CASE 3337: Application of SHELL for creation of new gas pool for Morrow production, Lea County.

CASE NO.
3337

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS
ETC.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 3337
Order No. R-3006
NOMENCLATURE

APPLICATION OF SHELL OIL COMPANY
FOR THE CREATION OF A NEW GAS POOL
AND FOR SPECIAL POOL RULES, LEA
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on November 23, 1965, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 3rd day of December, 1965, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Shell Oil Company, seeks the creation of a new gas pool for Morrow production in Lea County, New Mexico, and the promulgation of special rules and regulations including a provision for 640-acre spacing units.

(3) That the Shell Oil Company "GR" Federal Well No. 1 located in Unit E of Section 3, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico, has discovered a separate common source of supply which should be designated the Grama Ridge-Morrow Gas Pool; that the vertical limits of said pool should be the Morrow formation; and that the horizontal limits of said pool should be all of Sections 3 and 4, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico.

(4) That the applicant has established that one well in the Grama Ridge-Morrow Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, special rules and regulations providing for 640-acre spacing units should be promulgated for the Grama Ridge-Morrow Gas Pool.

(6) That the special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production, is hereby created and designated the Grama Ridge-Morrow Gas Pool, with vertical limits comprising the Morrow formation, and horizontal limits comprising all of Sections 3 and 4, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico.

(2) That Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
GRAMA RIDGE-MORROW GAS POOL

RULE 1. Each well completed or recompleted in the Grama Ridge-Morrow Gas Pool or in the Morrow formation within one mile thereof, and not nearer to or within the limits of another designated Morrow gas pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well shall be located on a standard unit containing 640 acres, more or less, consisting of a governmental section.

RULE 3. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 2 without notice and

hearing when an application has been filed for a non-standard unit and the unorthodox size or shape of the unit is necessitated by a variation in the legal subdivision of the United States Public Lands Survey, or the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of quarter-quarter sections or lots that are contiguous by a common bordering side.

(b) The non-standard unit lies wholly within a governmental section and contains less acreage than a standard unit.

(c) The applicant presents written consent in the form of waivers from all offset operators and from all operators owning interests in the section in which the non-standard unit is situated and which acreage is not included in said non-standard unit.

(d) In lieu of paragraph (c) of this rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if no such operator has entered an objection to the formation of such non-standard unit within 30 days after the Secretary-Director has received the application.

RULE 4. Each well shall be located no nearer than 1650 feet to the outer boundary of the section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 5. The Secretary-Director may grant an exception to the requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all operators offsetting the proposed location or if no objection to

the unorthodox location has been entered within 20 days after the Secretary-Director has received the application.

IT IS FURTHER ORDERED:

(1) That the locations of all wells presently drilling to or completed in the Grama Ridge-Morrow Gas Pool or in the Morrow formation within one mile thereof are hereby approved; that the operator of any well having an unorthodox location shall notify the Hobbs District Office of the Commission in writing of the name and location of the well on or before December 15, 1965.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

GUYTON B. HAYS, Member

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

esr/

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

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

December 3, 1965

Mr. Sumner Buell
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Re: Case No. 3336 & 3337
Order No. R-3005 and R-3006
Applicant:
Shell Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC *
Artesia OCC
Aztec OCC

Other

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 11/24/65

CASE 3337 Hearing Date 9am 11/23/65
DSN @ SF

My recommendations for an order in the above numbered cases are as follows:

creating the Drinkard Ridge Marlow Geo Pool ;
Enter an order approving 640-acre
spacing units for said pool.
Std unit to consist of single
governmental section.
Location of wells to be no nearer than
1650' to the outer boundary of the
section and no nearer than 330' to
an interior quarter-quarter section line.
Use ~~that~~ standard rules for
non-standard units and methods
locs.

D M Shutter
Staff Member

Docket No. 33-65

DOCKET: EXAMINER HEARING - TUESDAY - NOVEMBER 23, 1965

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

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

CASE 3294 (Continued from the September 22, 1965, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Harold J. Sechler, dba S. & S. Oil Producers, and all other interested parties to show cause why the Bond Well No. 1 located in the SW/4 NE/4 of Section 17, Township 9 North, Range 14 West, Valencia County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program.

CASE 3333: Application of William A. and Edward R. Hudson for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Queen formation through six wells in Sections 10, 11, and 15, Township 18 South, Range 31 East, Shugart Yates-Seven Rivers-Queen-Grayburg Pool, Eddy County, New Mexico.

CASE 3334: Application of Felmont Oil Corporation for an unorthodox location, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its Federal 9 Well No. 1 at an unorthodox location 660 feet from the North and East lines of Section 9, Township 8 South, Range 37 East, Bluitt-San Andres Gas Pool, Roosevelt County, New Mexico.

CASE 3335: Application of Monsanto Company for an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox oil well location 1200 feet from the South line and 660 feet from the West line of Section 32, Township 16 South, Range 33 East, West Kemnitz-Lower Wolfcamp Pool, Lea County, New Mexico.

CASE 3336: Application of Shell Oil Company for special rules for the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the East Hightower-Upper Pennsylvanian Pool in Section 25, Township 12 South, Range 33 East, Lea County, New Mexico, including a provision for 80-acre proration units.

CASE 3337: Application of Shell Oil Company for the creation of a new gas pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Morrow production in Sections 3 and 4, Township 22 South, Range 34 East, and Section 34, Township 21 South, Range 34 East, Lea County, New Mexico, and the establishment of special pool rules, including a provision for 640-acre spacing units.

CASE 3338: Application of Socony-Mobil Oil Company, Inc. for pool-lease commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle Glorieta, Blinebry, Upper-Pennsylvanian, Lower-Pennsylvanian, Devonian, Abo and Wolfcamp production from its State Bridges (Military Institute) Lease in Section 25, Township 17 South, Range 34 East, and from its State Bridges (Common School) Lease in Sections 3, 10 through 15, 22, 23, 24, and 26 and 27, Township 17 South, Range 34 East, Lea County, New Mexico, after separately metering the Military Institute production, allocating production to each lease by means of the subtraction method.

CASE 3339: Application of Socony-Mobil Oil Company, Inc. for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Denton North Wolfcamp Unit Area comprising 2,640 acres, more or less, of Federal and fee lands in Township 14 South, Range 37 East, Lea County, New Mexico.

CASE 3340: Application of Socony-Mobil Oil Company, Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Denton North Wolfcamp Unit by the injection of water into the Wolfcamp formation through twelve wells located in Sections 25, 26, 27, 34, 35, and 36, Township 14 South, Range 37 East, Lea County, New Mexico.

CASE 3341: Application of Tenneco Oil Company for an administrative procedure, San Juan and Rio Arriba Counties, New Mexico. Applicant, in the above-styled cause, seeks the establishment of an administrative procedure whereby wells presently completed in the Blanco-Mesaverde Pool could, without notice and hearing, be recompleted in the Blanco-Mesaverde and/or Basin-Dakota Gas Pools by means of setting a whipstock above the Mesaverde producing interval and directionally drilling around the old interval of completion which was originally shot. Operators utilizing such administrative procedure would be required to conduct appropriate deviation tests to ensure that no well would be completed nearer than 200 feet to the outer boundary of its proration unit.

CASE 3342: Application of Sunray DX Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Grayburg-Jackson Pool, Eddy County, New Mexico, by the injection of water into the Keeley zone of the San Andres formation through four wells in Sections 22 and 23, Township 17 South, Range 29 East.

CASE 3343: Application of Sunray DX Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Grayburg-Jackson Pool, Eddy County, New Mexico, by the injection of water into the Metex zone of the Grayburg formation through four injection wells in Sections 14 and 15, Township 17 South, Range 29 East.

CASE 3344: Application of Texaco Inc. for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the West Vacuum Unit Area comprising 2000 acres, more or less, of State land in Township 17 South, Range 37 East, Lea County, New Mexico.

CASE 3345: Application of Texaco Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its West Vacuum Unit by the injection of water into the Grayburg-San Andres formations through six injection wells located in Sections 3 and 4, Township 18 South, Range 34 East, and Sections 33 and 34, Township 17 South, Range 34 East, Vacuum Pool, Lea County, New Mexico.

CASE 3346: Application of Sinclair Oil & Gas Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Maljamar Pool by the injection of water into the Grayburg-San Andres formations through eight wells in Section 24, Township 17 South, Range 32 East, Lea County, New Mexico.

'65 Nov 3 PM 2 22

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF SHELL OIL COMPANY FOR THE CREATION OF A NEW GAS POOL AND FOR THE ESTABLISHMENT OF SPECIAL RULES AND REGULATIONS THEREIN, GRAMMA RIDGE-MORROW GAS POOL, LEA COUNTY, NEW MEXICO

Case No. 3331

APPLICATION

Comes now Shell Oil Company, by its attorneys, and applies to the New Mexico Oil Conservation Commission for the creation of a new gas pool and for the establishment of special rules and regulations therein and in support of its application states:

1. Shell Oil Company has completed its Federal GR Well No.1 located in Unit F, Section 4, T.22 S., R. 34 E., Lea County, New Mexico, in the Morrow formation, in the interval from 12,780 feet to 13,510 feet.

2. Subsequent to the completion of the Federal GR Well No.1, Shell Oil Company completed its State GRA Well No. 1 in the Morrow formation, which well is located in Unit E, Section 3, T. 22 S., R. 34 E., Lea County, New Mexico. Both the Federal GR Well No.1 and the State GRA Well No. 1 are shut in at the present time.

3. Shell Oil Company is in the process of drilling its State GRB Well No. 1 which it hopes to complete in the Morrow formation, which well is located 1980 feet from the South line and 660 feet from the West line of Section 34, T. 21 S., R.34 E. in Lea County, New Mexico.

4. Shell Oil Company request the Commission to create a new gas pool for Morrow production, to be designated the Gramma

Ridge-Morrow Gas Pool, based upon the Federal GR Well No. 1, as the discovery well in the pool. Horizontal limits for the pool should include Sections 3 and 4, T.22 S., R. 34 E., and Section 34, T. 21 S., R. 34 E., Lea County, New Mexico, and such additional lands as the Commission may deem to be justified on the basis of the evidence to be adduced at the hearing on this application.

5. Shell Oil Company further request the establishment of special rules and regulations for the Gramma Ridge-Morrow Gas Pool to provide for 640 acre spacing units. No particular well location requirements are requested and the standard locations prescribed by Commission orders in other 640 acre gas pools having spacing units of 640 acres will be satisfactory.

6. The Gramma Ridge-Morrow Gas Pool can be efficiently and economically drained and developed under special rules and regulations providing for 640 acre spacing units.

7. Approval of this application will prevent waste and protect correlative rights.

WHEREFORE, Shell Oil Company request that this application be set for hearing before the Commission or one of its Commissioners and that the Commission in its order creating the Gramma Ridge-Morrow Gas Pool and establishing rules and regulations therefor providing for 640 acre spacing units as set forth in this application.

SETH, MONTGOMERY, FEDERICI & ANDREWS

By _____

350 E. Palace Avenue
Santa Fe, New Mexico
Attorneys for Shell Oil Company

GRAMA RIDGE-MORROW GAS POOL
LEA COUNTY, NEW MEXICO
CASE NO. 3337

November 23, 1965

This exhibit is submitted in support of the application of Shell Oil Company to create a new gas pool for Morrow production in Sections 3 and 4, Township 22 South, Range 34 East, Lea County, New Mexico, to be designated the Grama Ridge-Morrow Gas Pool. Shell further requests special rules for this pool, including the establishment of 640-acre spacing units with standard well locations as prescribed by Commission orders.

History

Shell "GR" Federal No. 1, located in Unit E, Section 3, Township 22 South, Range 34 East, is the discovery well of the Grama Ridge-Morrow Gas Pool (see Enclosure 1). The Morrow formation was encountered at a depth of 12,780 feet (see Enclosure 2). Subsequently Shell drilled and completed the State "GRA" No. 1, located in Unit E, Section 3, Township 22 South, Range 34 East, and is currently drilling State "GRB" No. 1, located in Unit L, Section 34, Township 21 South, Range 34 East. Both of the completed wells are currently shut in pending a market for the gas.

Geology

The Morrow formation in southeastern New Mexico is composed of alternating layers of sand and carbonate. The porosity occurs in the sand zones; however, it is quite erratic and in many places the sand zones are tight. The Grama Ridge Pool is a stratigraphic trap associated with a west dipping monocline.

Reservoir Data

Bottom water has not been detected in this pool with the base of the pay being determined by termination of porosity. Therefore, it is believed that the gas in this pool will be produced by pressure depletion only. A summary of the reservoir and gas data is presented in Enclosure 3.

After completion of the two Morrow wells, an interference test was run to assist in determining the areal extent of the gas reservoir and as evidence that one well would drain 640 acres. The results of the interference test as well as shut-in pressures run before and after are presented in graphical form in Enclosure 4. The status of both wells during this period is also noted on this graph.

The conditions for the interference test were as follows: State GRA No. 1 well was flowed at a rate of six million cubic feet per day for six days; while the shut-in pressure was monitored in the offset well "GR" Federal No. 1, located 3645 feet away. The initial open flow potential test had been run on the GRA-1 well several days before the interference test was started and the well had been shut-in during the intervening period; whereas, the GR-1 well had been shut-in for the previous 77 days.

The pressure started declining in the shut-in well approximately 10 hours after flow commenced from GRA-1 and pressure in the shut-in well continued to drop throughout the test. At termination of the flow period (157 hours) pressure had declined 57 psi. A pressure bomb was run in GRA-1 after termination of the flow period and a 52-hour buildup was obtained. Pressure had completely built up 4 hours after shut-in and it was identical to the static pressure in "GR"-1 well taken 57 hours after termination of the flow period. Therefore, the interference test indicated and the shut-in pressures confirmed that both of the wells penetrated a common reservoir. The final static pressure in both wells was the same as the static pressure in "GR"-1 after its completion three months prior to the subject interference test.

A Sperry-Sun precision subsurface pressure gauge was used to monitor pressure in the shut-in well during the interference test. This gauge was selected because the manufacturer claims an accuracy of $\pm$0.05% of full scale reading and sensitivity of $\pm$0.005% of full scale. Use of this instrument enabled immediate detection of the arrival of pressure disturbance at the shut-in well.

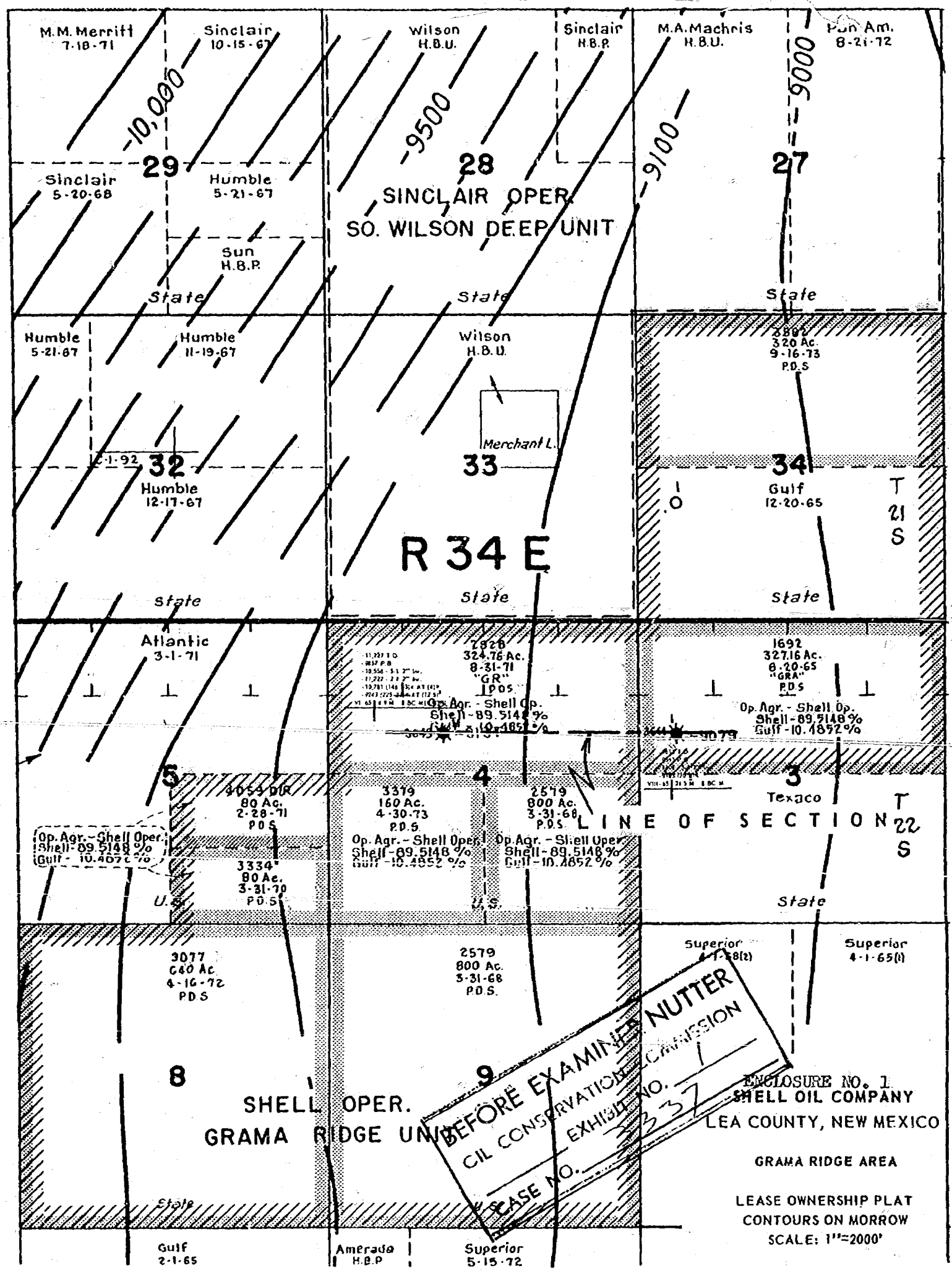
Calculations indicate that the pressure disturbance should have arrived at the shut-in well in about 6 hours. This closely approximates the 10-hour arrival time which was observed.

Economics

The economics of drilling wells in this field on both 320 and 640-acre spacing is presented in Enclosure 5. The analysis indicates that drilling on 320-acre spacing would not yield an adequate annual return on the investment to justify the risk involved in drilling. The 7.8 years payout would also tie up the investment for an unreasonable length of time; however, the annual yield on investment for 640-acre spacing and the shorter payout period would encourage additional drilling for full development of this pool.

Conclusion

Approval of this request for 640-acre spacing in the Grama Ridge-Morrow Gas Pool would be in the best interest of conservation because it will increase the economically recoverable reserves of the field. Approval of this application will also prevent waste and protect correlative rights.


M.M. Merritt 7-18-71
Sinclair 10-15-67
Wilson H.B.U.
Sinclair H.B.P.
M.A. Machris H.B.U.
Pan Am. 8-21-72
-10,000
-9500
-9100
-9000
29
28
27
Sinclair 5-20-68
Humble 5-21-67
SINCLAIR OPER.
SO. WILSON DEEP UNIT
Sun H.B.P.
State
State
State
Humble 5-21-67
Humble 11-19-67
Wilson H.B.U.
6880
320 Ac.
9-16-73
P.D.S
Merchant L.
C-1-92
32
33
34
Humble 12-17-67
Gulf 12-20-65
T 21 S
R 34 E
State
State
State
Atlantic 3-1-71
7828
324.76 Ac.
8-31-71
"GR"
P.D.S
Op. Agr. - Shell Op.
Shell - 89.5148 %
Gulf - 10.4852 %
1692
327.16 Ac.
8-20-65
"GRA"
P.D.S
Op. Agr. - Shell Op.
Shell - 89.5148 %
Gulf - 10.4852 %
5
4
3
4059 DIR
80 Ac.
2-28-71
P.D.S
3379
160 Ac.
4-30-73
P.D.S
2579
800 Ac.
3-31-68
P.D.S
Texaco
T 22 S
Op. Agr. - Shell Oper.
Shell - 89.5148 %
Gulf - 10.4852 %
3334
80 Ac.
3-31-70
P.D.S
Op. Agr. - Shell Oper.
Shell - 89.5148 %
Gulf - 10.4852 %
Op. Agr. - Shell Oper.
Shell - 89.5148 %
Gulf - 10.4852 %
LINE OF SECTION
U.S.
U.S.
State
3077
640 Ac.
4-16-72
P.D.S
2579
800 Ac.
3-31-68
P.D.S
Superior 4-1-65(2)
Superior 4-1-65(1)
8
9
SHELL OPER.
GRAMA RIDGE UNIT
State
Gulf 2-1-65
Amerada H.B.P
Superior 5-15-72
BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO.
ENCLOSURE NO. 1
SHELL OIL COMPANY
LEA COUNTY, NEW MEXICO
GRAMA RIDGE AREA
LEASE OWNERSHIP PLAT
CONTOURS ON MORROW
SCALE: 1"=2000'

Enclosure No. 3

RESERVOIR CHARACTERISTICS
GRAMA RIDGE-MORROW GAS POOL
LEA COUNTY, NEW MEXICO
CASE NO. 3337

November 23, 1965

Formation

1.	Net Pay, Feet	30
2.	Porosity	6
3.	Permeability, md.	4
4.	Water Saturation, %	25
5.	Reservoir Temp, °F	180
6.	Original Reservoir Pressure, psig @ -9350'	7500

Gas

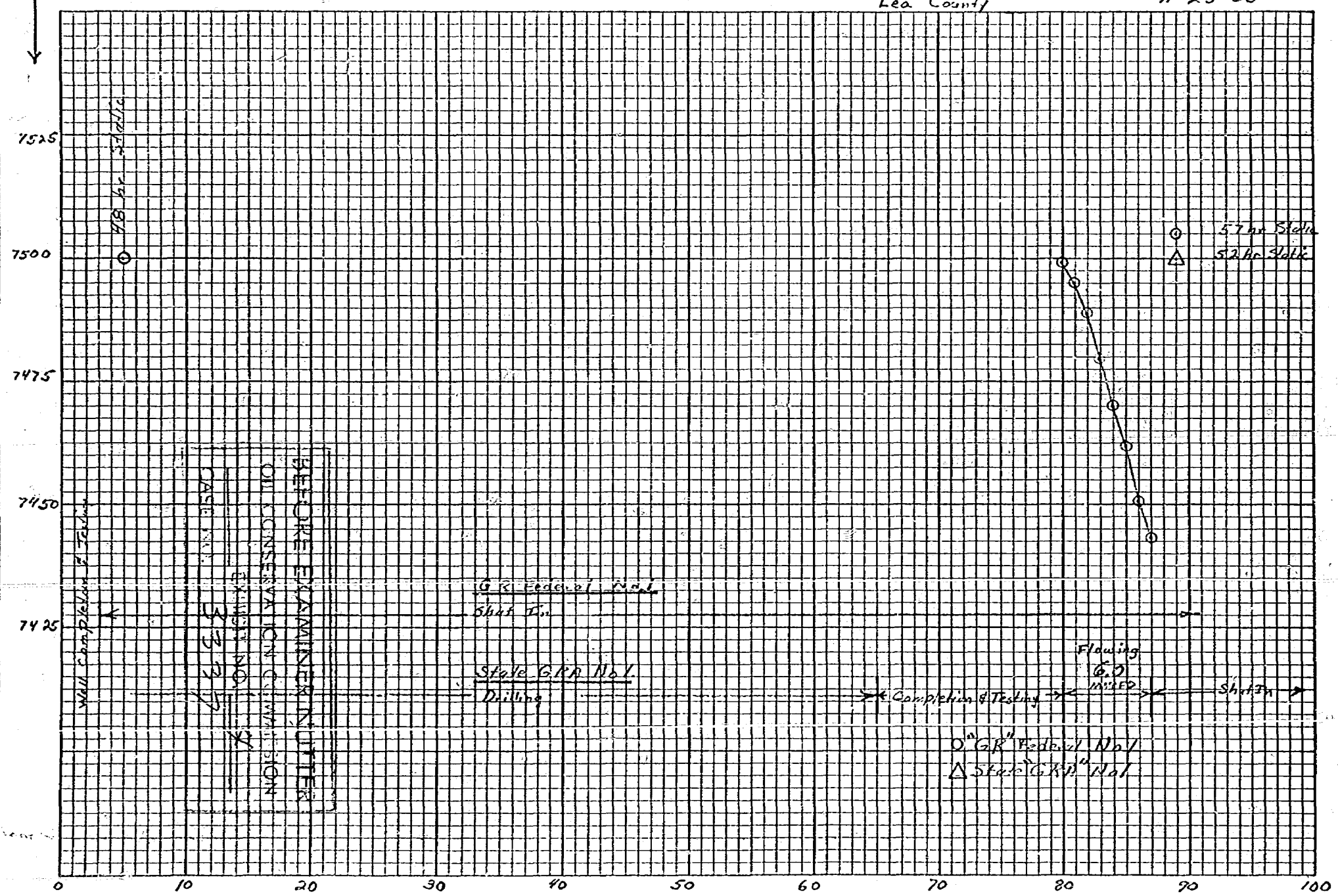
1.	Gas Gravity (Air = 1.0)	0.59
2.	Liquid Content, bbl/MMCF	8
3.	Methane Content, Mol %	94.05
4.	Hydrogen Sulfide Content, grs./100 $ft.^3$	0.05
5.	BTU Content, per MCF	1034

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO. 3337

Bottom Hole Pressure @ -9350' - P.S.I.

Grama Ridge Field
Lea County

Case No. 3337
11-23-65



Enclosure No. 4

Enclosure No. 5

ECONOMICS FOR VARIOUS SPACING SCHEMES
GRAMA RIDGE-MORROW GAS POOL
LEA COUNTY, NEW MEXICO
CASE NO. 3337

November 23, 1965

Basic Data

Gas Value ($/MMCF)	157.65
Condensate Value ($/Bbl.)	2.73
Net Interest	0.785
Production Taxes ($/MMCF)	10.43
Operating Cost ($/Month)	500
Investment-Well and Lease Facilities ($)	390,000

Economics

	Well Spacing	
	320-Acres	640 Acres
Recoverable Gas ($ft.^3$)	7.5 billion	15.0 Billion
Recoverable Condensate (Bbls.)	37,500	75,000
Gas Revenue ($)	1,577,000	3,153,000
Condensate Revenue ($)	102,000	205,000
Total Revenue ($)	1,679,000	3,358,000
Total Net Revenue ($)	1,318,000	2,636,000
Operating Cost ($)	132,000	132,000
Production Taxes ($)	78,200	156,000
Net Income ($)	1,108,000	2,216,000
Investment ($)	390,000	390,000
Profit ($)	718,000	1,826,000
Average Annual Percent Profit	8.4	16.8
Payout (Yrs.)	7.8	3.9

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 3337

SPECIAL RULES AND REGULATIONS
FOR THE
GRAMA RIDGE-MORROW GAS POOL

RULE 1. Each well completed in the Grama Ridge-Morrow Gas Pool or in the Morrow formation within one mile of the Grama Ridge-Morrow Gas Pool, and not nearer to or within the limits of another designated Morrow Pool, shall be spaced, drilled, operated and produced in accordance with these Special Rules and Regulations.

RULE 2. Each well completed in the Grama Ridge-Morrow Gas Pool shall be located on a standard unit containing 640 acres, more or less, consisting of a single governmental section.

RULE 3. Each well completed in the Grama Ridge-Morrow Gas Pool shall be located no nearer than 1650 feet to the outer boundary of the section and no nearer than 330 feet to any governmental quarter-quarter section line. Any well drilled to or being completed in or presently drilling to the Grama Ridge-Morrow Gas Pool is granted an exception to the well location requirements of this rule.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
NOVEMBER 23, 1965

EXAMINER HEARING

IN THE MATTER OF:
Application of Shell Oil Company for the creation of a new gas pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Morrow production in Sections 3 and 4, Township 22 south, Range 34 east, and Section 34, Township 21 south, Range 34 east, Lea County, New Mexico, and the establishment of special pool rules, including a provision for 640-acre spacing units.

Case No. 3337

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. DURRETT: Application of Shell Oil Company for the creation of a new gas pool and for special pool rules, Lea County, New Mexico.

MR. BUELL: We will have one witness who was sworn in Case 3336. Do you want him resworn at this time?

MR. NUTTER: He's still under oath.

DIRECT EXAMINATION

BY MR. BUELL:

Q You are the same Richard D. Seba that testified in the previous case, Number 3336?

A Yes, I am.

Q Are you familiar with Shell's application in this Case 3337?

A Yes, I am.

Q And what does Shell Oil seek by that application?

A Shell Oil seeks creation of a new gas pool for Morrow production in Section 3 and 4, Township 22 south, Range 34 east, Lea County, New Mexico and it requests that this be designated the "Gramma Ridge-Morrow Gas Pool." Shell further requests special rules for this pool, including the establishment of 640-acre spacing as a gas pool.

(Whereupon, Applicant's Exhibits 1 through 6 marked for identification.)

MR. BUELL: Mr. Examiner, I would like to point out

at this time in the application which our office filed on behalf of Shell, "Grama Ridge" is misspelled. It's one "M" instead of two.

MR. NUTTER: Well, the name wasn't included in the notice. We'll chalk it up to the secretary.

Q (By Mr. Buell) Referring to what has been marked Exhibit Number 1, will you explain what that shows, what it is?

A Yes. Exhibit Number 1 is a plat of the general area of the requested special pool rules showing lease ownership, fee ownership, and I've also outlined the current drilling unit with the hashered marks. Gulf and Shell have formed a drilling unit comprising approximately five sections that encompass the two wells that have currently completed in the requested pool. The two wells that have currently been drilled are shown in this plat; being specifically, Shell "GR" Number 1 located in the northwest quarter, Section 4 and the Shell State "GRA" Number 1 located in the northwest quarter of Section 3.

You will also note that there is a line between these two wells which will be a line in a cross section to be presented in Exhibit Number 2.

There is a third well currently drilling in this area which we anticipate will find pay in the subject pool and will also be included with the subject pool at a future date upon completion. This is the one located in Section 34 in the

southwest quarter of that section which originally was Gulf acreage but is now included in the drilling unit and it is Gulf; it is being called Shell State "GRB" Number 1. This is currently drilling at approximately 4,000 feet.

Q Referring you now to what has been marked Exhibit 2, would you explain that please?

A Exhibit 2 is a log cross section through the two wells that have currently been drilled in the proposed pool.

The Shell Federal 1, "GR" Federal 1, which is labeled on the cross section as "GR 4-1"; the Shell State "GRA" Number 1. I have also drawn two correlation lines on this cross section. One at the top of the Morrow and the other at the base of the Morrow.

The Shell "GR" Federal was drilled through the entire Morrow section but, as you will note, it was completed in the upper portion of the Morrow.

Also on this cross section I would like to point out the same things that we showed previously as legended items. We show the gross producing interval and we show the interval over which the stem tests were run. The specific drill stem tests are shown at the bottom of each of the logs and also the calculated absolute open flow potential of each of the wells.

I would also like to point out that the Shell "GR" Federal 1 is completed in two particular intervals; being from

12,800 and about 83 to 12,903 and the second interval from 13,093 to 13,111 and there were drill stem tests taken over both of these intervals.

The completion interval in the Shell "GR" State 1 is 12,827 to 12,847.

Q Well, referring you now to Exhibit Number 3, would you please discuss that?

A Yes. Exhibit Number 3 is a summary of the average reservoir properties and gas properties encountered in the two wells completed in the proposed pool. The net pay is estimated to be 30 feet or an average of 30 feet; porosity of 6 per cent; permeability of 4 milidarcies; water saturation of 24 per cent; a reservoir temperature of 180 degrees; the original reservoir pressure at a minus 9350 of 7500 pounds; the gas gravity is .59 with the air being equal to 1; the gas contains 8 barrels per million cubic feet, 8 barrels of liquids; the methane content of the gas is 94.05 per cent; contains .05 grains per 100 cubic feet of hydrogen sulfide and has a BTU content of 1034 BTU's per 1000 cubic feet.

Q Referring to Exhibit 4, would you explain that, please?

A Yes. After completion of the second well which was the "GRA" Number 1, we sought to determine if both of these wells had penetrated a common reservoir. So, I'd like to refer you back to Exhibit 1, which was the plat, and then describe

the interference tests that we ran between these two wells to establish that they are both in the same common reservoir and that there is communication between the two.

The "GR" Federal 1 was completed in the first part of June of this year. We ran a static pressure after a 48-hour shut in and this is noted on Exhibit 4 at approximately 7500 pounds and is located in about the fifth day. I would like to point out that this graph is bottom hole pressure at 9350 versus elapsed time in days. This well was then shut in and has remained shut in. To this day there has been no further production on the "GR" Federal Number 1 since the final testing in June.

After the completion of the "GRA" well in August, the well was completion tested and the interference test was undertaken. In the interference test we flowed "GRA" Number 1 at approximately 6 million cubic feet per day for a total of six days. During this flowing period we monitored the pressure in the offset well, "GR" Federal Number 1, for this total period. We employed a very sensitive Sperry-Sun pressure bomb and obtained the pressure that I have shown with the circles starting with the 80th day on this curve. You will note that the pressure started dropping very shortly after flow commenced from the "GRA" Number 1 well and at the end of six days had dropped a total of 57 pounds. The initial time when pressure started

dropping in the "GR" Federal 1 was 10 hours after commencement of flowing from the "GRA" Number 1.

We did make some rough calculations to determine when this pressure front or pressure drop should have started at the "GR" 1 and our calculations indicate approximately six hours, so we thought this was in very good agreement with our calculations.

It was to us conclusive evidence that the two wells were in communication because we noted this total of 57 pounds pressure drop over the six-day period.

After shutting in the "GRA" Number 1, we went back into that well and took a 52-hour build up which is shown by the triangle at approximately the 89th day. The pressure completed build up was in four hours and the static for the subsequent 48 hours at 7500 pounds.

We then went back into the "GR" Federal Number 1 and read a static 57 hours after the offset well was shut in and obtained a pressure of 7505.

The bombs used for measuring the build up in static pressures were not as accurate as the bomb used for the interference tests which accounts for the slight discrepancy between the two. This correlates very well then with the static pressure run in the "GR" 4 or "GR" Federal 1, approximately 77 days before and this to us was conclusive

evidence that the two wells were in communication and that they would both adequately drain the 640 acres.

Q Referring you now to Exhibit 5, would you go through that please?

A Yes. Exhibit Number 5 is an economic analysis of drilling wells on both 320 acres, which is the State spacing, and the requested 640-acre spacing.

At the top of the exhibit, we have the basic data that was used in making these computations. We used a gas value of 15.8 cents per MCF which is an average over the life of the project being basically 14 cents per thousand plus a 1 per cent every five years escalation. The condensate produced would have a value of $2.73. Shell's net interest in the acreage, .785. Production taxes are estimated to be $10.43 per million. Operating cost is approximately $500 a month and the investment in well and lease facilities, $390,000.

Going to the lower portion of this exhibit, I would like to point out several items: First, the recoverable gas in cubic feet for 320 acres would be 7-1/2 billion whereas for 640 it would be 15 billion. These reserves were determined by volumetrics used in the data that was presented in the previous exhibit. And along with that we have assumed that over the life of the project we would recover 5 barrels per 9 cubic feet

yielding recoverable condensate for 320-acre spacing of 37,500 and 75,000 barrels for 640-acre spacing. The numbers presented subsequent to this are used in calculating the net income from the various spacing schemes. We calculate that the net income for 320-acre spacing would be $1,108,000 whereas for 640 acres we would derive a net income of $2,216,000. Investment would be the same and we developed on 320 and 640 thus yielding a profit for 320-acre spacing of $718,000 and for 640-acre spacing yielding a profit of $1,826,000. Now, because of the nature of the reservoir being a gas reservoir, we felt that we should use a slightly different criteria for determining the profitability than was used in normal oil reservoirs. Therefore, I have presented the average annual percent profit and payout for the two spacing schemes. The annual average profit for 320 acres would be 8.4 per cent and the average payout would take 7.8 years. For the 640-acre spacing scheme, the annual average profit would be 16.8 per cent whereas the payout would require only 3.9 years.

Now, we feel that the profit criteria for 320-acre spacing are not commensurate with the risk involved in drilling to this reservoir and, therefore, would not justify additional drilling in the pool if we were limited to 320 acres per well.

I might point out the reasoning for using the different profit criteria for a gas well and that is that most

pipe lines will take gas on the basis of 1 million cubic feet per day per pipe line. Assuming a plant life over the entire period would require 21.9 years to exhaust the reserves of a gas well and so the rate would be half for the 320-acre spacing than it would be for 640. Therefore, we feel that the payout and average annual profit are the criteria that should be followed in determining profitability in such a venture.

Concerning the limits, specific depths aren't imposed; that the depths indicated in Exhibit 2 would be applied.

Q And the horizontal limits you propose to be the same as what?

A We propose at the present time in the absence of further proven production that the pool be limited to Sections 3 and 4..

Q Referring you now to Exhibit 6, would you outline briefly what that shows?

A Exhibit 6 are the proposed rules and regulations for the Grama Ridge-Morrow Gas Pool in which we state that each well completed the Grama Ridge-Morrow Gas Pool or in the Morrow formation within one mile of the Grama Ridge-Morrow Gas Pool and not nearer to or within the limits of another designated Morrow Pool shall be spaced, drilled, operated and produced in accordance with these special rules and regulations. We further stipulate that the drilling unit be specified as

640 acres and that each well completed in the Grama Ridge-Morrow Gas Pool shall be located within the center 160 acres of the governmental section.

Q Also in those rules is an exception for the present well drilled or drilling?

A Yes, in that two wells are already completed in the proposed pool and one drilling, we propose that these be granted exceptions at the present time under the establishment of the pool.

Q Were Exhibits 1 through 6 prepared by you or under your supervision?

A Yes, they were.

Q Do you feel that the granting of your application would tend to prevent waste and protect correlative rights?

A Yes, I do.

MR. BUELL: At this time I move that the introduction of Exhibits 1 through 6 be accepted.

MR. NUTTER: Applicant's Exhibits 1 through 6 shall be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 6 were offered and admitted into evidence.)

MR. BUELL: I have no further questions.

MR. NUTTER: Any questions, Mr. Durrett?

CROSS EXAMINATION

BY MR. DURRETT:

Q If the Commission adopts the proposed rules, will all three of the locations shown on your Exhibit Number 1 be exceptions to this?

A No, sir. The discovery well is drilled within the center 160 acres in Section 4. However, Well "GRA" 1 and "GRB" 1 would be exceptions to this spacing.

Q What are they located; 660 to the section line?

A Yes.

MR. DURRETT: Thank you.

BY MR. NUTTER:

Q Mr. Seba, is the hashered line on Exhibit Number 1 the boundary of the unit?

A Of the drilling unit, yes, sir.

Q Of the Grama Ridge unit, of the over-all thing?

A This is the Grama Ridge unit, yes, operated by Shell whereas the second shading was the original Shell acreage.

Q But the hashered line is the unit?

A Yes, sir.

Q Well now, in other words the north half of Section 3 is in the unit but the south half of Section 3 appears to a be a just space outside the unit?

A Correct.

Q So for all practical purposes on 320-acre spacing it

would be almost mandatory that you dedicate the north half of this section --

A Yes, sir.

Q -- because you control that?

A Yes. We are in the process of negotiating with Texaco to unitize that section or bring them into the unit but we have not affected an agreement with them at the present time.

Q The "GR" 1 on the Federal lease in Section 4 was the discovery well?

A Yes, sir.

Q And you knew you had a gas well there?

A Yes, sir.

Q Was this second well drilled subsequent to the time the Commission revised Rule 104 and permitted the dedication of 320 to Pennsylvanian for deeper gas wells?

A Both of these wells were completed in 1965.

Q Well then, this would be subsequent to the rule revision?

A Yes.

Q Why then wasn't the location of the "GRA" Number 1 located on one of the interior 40's of that 320-acre tract?

A The "GRA" Number 1 was originally proposed as a Silurian test and the contours on the silurian indicate that there is a high in that area and we were drilling there to get

the most favorable position in the Silurian. At the time we reached the Morrow, we terminated our plans to drill to the Silurian. However, the "GRB" Number 1 is now predicted to the Silurian and pipe will be set so we can go to the Silurian if we discovery Silurian gas.

Q Is that the well in the Gulf lease 34?

A Yes. So both of those wells were drilled on the basis of Silurian highs in hopes of getting the most advantageous location in the Silurian rather than drill to conform to the Morrow.

Q I see, but the "GRA" Number 1 never did go to the Silurian?

A No, sir.

Q You stopped in the Morrow as soon as --

A That is correct.

Q -- had a well?

A We actually thought the "GRA" well was a better gas well in the Morrow than the original.

Q Now, on your interference test data sheet you show the initial pressure for the "GR" Federal Number 1 but you don't show the initial pressure for the "GRA". Did you have any initial pressure on it?

A The pressures that we had prior to this shut-in we did not feel were representative of the reservoir and we felt

that only after the cleanup that was effected by this stay flow period did we actually get a true measure of the pressure in the Morrow so this is why only the one triangle is indicated. The pressures prior to that during the completion and testing phase we didn't feel were representative of the pressure in the Morrow.

Q So you actually had no initial pressure on it?

A No, sir. We felt that since it correlated very well with the static pressure run some 80 days prior to this in the discovery well substantiated the fact that we did not appreciably deplete this reservoir through this testing procedure.

Q Now, on your Exhibit 5 you show an operating cost of $500 a month. Is this a typical operating cost for a Shell gas well?

A In the absence of actual operations we use some guide lines and this is the figure that the guide lines indicate that it will cost us to operate this well.

Q Is the guide line a typical cost?

A The guide line is statistical cost not necessarily for this area but based on some of our operations over a wider area.

Q And this would include all types of costs?

A Well, they are the costs.

Q Home office overhead and everything?

A Yes.

Q And your payout is based on a rule of thumb of a million to a billion?

A Yes, generally this is the type of contract that the gas companies like to write so that they will have approximately 20-year reserves.

Q Has any contract been negotiated as yet for the sale of this?

A No, sir. At the present time we are talking with three different pipeline companies but no specific contract has been written.

MR. NUTTER: I see. Are there any further questions of Mr. Seba? You may be excused.

Do you have anything further, Mr. Buell?

(Counsel nods head.)

Does anyone have anything else they wish to offer in Case 3337? We will take the case under advisement.

(Whereupon, Case Number 3337 was concluded.)

I N D E X

E X H I B I T S

EXHIBIT	MARKED FOR IDENTIFICATION	OFFERED	ADMITTED
App's. 1	2	11	11
App's. 2	2	11	11
App's. 3	2	11	11
App's. 4	2	11	11
App's. 5	2	11	11
App's. 6	2	11	11

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

Witness my Hand and Seal this 24th day of December, 1965.

Dean A. Robinson
NOTARY PUBLIC

My Commission Expires:

October 16, 1969.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3337, heard by me on Nov. 23, 1965.

..... Examiner
New Mexico Oil Conservation Commission