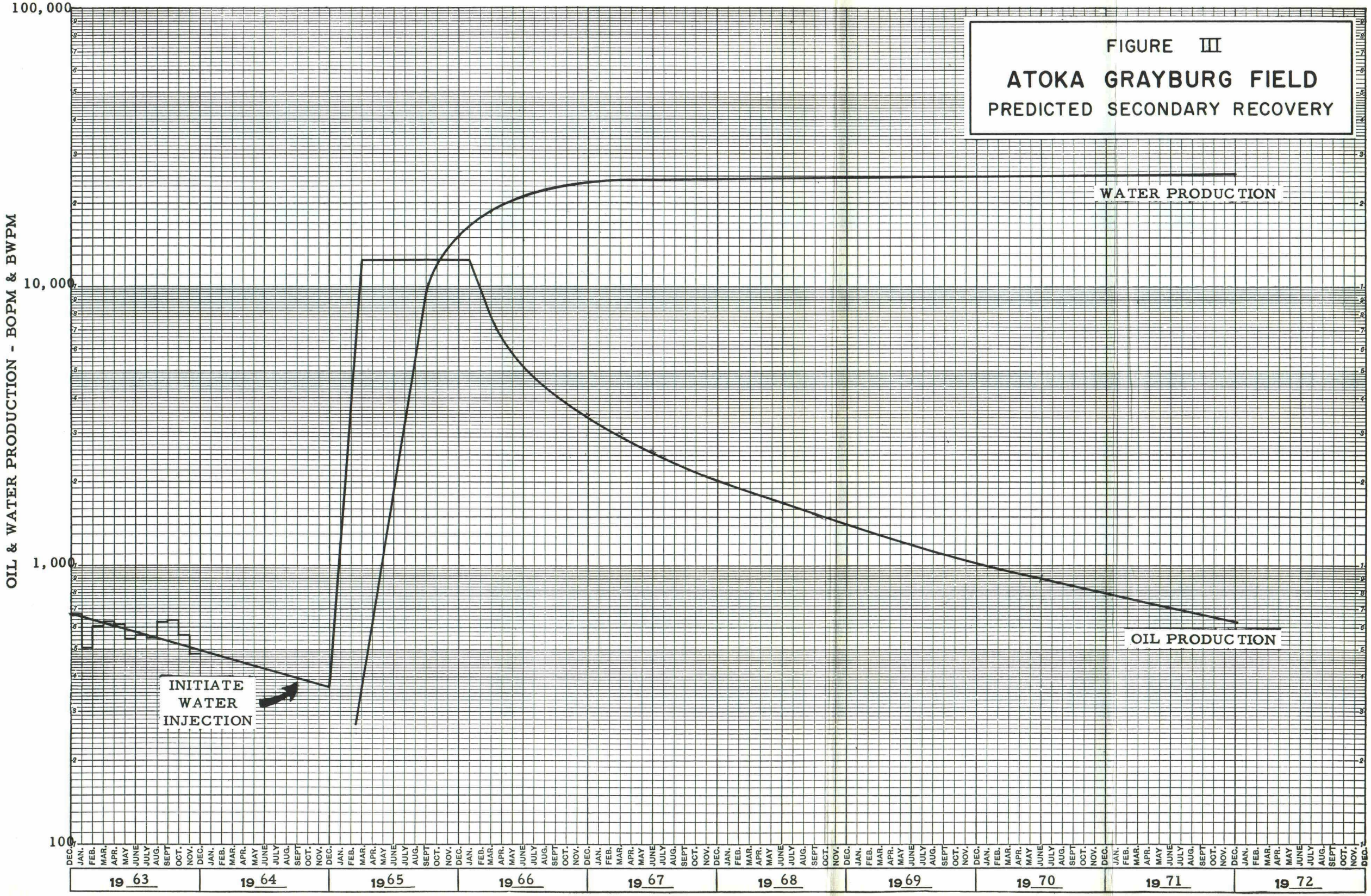


FIGURE III

ATOKA GRAYBURG FIELD

PREDICTED SECONDARY RECOVERY

OIL & WATER PRODUCTION - BOPM & BWPM

100,000

10,000

1,000

100

WATER PRODUCTION

OIL PRODUCTION

INITIATE WATER INJECTION

DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.

19 63 | 19 64 | 19 65 | 19 66 | 19 67 | 19 68 | 19 69 | 19 70 | 19 71 | 19 72

EXHIBIT "B"

ATOKA GRAYBURG FIELD

CONTINUED PRIMARY DEPLETION

OIL PRODUCTION - BOPM

10,000

1,000

100

10

ECONOMIC LIMIT

NUMBER OF WELLS

DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.

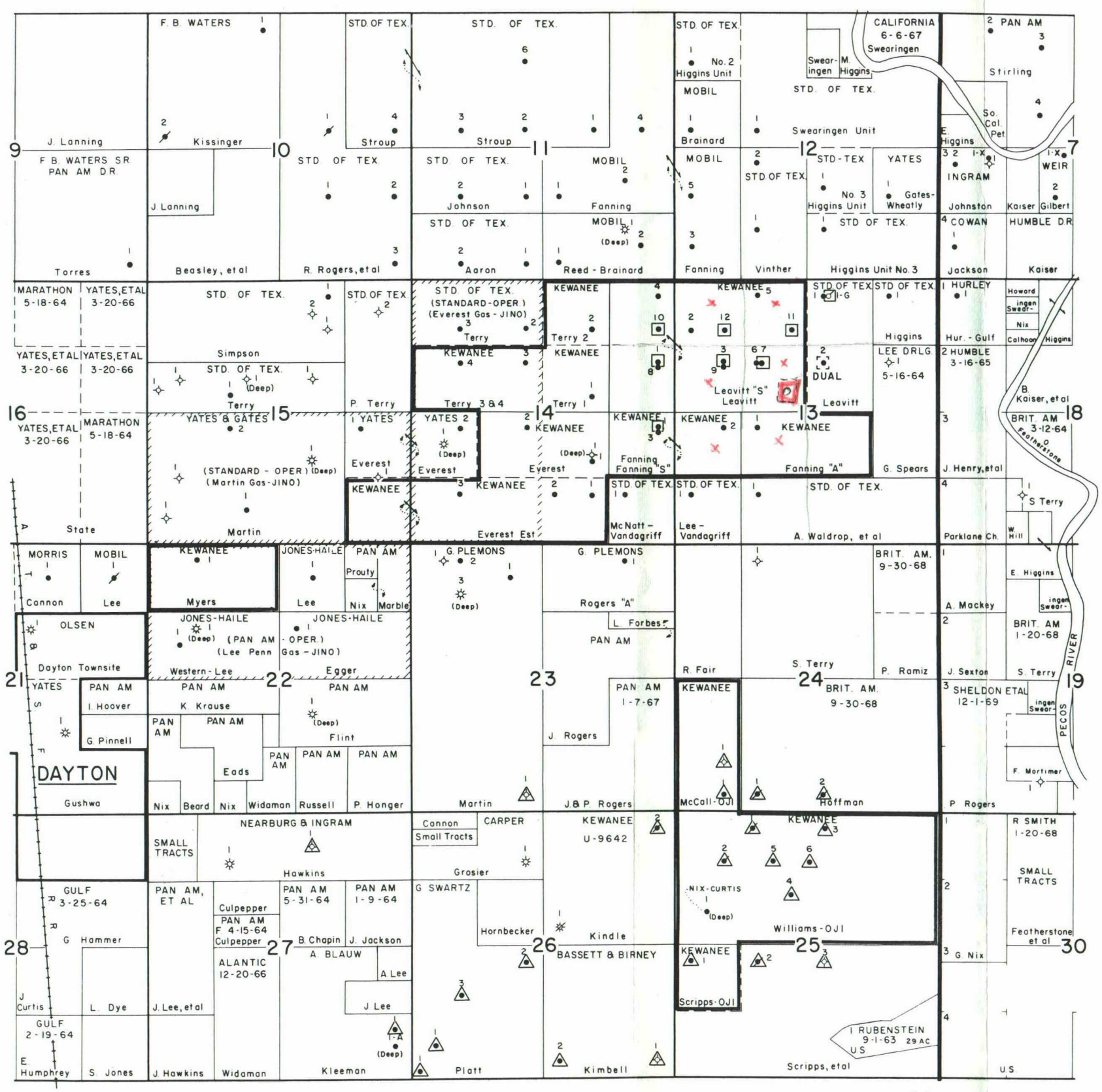
19 56 | 19 57 | 19 58 | 19 59 | 19 60 | 19 61 | 19 62 | 19 63 | 19 64 | 19 65

R 26 E

R 27 E

T 18 S

T 18 S



LEGEND

□ ATOKA GRAYBURG △ DAYTON GRAYBURG

• ATOKA SAN ANDRES

EXHIBIT "A"

ATOKA GRAYBURG & DAYTON GRAYBURG FIELDS

EDDY COUNTY, NEW MEXICO

LEGEND	KEWANEE OIL COMPANY	DIVISION: WEST TEXAS	Drawn: E.G.F.	REVISED
○ LOCATION ✳ ABD. GAS WELL ● OIL WELL ✧ DRY HOLE ✳ GAS WELL ✳ ABD. OIL WELL	LEAVITT AREA EDDY COUNTY, NEW MEXICO	DISTRICT: MALJAMAR SCALE 1" = 1000' 500 0 660 1320 2640	Traced Checked: K.E.G. Date 3-2-64	FILE W-64