ACASE 7208: GULF OIL CORPORATION FOR THE AMENDMENT OF POOL RULES, EDDY COUNTY, NEW MEXICO

CASE NO.

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APPliCation, Transcripts, Small Exhibits,

ETC.

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In paragraph 13, Top 245-Rge 26 E, NMPM, Soctions 14-17, Should be changed to read "Sections 15-17: ALL." Bolbooks indicate that section 14 is not included Win pool boundaries.

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

> CASE NO. 7208 Order No. R-2429-C

APPLICATION OF GULF OIL CORPORATION For the Amendment of Pool Rules, Eddy County, New Mexico.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 25, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 7th day of April, 1981, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2429-A, entered March 27, 1963, in Case No. 2737, the Division promulgated special pool rules for the White City-Pennsylvanian Gas Pool in Eddy County, New Mexico, including a provision for 640-acre well spacing and proration units and specified well locations.

(3) That by Order No. R-2429-B, entered April 13, 1964, the Division continued said special pool rules in full force and effect until further order of the Division.

(4) That the applicant in the instant case, Gulf Oil Corporetion, seeks the amendment of the special pool rules for the spacing and location of wells in the White City-Pennsylvanian Gas Pool, and seeks to have said pool governed by the provisions of Rule 104 C II(a) of the Division Rules and Regulations for gas pools of Pennsylvanian age, with respect to acreage dedication, but with certain specified locations for wells in said pool. -2-Case No. 7208 Order No. R-2429-C

(5) That the evidence in this case indicates that the wells in the White City-Pennsylvanian Gas Pool are not draining 640 acres as it had been thought that they would, but that in fact the average well in the pool is draining only 257 acres.

(6) That although the Strawn, Atoka, and Morrow zones of the Pennsylvanian all produce gas in the subject pool, production from the pool is mostly from the many separate pay stringers in the Morrow zone which vary greatly in areal extent and in permeability, porosity, and thickness, both within individual stringers and between stringers.

(7) That due to the variation in the areal extent and in permeability, porosity, and thickness of the stringers, there is considerable variation in the amount of original gas in place tapped by the various wells completed in the subject pool, and also in the percent of such original gas in place under each well which may be expected to be recovered by the well.

(8) That due to the variation in the areal extent and in permeability, porosity, and thickness of the stringers in the Pennsylvanian formation in the subject pool, the existing wells (drilled on 640-acre spacing and proration units) are not believed to have encountered many of the smaller stringers in the reservoir, nor are they expected in all cases to effectively and efficiently drain the stringers which they have tapped.

(9) That to reduce the size of the spacing and protation units in the subject pool from 640 acres to 320 acres would result in numerous additional wells being drilled in the pool, and would greatly enhance the chances of tapping all of the productive stringers in the reservoir, and could also improve the drainage of gas from stringers previously tapped by sxisting wells.

(10) That the wells presently completed in the White City-Pennsylvanian Gas Pool are not effectively and efficiently draining the 64D-acre spacing and proration units assigned to them, but if 32D-acre spacing and proration units are adopted for said pool, the wells in the pool should more effectively and efficiently drain the spacing and proration units assigned to them.

(11) That according to the evidence submitted in this case, approximately 1.48 billion cubic feet of additional gas may be expected to be recovered by each additional well drilled as the result of amending the existing pool rules and developing the White City-Pennsylvanian Gas Pool on 320-acre well spacing and proration units. -3-Case No. 7208 Order No. R-2429-C

(12) That the amendment of the Special Pool Rules for the White City-Pennsylvanian Gas Pool as promulgated by Division Orders Nos. R-2429-A and R-2429-B is in the public interest and will not cause but will prevent wasts, and will not impair but will protect correlative rights.

(13) That the vertical limits of the White City-Pennsylvanian Gas Pool comprise the Pennsylvanian formation and the horizontal limits comprise the following described lands in Eddy County, New Mexico:

> TOWNSHIP 24 SOUTH, RANGE 26 EAST, NMPM Sections 8 and 9: All Sections 14 through 17: All Sections 19 through 22: All Sections 28 through 30: All Sections 32 through 35: All

TOWNSHIP 25 SOUTH, RANGE 26 EAST, NHPM Sections 1 through 4: All Sections 10 through 12: All

(14) That Rule 2 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as follows:

> "RULE 2. Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located on a standard unit containing 320 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental section."

(15) That Rule 4 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as follows:

> "RULE 4. Each well shall be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundary nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary."

(16) That the effective date of this order and the provisions hereof should be April 1, 1981.

-4-Case No. 7208 Order No. R-2429-C

IT IS THEREFORE ORDERED:

(1) That Rule 2 of the Special Rules and Regulations for the White City-Pennsylvenian Gao Pool in Eddy County, New Mexico, as promulgated by Division Orders Nos. R-2429-A and R-2429-B, is hereby amended to read in its entirety as follows:

> "RULE 2. Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located on a standard unit containing 320 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental section."

(2) That Rule 4 of said Special Rules and Regulations is hereby amended to read in its entirety as follows:

"RULE 4. Each well shell be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundary nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary."

(3) That the locations of all wells drilled and completed in the White City-Pennsylvanian Gas Pool are hereby approved.

(4) That the operator of each well in the White City-Pennsylvanian Gas Pool shall have until May 1, 1981, to file with the Artesia District Office of the Division new Forms C-102, Well Location and Acreage Dedication Plat, for each of his wells, showing thereon the location of the well and the acreage dedicated thereto pursuant to this order. Failure to so file such plats will subject the well to cancellation of allowable.

(5) That this order shall become effective at 7:00 o'clock a.m. on April 1, 1981, and shall apply to the White City-Pennsylvanian Gas Pool as described in Finding No. 13 above and as it may be subsequently extended by the Division, and to the Pennsylvanian formation within one mile of said pool.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary. -5-Case No. 7208 Order No. R-2429-C

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



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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BRUCE KING LARRY KEHOE

May 1, 1981

POST OFFICE BOX 2088 STATE LAND OFFICE SUILDING SANTA FE, NEW MEXICO 87501 (505) 827-2434

Mr. Joseph Soliz, Attorney Gulf Oil Corporation P. O. Box 3725 Houston, Texas 77001

Re: CASE NO. 7208 ORDER NO. R-2429-C-

Applicant:

Gulf Oil Corporation

Dear Sir:

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

Pours very truly, JOE D. RAMEY Director

JDR/fd

Copy of order also sent to:

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Hobbs OCD Artesia OCD Aztec OCD

Other

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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT UIL CONSERVATION DIVISION

CASE NO. 7208 Order No. R-2429-C-1

APPLICATION OF GULF OIL CORPORATION For the Amendment of Pool Rules, Eddy County, New Mexico.

NUNC PRO TUNC ORDER

BY THE DIVISION:

It appearing to the Division that Order No. R-2429-C, dated April 7, 1981, does not correctly state the intended order of the Division,

IT IS THEREFORE ORDERED:

(1) That Finding No. (13) on page 3 of Order No. R-2429-C is hareby amended to read in its entirety as follows:

"(13) That the vertical limits of the White City# Pennsylvanian Gas Pool comprise the Pennsylvanian formation and the horizontal limits comprise the following described lands in Eddy County, New Mexico:

TOWNSHIP 24 SOUTH, RANGE 26 EAST, NHPM Sections 8 and 9: All

Sections 8 and 9: All Sections 15 through 17: All Sections 19 through 22: All Sections 28 through 30: All Sections 32 through 35: All

TOWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM Sections 1 through 4: All Sections 10 through 12: All"

(2) That this order shall be effective <u>nunc pro tunc</u> as of April 7, 1981.

DONE at Santa fe, New Mexico, on this <u>30th</u> day of April,



STATE OF NEW MEXICO OIL CONSERVATION DIVISION Ø Amer JDE D. RANEY Director

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OIL CONSI STATE LI SANTA I	MINERALS DEPARTMENT ERVATION DIVISION AND OFFICE BLDG. FE, NEW MEXICO arch 1981
EXAMI	NER HEARING
IN THE MATTER OF:	>>))
Application of Gulf for the amendment o Eddy County, New Me	f pool rules,) CASE
BEFORE: Daniel S. Nutter	
TRANSCRI	PT OF HEARING
APPE	ARANCES
For the Oil Conservation Division:	Ernest L. Padilla, Esq. Legal Counsel to the Divisi State Land Office Bldg. Santa Fe, New Mexico 87501
For the Applicant;	Joseph G. Solìz, Esq. THE GULF COMPANIES
· · · ·	F. O. Box 3725 Houston, Texas 77001

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2	MR. NUTTER: We'll call now Case Number
3	7208.
4	MR. PADILLA: Application of Gulf Oil
5	Corporation for the amendment of pool rules, Eddy County, New
6	Mexico.
7	MR. SOLIZ: Mr. Examiner, I am Joseph
8	Soliz, and I am an attorney representing Gulf Oil Corporation.
9	I'm appearing here today in association with William V. Kastler,
10	also an attorney for Gulf Oil Corporation.
11	MR. NUTTER; We have your letter of
12	appearance by Mr. Kastler in our file, Mr. Soliz.
13	MR. SOLIZ: Thank you, sir.
14	We have three witnesses here today that we'd like
15	to present.
16	
17	(Witnesses sworn.)
18	
19	CHARLES F. KALTEYER
20	being called as a witness and being duly sworn upon his oath,
21	testified as follows, to-wit:
22	
23	DIRECT EXAMINATION
24	BY MR. SOLIZ:
25	Q. Would you please state your name for

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1		5
2	the record?	
3	А.	Charles F. Kalteyer, K-A-L-T-E-Y-E-R.
4	Q.	Mr. Kalteyer, by whom are you employed?
5	A.	Gulf Oil Corporation.
6	Q.	In what location?
7	А.	In Midland, Texas,
8	Q	And what is your position there?
9	А.	Chief Proration Engineer for the
10	Southwest District.	
11	Q	Are you familiar with Gulf's application
12	in the present case?	
13	Α.	Yes, sir.
14	Q.	And have you previously testified
15	before the Commission	and had your credentials accepted?
16	Α.	Yes, sir, I have.
17		MR. SOLIZ: Are the witness' credentials
18	acceptable?	
19		MR. NUTTER: Yes, they are.
20	Q.	Mr. Kalteyer, what is Gulf seeking in
21	this application?	
22	Ŀ.	Gulf is seeking the amendment of
23	the special pool rules	s for the White City Pennsylvanian Gas
24	Pool, which were adopt	ted March 27th, 1963, under Case 2737,
25	and Order No. R-2429A	•

These rules provide for 640-acre standard
proration units, with wells to be located no nearer than 1650
feet to the boundary of the spacing unit, and no nearer than
330 to any governmental quarter quarter section line.

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Q.

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Ω What amendments to these rules is Gulf proposing?

8 A. Gulf proposes that the rules be amended
9 to provide for 320-acre proration units with each well to be
10 located no nearer than 660 to the nearest side boundary of
11 the dedicated tract, nor closer than 1650 to the nearest in
12 boundary, nor closer than 330 to any quarter quarter section
13 or subdivision inner boundary.

14 <u>0</u> Why is Gulf making this request to
15 reduce the standard size unit from 640 acres to 320 acres?
16 <u>A</u> Gulf has made an extensive study of the
17 field, both from a geological standpoint and the continuity
18 and discontinuity of pays, and from an engineering standpoint
19 as to drainage based on performance.

You will see by the testimony of our
next two witnesses why we believe that except for two cases
the current wells are not efficiently and effectively
draining the reserves under the 640-acre proration unit
development pattern.

Mr. Kalteyer, you have before you

1	7
2	Exhibit One. Will you please tell us a little bit about the
3	history of the field?
4	A. Gulf's Exhibit Number One shows the
5	current outline of the White City Pennsylvanian Gas Pool, as
6	contained within the hachured lines.
7	The pool was discovered in 1960 by
8	Gulf's Federal Estill"AD" No. 1, now shown as our White City
9	Penn Com 1 Well 1, located in Unit A of Section 29, T24 South,
10	Range 26 East, and highlighted with a blue arrow.
11	The pool now has 23 wells with proration
12	units covering the 23 sections, or 14,720 acres. The cumula-
13	tive production as of 1-1-1981 is in excess of 62 billion
14	cubic feet.
15	In December of 1980 the average rate
16	of production was approximately 1050 Mcf per well.
17	The last
18	MR. NUTTER: That's per day?
19	A. Yes, Mcf per day per well.
20	The last extension to the field was in
21	January of 1980, when Gulf completed its Marguardt Federal
22	Well No. 2 in Unit F, Section 12, Township 25 South, Range
23	26 East, and this well is located in the extreme southeast
24	corner of the field.
25	As mentioned earlier, under the Case

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1	8
2	2737 and Order No. R 2429A, the Oil Conservation Commission
3	approved Gulf's request for the adoption of the 640-acre pro-
4	ration unit pattern.
5	Our study of the performance clearly
6	points out that with the exception of two wells, the wells in
7	the pool are not capable of efficiently and effectively
8	draining 640 acres, and the rules should be amended to provide
9	for 320-acre standard proration units.
10	MR. NUTTER: Mr. Kalteyer, before you
11	go any further, this is called the White City Pennsylvanian
12	Gas Pool, so by the nomenclature we think it's producing from
13	the entire Pennsylvanian formation.
14	What formation is it actually producing
15	from?
16	A. It does produce from the Strawn, Atoka,
17	and the Morrow.
18	MR. NUTTER: Strawn, Atoka, and Morrow.
19	A. Basically Morrow production.
20	MR. NUTTER: Thank you.
21	Q. Mr. Kalteyer, was Exhibit Number One
22	prepared under your supervision or direction?
23	A. Yes, sir.
24	MR. SOLIZ; Mr. Examiner, at this time
25	I'd like to submit Exhibit Number One into evidence.

9 1 2 MR. NUTTER: Exhibit One will be admitted 3 in evidence. 4 MR. SOLIZ: I have no other further --5 or no further questions of Mr. Kalteyer. 6 MR. NUTTER: Does anyone have any 7 questions of Mr. Kalteyer? He may be excused. 8 9 ROBERT R. CASAVANT 10 being called as a witness and being duly sworn upon his oath, 11 testified as follows, to-wit: 12 13 DIRECT EXAMINATION 14 BY MR. SOLIZ: 15 Would you please for the record state Q. 16 your name? 17 Robert R. Casavant. A. 18 And your address and current occupation? Q. 19 P. O. Box 1150, Gulf Oil Building, A. 20 Midland, Texas, 79702. 21 Current occupation, Exploration 22 Geologist for Gulf Oil. 23 MR. NUTTER: How do you spell your last 24 name? 25 A. C-A-S-A-V-A-N-T.

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10 1 MR. NUTTER: C-A-S-A-V-A-N-T? 2 That's correct. 3 A. MR. NUTTER: Thank you. Mr. Casavant, could you tell us something Q. 5 about your educational and your occupational background? 6 Yes. I received a BS in zoology in 7 A. 1976 and a Bachelor of Science in geology in 1977 from Eastern 8 Illinois University, Charleston, Illinois. 9 I also completed an oceanography minor 10 from the same school. 11 I have graduate credits towards an MS 12 at the University of Texas Permian Basin, Odessa, Texas. 13 My employment post my educational back-14 ground was with Exploration Logging, Incorporated, based out 15 of Houston and Oklahoma City from 1977 to January, 1979, as 16 a Senior Wellsite Geologist and Pressure Engineer. Experience 17 ranged from the Gulf Coast to the -- Oklahoma, and I'd say 18 close to 70 percent of my experience was centered in the 19 Delaware Basin of Texas and New Mexico, as well as the Morrow 20 21 Anadarko area, Oklahoma. After this I joined -- came on with 22 Gulf Oil Corporation in Midland in January of '79 up to the 23 present as an exploration geologist, experienced stratigrapher 24 and explorationist, (mainly in the Northwest Shelf of both 25

 1 11 2 the Delaware and the Midland Basin areas, with emphasis on 3 the Penneylvanian systems in both. 4 In addition I worked a production per 5 as a production geologist out of the Hobbs area office from 6 August, 1979, to December, 1979. 7 Q Are you familiar with Gulf's applica 8 in this case? 9 A. Yes, I am. 10 Q In the course of your employment hav 11 you had an occasion or an opportunity to study in detail to 	riod n tion
 the belaware and the Hidrand Basin areas, with emphasis on the Penngylvanian systems in both. In addition I worked a production per as a production geologist out of the Hobbs area office from August, 1979, to December, 1979. Q Are you familiar with Gulf's applica in this case? A. Yes, I am. Q In the course of your employment hav 	riod n tion
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 Are you familiar with Gulf's applica in this case? A. Yes, I am. Q. In the course of your employment have 	
 8 in this case? 9 A. Yes, I am. 10 Q. In the course of your employment have 	
9 A. Yes, I am. 10 Q. In the course of your employment have	9
10 Q. In the course of your employment have	3
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11	-
you had an occasion or an opportunity to study in detail t	ne
12 White City Pennsylvanian Gas Pool?	
13 A. Yes, I have.	
14 MR. SOLIZ: Mr. Examiner, are the wi	t-
15 ness' credentials acceptable to the Commission?	
16 MR. NUTTER: Yes, he's qualified.	
17 Q. Mr. Casavant, you have before you	
18 Exhibit Number Two. Could you explain that to the Examine	r?
19 A. Yes, sir. Exhibit Number Two is a t	ype
20 log. It's a density neutron log, No. 1 Gulf Energy and	
21 Minerals, No. 1 Estill "AD" Federal No. 1 in Section 19,	
22 Township 24 South, 26 East.	
23 Present on your Exhibit Number Two W	e
24 have indicated the top of the Strawn formation picked at	
25 10253; the top of the Atoka, 10428; and the top of the Mor	row

12 1 2 at 10830. The purpose of the type log is to demon-3 strate the productive zones sought after through the pool 4 area and the nature of the sediment from a log characteristic. 5 The Strawn is basically a carbonate unit. 6 7 The Atoka throughout the pool limits is primarily a carbonate 8 unit, interrupted occasionally by clastics; and of course the Q top of the Morrow is the Morrow limestone and the lower part is the clastic interval, which makes up, like I said, the 10 11 most percentage of the production in the Pennsylvanian Pool. 12 Q. Okay. 13 A. With these three formations what the ~-14 I mean the significance of these things throughout the pool 15 area is basically they represent an overall transgressive 16 sequence of deposition throughout the pool area, represented 17 by periods of standstills, ; hich we will get into with the 18 Morrow Clastics. 19 Okay, that's all. 20 You also have before you an exhibit Q. marked Number Three. Would you refer to that and explain that 21 22 to the Examiner? 23 Exhibit Number Three is a structure map A. over the White City Penn Pool limits, mapped on top of the 24 25 Morrow limestone, a structural and stratigraphic datum easily

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13 1 2 correlated through the area regionally. 3 The index map shows the regional location of the White City Penn Pool in its relationship to the South 4 5 Carlsbad Field and other surrounding regional features. 6 MR. NUTTER: What do the contours on 7 the map indicate? Those are also on the Morrow. 8 A. 9 MR. NUTTER: Morrow contours. 10 Yes. This is a computer map on the ---A. that I originated on the index map and on the left your 11 structure map that you are looking at is an interpretive 12 structure map, ; here the contours are tightened up to accen-13 14 tuate the structure throughout the pool. Contour interval is 100 feet and the 15 unit outline is indicated in both index as well as interpre-16 17 tive structure maps. 18 Mr. Casavant, you also have before you Ũ 19 Exhibit Number Four. Would you explain the significance of 20 your Exhibit Four? 21 Exhibit Number Four is partly interpre-A. tive and partly factual, you might say. We're looking at a 22 combination 3-D, or three dimensional stratigraphic structural 23 overview of the White City Penn Pool. The structural closures 24 25 you see on the top of the 3-D model here are the actual

2 structural contours you have in Exhibit Number Three, those
3 line up. The scale again on the horizontal is greatly exag4 gerated because of the nature of the section, the thickness of
5 it.

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6 Demonstrated here is the lead-in to not
7 only is the field -- not only is the structural emphasis in
8 the area a reason for the production throughout the pool, but
9 also the stratigraphic and the depositional nature of this
10 field must be looked at in order to determine the problem we
11 have at hand here in determining for breaking down our proration
12 units.

13 One thing you might notice there is the 14 Morrow limestone, the clastics, and the second clastic inter-15 vals are illunstrated. The very discontinuous -- or erratic 16 nature of the sands both in a vertical sense as well as a 17 horizontal sense, the majority of the sands are located in 18 the central part of the field and the north part of the field 19 and they become of lesser frequency to the south and the 20 southeast, and this will be illustrated with later exhibits. 21 So we're looking at here a very erratic 22 and unpredictable type of deposition from this 3-D. The 23 north arrow there will indicate that when we'll be able to

position your full unit for you.

Q.

Okay. I'd like now to direct your

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1	15
2	attention to Exhibit Number Five. Would you please now explain
3	this exhibit for Mr. Nutter?
4	A. Okay. Exhibit Number Five is up on the
5	wall here, Mr. Nutter. It's a stratigraphic cross section
6	E-E through the central part of the ten pool area. You have
7	that in front of you, I believe, or do you have the copy? It
8	would probably be easier for you to pull that out.
9	MR. NUTTER: This one here?
10	A. Exhibit Number Five.
11	MR. NUTTER: Well, I didn't want to un-
12	fold that.
13	A. Okay.
14	MR. NUTTER: What's the line of your
15	cross section? Just tell me that and I'll put it on here.
16	A. Okay, it's right through the central
17	part of the field. Okay.
18	MR. NUTTER: Okay, what what pool
19	wells are on that cross section? There's one in Section 4
20	on there?
21	A. One in Section 4.
22	MR. NUTTER: Maybe you could just take
23	this map and draw that cross sectional line across that pool
24	there with the orange pen and I'll follow your cross section.
25	A. Sir, the wells circled in orange there

2 | are the wells (inaudible).

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This is a stratigraphic cross section hung on the Morrow limestone as the datum to knock out the structure, so to speak, and what we'd like to illustrate here is the -- in the index part, the dark formation unit lines here are regional formation units that I used for correlation throughout the area.

9 However, the slashed or the hachured 10 marks that you see here are the genetic sand units that I 11 correlated throughout the pool area, and these are related, 12 based on gamma ray resistivity, as well as sample log charac-13 teristics, and in correlating these clastics throughout the 14 field and pool unit, we're looking primarily at the Morrow 15 Clastics interval, we're noticing a very high degree of 16 variability in a horizontal sense.

17 Taking the first sand we start to deve-18 lop a certain signature of the sand and we come to the next 19 borehole and it changes quite a bit. We keep going, and some 20 places we actually have the sand absent. it's completely 21 gone. We pick it back up, we pick it strong, and as you go 22 down the section you notice the different colors here repre-23 sent the different sand units that we map, and the variability 24 extends throughout your exhibit; taking a closer look at it 25 you'll be able to see that there's a high degree of lateral

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2 variation. Also, between these particular sand units 3 are shale units, which isolate these in a vertical sense, too. 5 So we're looking at more or less small depsotional pods that are not continuous and related to one another in the sense of 6 7 both pressure, porosity, permeability, as well as clastic material. ð 9 So what we're trying to show by this 10 cross section is that we also have stratigraphic and deposi-11 tional reasons that plays in the production or the nonproduction 12 from borehole to borehole. MR. NUTTER: And this is why you think 13 14 that these wells on the 640 aren't producing --15 Yeah, I don't believe ---A. 16 MR. NUTTER: -- because they're missing 17 some of these pods --Absolutely, and then in some places 18 A. they're present that we don't know about. In other words, 19 we're in between two boreholes, and I think that we're not 20 adequately testing this clastic series in trying to get the 21 maximum reserves from this area. 22 And this is demonstrated both in --23 this whole thing was cross sectioned and this is just one of 24 the cross sections, but the Upper Clastic and the Lower Clastic 25

17

1 18 2 interval represents this kind of behavior, very, very erratic 3 depositional history to it. Now these lead into the last exhibit, 5 Exhibit Number Six. 6 Q. Exhibit Number Six, would you explain 7 that exhibit? 8 A. Okay, Exhibit -- I don't know if you can --9 the best thing for you to do --10 MR. NUTTER: There's a pointer down 11 there, if you think you need a pointer. 12 A. I thought I was tall enough. 13 MR. NUTTER: You may be tall enough, 14 your arms aren't long enough. 15 A. Again here's our position for the full 16 outline of the study area involved and what we did was, we 17 went -- this is a type log or just one of the logs out of the 18 field, and broke up all the particular sand units throughout 19 the Upper and Lower Clastic intervals and then assigned to 20 them in an environmental interpretation based on the gamma 21 ray, resistivity, and sample characteristics. This is done 22 many times in an academic sense, but we are applying it to 23 industry, and in this particular case I -- from each of these 24 sands, for instance, sand A, up through sand A, I studied 25 just each sand separately and reconstructed what I call the

19 1 2 paleo-environmental reconstruction of the deposition of that 3 one particular sand at that time. 4 MR. NUTTER: Now these are all Morrow 5 sands, aren't they? 6 Yes, sir. A. 7 MR. NUTTER: I see. 8 And what we're looking at here, Stage A, Ä. 9 coincides with the deposition of Sand A, Sand B with Stage B, 10 Sand C with Stage C, and so on. And just standing back and 11 looking at this, we can see visually a variability in the 12 position and a variability or quality of these sands, not only 13 in time but in the type of sand throughout the pool unit, 14 and this is -- the pool unit is mainly centered in the center por-15 tion of these little maps, okay. 16 MR. NUTTER: Now what are the white 17 lines running through the orange colored area? 18 Okay, the white lines represent the A. 19 best sand quality and signature of the channel sand. Okay. 20 And, of course, where we have the orange, or on your exhibits 21 which will be dark blue, represents the most massive accumu-22 lation of productive sands: I'm saying that could contribute 23 productively. 24 Also, this is -- the orange or the 25 white area represent where we have the coarsening upwards of

1	20
2	sand units, which are the and the fining upwards, which are
3	the productive units through this pool.
4	So we come into the green parallel lines.
5	we're starting to break up in our our sand packages are
6	becoming more or less erratic and sand is not being deposited
7	in that one particular place like it was in times previous.
8	So if you pick a point here we have absolutely no sand, just
9	marine shale, we move over in a relative position and the
10	next time we have a deposition of a better sand.
11	So what we're saying here by looking at
12	this thing in layers is we're seeing the variation being
13	spelled out in the story, and the blue, of course, is where
14	we have absolutely no sands present, or if we do, they're
15	very, very broken up and not significant enough for production.
16	So what we're doing, we're unfolding
17	the story of the Morrow deposition from the first sands and
18	the second sands, showing the high the high degree of
19	variability, not only of deposition but as we'll see in our
20	engineering study, this relates to our porosity and permeability
21	per reservoir.
22	Are there any questions of this exhibit?
23	MR. NUTTER: Not now.
24	A. I might add that a confirmation on this
25	particular small area of the Northwest Shelf of the Delaware

Section of the second

Basin , that representing there those pulses in the dumping
of the clastics, truely represents a deltaic type of deposition, so at least through the pool area we have, I feel, a
very good handle on the way these things are behaving.

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Mr. Casavant, do you have an opinion
based on your study of the White City Pennsylvanian Gas Pool
as to whether or not the now existing wells will actually drain
the 640-acre units now applicable to the unit?

10 A. No, from preliminary study of the poroii sity and the sands that we actually perfed, in addition to
12 the depositional history that we've uncovered and cross sec13 tioned, I do not think they will adequately drain 640 acres.
14 I do see a need to break that down.

15 Q And do you feel that the drilling of 16 additional wells is the only way which would insure recovery 17 of hydrocarbons that will not be recovered out of the now 18 existing wells?

19 A. I do, to adequately test it, yes.
20 Q. Okay. Is it your recommendation, then,
21 that the White City Pennsylvanian Gas Pool rules be amended to
22 provide for 320-acre spacing rather than 640-acre spacing
23 presently applicable to it?

Mr. Casavant, have Exhibits Number Two,

I do.

A. Q.

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1	22
2	Three, Four, Five, and Six been prepared under your direction
3	and supervision?
4	A. Yes, they have.
5	MR. SOLIZ: Mr. Examiner, at this time
6	I would like to submit Exhibits Two through Six into evidence
7	in this case.
8	MR. NUTTER: Gulf Exhibits Two through
9	Six will be admitted.
10	MR. SOLIZ: I have no other questions
11	of Mr. Casavant.
12	
13	CROSS EXAMINATION
14	BY MR. NUTTER:
15	<u> <u> </u> Mr. Casavant, your Exhibit Number Four, </u>
16	Exhibit Number Five, and Exhibit Number Six, all seem to relate
17	to the producing formations below the Upper Morrow Clastics.
18	Now Mr. Kalteyer stated that the pool was producing from the
19	Strawn, Atoka, and Morrow, and I think one of your exhibits
20	also oh, your your log
21	A. Yes, sir.
22	Q. Showed the Strawn and the Atoka also.
23	Now does this broken string of pods and lenses and the dis-
24	continuity that you see here in the Morrow formation apply
25	also to the Strawn and to the Atoka?

a farmente

2 λ. On a material basis of what the material 3 is, no, but porositywise, yes. We don't quite understand yet 4 the carbonate units of the Strawn and the Atoka through the 5 field. Now, there's only, I think we have two Atoka wells that 6 are presently on production and there are three wells that are 7 producing from the Strawn, but the majority of the wells 8 throughout the area, and outside of the pool area, are Morrow 9 prospects, so to speak, or Morrow -- or basically --

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24

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10 Well, are some of these wells perforated Q 11 in all of these zones or more than one of these zones, or 12 that would be like Strawn and Atoka and Morrow, or Atoka and 13 Morrow, cr are they all either Strawn cr Atoka or Morrow?

14 No, they're -- there are some presently A. 15 producing out of several of the formations, in the pool area ~ 16 in the pool limit.

17 Well, do you believe that a well that Q. 18 may not be draining 640 acres in the Morrow might be draining 19 640 acres in the Strawn or Atoka?

20 No, sir, not -- not from my experience A. 21 with carbonate rock. I do not believe that we have that kind 22 of drainage characteristics to carbonate rocks.

23 So all of these exhibits apply to Morrow Q. only. You feel that there is this lack of permeability or something in the Strawn and the Atoka that's preventing that

1 24 2 drainage also? 3 A. Yes, sir, that could be the case. 4 Clastics do have a history anyway of -- both from a depositional 5 viewpoint and from an engineering viewpoint, of having much 6 greater drainage than the carbonates in this area. 7 So we weren't too worried with the 8 porosity through these Strawn and Atoka sections. 9 Now all of the colors on Exhibit Number Q. 10 Five there are down below the top of the Upper Morrow Clastics 11 As a matter of fact, the Morrow limestone at the top of the 12 cross section, are any of those wells perforated in Strawn and Atoka, do you know? 13 14 No, I do not know. I'd have to -- we A. 15 may have the data. I could refer that question to the 16 engineer. 17 But the bulk of your study here has been 0. 18 to the Morrow, hasn't it? 19 Yes, sir. The nature of the Atoka and A. 20 the nature of the Strawn and, of course, the production 21 standpoint of drilling -- the spacing, or at least the control 22 involved is very widespread through this area, so if we have 23 better control on the Morrow and the erratic nature of the 24 Morrow, is what we're primarily seeking, but also the porosity 25 in the Atoka and Strawn is just as questionable.

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1	25
2	Q. I see.
3	MR. NUTTER: Are there any other question
4	of Mr. Casavant? He may be excused.
5	
6	JEFFREY P. ORTWEIN
7	being called as a witness and being duly sworn upon his oath,
8	testified as follows, to-wit:
9	
10	DIRECT EXAMINATION
11	BY MR. SOLIZ:
12	Q. Would you please state your name, address
13	and occupation for the record?
14	A. Jeffrey P. Ortwein, O-R-T-W-E-I-N,
15	P. O. Box 670, Hobbs, New Mexico.
16	Q. And could you tell us your occupation?
17	A. I'm a reservoir engineer for Gulf Oil
18	Corporation.
19	Q. Could you tell us something about your
20	educational background and your occupational experience?
21	A Yes, sir. I graduated from Penn State
22	University with a BS in petroleum engineering in 1979. Pre-
23	vious to that I had worked one summer as an engineer.
24	I joined Gulf in June '79 and have one
25	year and nine months engineering experience with Gulf in

26 1 2 southeast New Mexico. 3 You said you had some experience in the Q. 4 summer of '78? 5 Yes, sir. A. And who was that with? Q. 7 This was with Quaker State Oil Company A. 8 in Pennsylvania. 0 Are you familiar with Gulf's application Q. 10 in this case? 11 Yes, sir, I am. A. 12 And in the course of your employment Q. 13 have you had occasion to study in detail the White City Penn-14 sylvanian Gas Pool? 15 A. Yes 16 And was this in Hobbs, in the Hobbs Area Q. 17 Office? 18 Yes. A. 19 MR. SOLIZ: Mr. Examiner, are the wit-20 ness' credentials acceptable? 21 MR. NUTTER: Yes, they are. 22 Mr. Ortwein, you have before you what's Q. 23 been marked as Exhibit Number Seven, and I'd like to ask you 24 to identify it. 25 Exhibit Seven is a table of all the A.

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1 27 2 wells in the White City Penn Gas Pool from which I made an 3 engineering study to determine the areal extent that hydrocarbons were being drained in the Pennsylvanian formation from 5 these wells. What sources of data or information did 7 you review in order to come up with your -- with the informa-8 tion contained on Exhibit Number Seven? 0 A. The data in Exhibit Seven came from log data, completion data, performance curves, and P/z curves. 10 11 Q. What do you mean when you refer to P/Z12 curves? 13 A. P/Z is a bottom hole pressure versus 14 time versus cumulative production curve, but the pressure is 15 corrected with -- using the Z factor, compressibility, for 16 straight line extrapolation purposes. 17 Q. Approximately for what period of time 18 do the data cover that you reviewed for this study? 19 This data covered a period of time from A. 20 the completion of the discovery well in April, 1960, up to 21 approximately December, 1980. 22 Okay. Now based upon the data that Q. 23 you've just described and the information appearing in Exhibit

you've just described and the information appearing in Exhibit
Seven, do you have any opinion as to the area being drained
on an average by the wells presently producing from the White

1	28
2	City Penn Pool?
3	A. Yes, the results of my analysis show
4	that the average drainage per well is 257 acres.
5	Q Was Exhibit Number Seven prepared under
6	your supervision or direction?
7	A. Yes,
8	Q. I'd like you now to refer to Exhibit
9	Number Eight and ask you to identify that exhibit, please.
10	A. Exhibit Eight consists of supportive
11	reservoir parameters. These parameters were used in the
12	volumetric calculation of gas in place for the existing wells.
13	Q. What sources of information did you re-
14	view in order to come up with the numbers that appear on this
15	Exhibit Eight?
16	A. Most of the numbers come from log data
17	but some came from completion and DST information.
18	Q. And by DST I assume you refer to drill
19	stem tests?
20	A. Yes.
21	Q Would you explain how Exhibit Eight
22	relates to Exhibit Seven?
23	A. The information in Exhibit Eight was
24	used to calculate a volumetric original gas in place on a per
25	acre basis. This appears in column one of Exhibit Seven.

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1	29
2	This volumetric original gas in place
3	per acre then was compared to the original gas in place ob-
4	tained from actual well performance projected from the P/Z
5	curve.
6	From this comparison the calculated
7	drainage area per well was obtained.
8	Q. Was Exhibit Number Eight also prepared
9	under your supervision and your direction?
10	A. Yes.
11	Q I'd like to ask you now to refer to Ex-
12	hibit Number Nine, which I believe is broken down into three
13	sub-parts, Nine-A, Nine-B, and Nine-C, and ask you to identify
14	them.
15	A. Exhibit Nine is broken into three parts,
16	A, B, and C. These are bottom hole pressure versus time plots
17	for all the wells in the pool. If you could refer back to
18	Exhibit One it would help me to explain this exhibit, the
19	lease plat.
20	Okay, part A contains plots for the
21	three top three rows of sections in the pool. There are
22	seven rows of sections. Part A contains plots for the wells
23	in Rows 1, 2, and 3, Sections 8 through 22.
24	Part B contains plots for all the wells
25	in the third, fourth, and fifth rows of the pool, which is

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2	Sections 19 through 35, and Part C contains the plots for the
3	wells in Rows 5, 6, and 7, or Section 32 through Section 12
4	of the township below.
5	So in each plot one row of wells is
6	seen in the previous plot.
7	These pressure-time plots illustrate a
8	lack of continuity between offsetting wellbores. You can see
9	that as new wells were drilled nearly all came in at near
10	virgin reservoir pressure, on the order of 5000 pounds, and
11	looking towards the righthand side of the page you can see
12	that at present there exists wide variations in bottom hole
13	pressures of offset wellbores; a range from about 13 to 2400
14	psi 3400 psi.
15	Q. Okay, as I understand it, then, it's
16	your testimony that the presently existing producing wells do
17	not adequately drain the 640-acre spacing?
18	A. That's correct.
19	Q. Is it your opinion, then, that if addi-
20	tional wells were drilled the hydrocarbons now underlying the
21	640-acre spacing units will be produced?
22	A. Yes, that's also correct.
23	Q. I'd like you now to refer to Exhibit
24	Number Ten and identify that for us.
25	A. Firstly, Exhibit Ten shows that cumu-

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31 1 2 lative gas recovery to date is 62 Bcf. 3 Secondly, it shows that the ultimate recovery expected for each existing well is around 4 Bcf, and 5 finally, each additional well can expect to recover somewhere 6 around 1.5 Bcf. Those additional would be infill wells 7 drilled on 320-acre spacing. Ŷ Q. How did you arrive at the average ulti-9 mate gas recovery? 10 The ultimate recovery for the existing A. 11 wells was based on an extrapolated pressure cutoff on the 12 P/Z plots. 13 Were Exhibits Number Nine and Ten also Q 14 prepared under your direction or supervision? 15 Yes. A. 16 Okay. In order to summarize your testi-Q. 17 mony, I'd like to ask you whether or not you have an opinion 18 based on a study of all the data you've prepared, relating 19 to the White City Pennsylvanian Gas Pool, as to whether or 20 not the now existing wells will actually drain the 640-acre 21 units now applicable to the wells? 22 A. My study shows that the existing spacing 23 is inadequate and that additional wells are needed to recover 24 the hydrocarbons under each proration unit. 25 And you feel like the drilling of addi-Q

1	32	
2	tional wells is the only way which would insure recovery of	
3	hydrocarbons that would not that will not be recovered	
4	out of the now existing wells?	
5	A. Yes.	
6	Q And based on the present 640-acre spaci	ng
7	unit, Gulf is prevented from drilling additional wells, is	
8	that correct?	
9	A. Would you repeat that, please?	
10	Q. And based on the present 640-acre spaci	ng
11	unit, Gulf would be prevented from drilling some of the addi-	
12	tional wells, is that correct?	
13	A. Yes, that's correct.	
14	Q Is it your recommendation, then, that	
15	the White City Pennsylvanian Gas Pool rules be amended to	
16	provide for 320-acre spacing rather than 640-acre spacing	
17	in accordance with Gulf's application?	
18	A. Yes.	
19	Q Is it your opinion that the granting of	:
20	Gulf's application would result in the prevention of waste,	
21	the protection of correlative rights, and be in the interest	
22	of conservation?	
23	A. Yes.	
24	Q. Do you have anything further to add	
25	to any testimony you've already given?	

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1 33 2 MR. SOLIZ: Mr. Examiner, at this time 3 I'd like to submit Exhibits Seven through Ten into evidence in this case. 5 MR. NUTTER: Gulf's Exhibits Seven 6 through Ten will be admitted in evidence. 7 MR. SOLIZ: I have no further questions 8 of this witness. 0 10 CROSS EXAMINATION 11 BY MR. NUTTER: 12 Now, Mr. Ortwein, in your Exhibit Q. 13 Number Seven, you have calculated the original gas in place 14 on a volumetric basis and it's millions of cubic feet per 15 acre. 16 Yes, sir. A. 17 Now, you used the data that's on Exhibit Q. 18 Eigh' to make that volumetric calculation, is that correct? 19 A. That's correct. 20 Q. And I notice two or three wells here 21 don't have any volumetric figures. Is that because logs were 22 not available or you couldn't make an interpretation of the 23 proper data from those logs, or something? 24 Yeah, either we couldn't get the logs A. 25 or they weren't deep enough to use to adequately get a feel

.

34 1 2 for the porosity or --3 Now, in using those logs and making this Q. 4 volumetric calculation, were some of those wells perforated 5 and completed in the Strawn as well as the Atoka and the 6 Morrow? 7 And are all three of those formations 8 included in these volumetric reserves? 9 Yes, sir, if you lookat the bottom of A. 10 Exhibit Seven. 11 Okay. Q. 12 Gulf has three wells, the White City A. 13 Penn Gas Com No. 1, No. 2, and No. 3 No. 1, each of these are 14 listed on two separate entries. One completion was a Strawn 15 and the second Atoka in both wells, and also on the pressure 16 time plots the workovers were indicated. 17 On that No. 1 Well we had perforated 18 the Atoka and Morrow simultaneously but the Atoka came in so 19 good that we set a bridge plug and we aren't producing Morrow 20 right now. 21 And so you made your volumetric calcu-0. 22 lation of reserves there. 23 Then you took your P/Z on your -- against 24 your cumulative production and determined what the cumulative 25 production on these wells is going to be.

35 1 2 Yes, sir. A. 3 Q And that's the second column on Exhibit 4 Seven. 5 Α. Yeah that's an extrapolation to P/Z 6 equals zero. 7 Q. And then you took the -- the figure in 8 column A and multiplied that by 640 acres to find out what 9 the calculated reserves would be under the 640-acre tract? 10 A. Kind of; kind of skipped that step in 11 that we did the volumetric on the per acre basis, but if you 12 did multiply column one by the 640, that will be the original 13 gas in place in the whole proration unit, which would give 14 you the same comparison. 15 Q. And then if you took the P/Z calculation 16 of ultimate gas, you'd find that it's coming from only 268 17 acres on that first well, rather than the calculated volume 18 under the 640. 19 Yes, sir. A. 20 Now, on your Exhibit Ten you show a Q. 21 cumulative gas recovery at 1-1-81 to be 62 billion. 22 A. Yes, sir. 23 And there are 23 wells in the pool, Q. 24 Now you also sho your average ultimate gas recovery per well 25 to be 4 billion. Now is that based on the 23 wells that are

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2	in the pool?
3	A. Yes, sir.
4	Q. So that would give us a total for the
5	pool ultimate recovery of about 92 billion.
6	A. That's correct.
7	Q. So we're getting 6/9ths we have
8	gotten 6/9ths of the total reserves so far, is that it?
9	A. Yes, that's correct.
10	Q. Now, how did you estimate what your
11	additional infill gas recovery per well is going to be?
12	A. Well, I took the existing wells and went
13	from the calculated drainage area into a drainage radius and
14	plotted this up on worksheet, and then proposed 1980/1980
15	infill locations, and I tried to draw what I thought what
16	I figured these wells would drain and then I planimetered the
17	additional area that the existing well wouldn't drain, and
18	using the volumetric and a numerical recovery factor, I
19	backed into an average in additional
20	Q. So the additional recovery per well is
21	a volumetric calculation that you planimetered out after
22	drawing a radius of drainage for the existing well?
23	A. Yes, sir.
24	Q. And the radius of drainage was based on
25	your 268 acres for that first well on Exhibit Seven, is that
25	your 268 acres for that first well on Exhibit Seven, is that

1		37
2	it?	
3	А.	Right.
4	Q.	And you think that is about 1-1/2
5	billion cubic feet per	r well?
6	А.	Yes, sir.
7	Q.	On an infill program.
8	А.	Yes, sir, that's that's the starting
9	point. We may recove:	r more.
10	Q.	Now I presume some of these tracts that
11	have produced pretty	good, for example, the one well there
12	that's drained over 1	000 acres according to Exhibit Seven,
13	you wouldn't have an .	infill well in there, would you?
14	А.	Probably not, but we haven't well,
15	we need to that part	rticular well is in a funny location.
16	It's in the very corn	er of the proration unit. That's our
. 17	White City Penn No. 1	in Section 29, so we may possibly in
18	that case have a	
19	Q	Well, that was the discovery well for
20	the pool.	
21	A	Yes, sir.
22	Q	So it got a head start, didn't it?
23	А.	Yes.
24	Q	And it is right in the corner, the ex-
25	treme corner of the p	roration unit.

38 1 MR. NUTTER: Are there any other ques-2 tions of this witness? He may be excused. 3 MR. SOLIZ: Mr. Examiner, we've completed 5 our case now. MR. NUTTEP: Mr. Kalteyer I'll ask you 6 7 now. On these proposed rules that you've got, you're simply proposing that the spacing units be changed from 640 acres 8 to 320 acres, but you're not proposing that the well location 9 requirements, that 320 acres would be under the statewide 10 rules for Pennsylvanian pools in southeast New Mexico, but 11 you're not proposing well locations in accordance with those 12 13 statewide rules. MR, KALTEYER: That's correct because 14 the original rules were 1650 from the boundary. 15 MR. NUTTER: So you would --16 MR. KALTEYER: So we left it at that. 17 MR. NUTTER: You don't want to abolish 18 19 the pool rules; you want to keep the special pool rules be-20 cause you've got a special well location requirement. MR. KALTEYER: Yes, sir that's correct. 21 22 MR. NUTTER: I see. 23 Are there any questions for Mr. Kalteyer 24 on his well locations? 25 Do you have anything further, Mr.

1	39	
2	Soliz?	
3	MR. SOLIZ: No, sir.	
4	MR. NUTTER: Does anyone have anything	
5	they wish to offer in Case 7208?	
6	We'll take the case under advisement.	
7		
8	(Hearing concluded.)	
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CERTIFICATE

I, SALLY W. BOYD, C.S.R., DO HEREPY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Cally W. Boyd C.S.R.

I do hare' forenoing is

Oil Conservation Division

SALLY W. BOYD, C.S.R. Rt. 1 Box 193-B Sunta Fc. New Mexico 07301 Phone (303) 455-7409 

ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BRUCE KING GOVERNOR LARRY KEHOE SECRETARY

April 9, 1981

POST OFFICE BOX 2088 STATE LAND OFFICE BUILDING SANTA FE, NEW MEXICO 87501 (305) 827-2434

Mr. Joseph Soliz, Attorney Gulf Oil Corporation P. O. Box 3725 Houston, Texas 77001 Re: CASE NO. 7203 ORDER NO. <u>R_2429_</u>C

Applicant:

Dear Sir:

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

Yours very truly, JOE D. RAMEY Director

JDR/fd

Copy of order also sent to:

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Hobbs OCD	
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Aztec OCD	~~~~

Other

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	Eddy County New Mexico.)	7208
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	For the Applicant: Joseph	G. Soliz,	Esq.
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2	MR. NUTTER: Ve'll call now Case Number
3	7208.
4	MR. PADILLA: Application of Gulf Oil
5	Corporation for the amendment of pool rules. Eddy County, New
6	Mexico.
7	MR. SOLIZ: Mr. Examiner, I am Joseph
8	Soliz, and I am an attorney representing Gulf Oil Corporation.
9	I'm appearing here-today in association with William V. Kastler,
10	also an attorney for Gulf Oil Corporation.
11	MR. NUTTER We have your letter of
12	appearance by Mr. Kastler in our file, Mr. Soliz.
13	MR. SOLIZ: Thank you, sir.
14	We have three witnesses here today that we'd like
15	to present.
16	
17	(Witnesses sworn.)
18	
19	CHARLES F. KALTEYER
20	being called as a witness and being duly sworn upon his oath,
21	testified as follows, to-wit:
22	
23	DIRECT EXAMINATION
24	BY MR. SOLIZ:
25	Q Would you please state your name for

1		3
2	the record?	
3	λ.	Charles F. Kalteyer KA L-T L-Y E-R.
4	0.	Hr. Halteyer, by whom are you employed?
5	ħ.	Gulf Oil Corporation.
6	Q.	In what location?
7	λ.	In Midland, Texas.
8	۵	And what is your position there?
9	λ.	Chief Proration Engineer for the
10	Southwest District.	
11	Ω.	Are you familiar with Gulf's application
12	in the present case?	
13	. Α.	Yes, sir.
14	Ç.	And have you previously testified
15	before the Commission	and had your credentials accepted?
16	<u>A.</u>	Yes, sir, I have.
17		MR. SOLIZ: Are the witness' credentials
18	acceptable?	
19		MR. NUTTER: Yes, they are.
20	Ç.	Mr. Kalteyer, what is Gulf seeking in
21	this application?	
22	A.	Gulf is seeking the amendment of
23	the special pool rule	s for the White City Pennsylvanian Gas
24	Pool, which were adop	ted March 27th, 1963, under Case 2737,
25	and Order No. R-2429A	•

and a second sec

2 These rules provide for 640-acre standard
3 promation units, with wells to be located no nearer than 1650
4 feet to the boundary of the spacing unit, and no nearer than
5 330 to any governmental quarter quarter section line.

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proposing?

8 A. Gulf proposes that the rules be amended
9 to provide for 320-acre proration units with each well to be
10 located no nearer than 660 to the nearest side boundary of
11 the dedicated tract, nor closer than 1650 to the nearest in
12 boundary, nor closer than 330 to any guarter guarter section
13 or subdivision inner boundary.

14 0. Why is Gulf making this request to
15 reduce the standard size unit from 640 acres to 320 acres?
16 A. Gulf has made an extensive study of the
17 field, both from a geological standpoint and the continuity
18 and discontinuity of pays, and from an engineering standpoint
19 as to drainage based on performance.

You will see by the testimony of our
next two witnesses why we believe that except for two cases
the current wells are not efficiently and effectively
draining the reserves under the 640-acre proration unit
development pattern.

Mr. Kalteyer, you have before you

1 7 2 Exhibit One. Will you please tell us a little bit about the 3 history of the field? Gulf's Fxhibit Number One shows the ř., 5 current outline of the White City Pennsylvanian Gas Pool, as contained within the hachured lines. The pool was discovered in 1950 by 8 Gulf's Federal Estill"AD" No. 1, now shown as our White City 9 Penn Com 1 Well 1, located in Unit A of Section 29, T24 South, 10 Range 26 Fast, and highlighted with a blue arrow. 11 The pool now has 23 wells with proration 12 units covering the 23 sections, or 14,720 acres. The cumula-13 tive production as of 1-1-1981 is in excess of 62 billion 14 cubic feet. 15 In December of 1980 the average rate 16 of production was approximately 1050 Mcf per well. 17 The last ---18 MR. NUTTER: That's per day? 19 A. Yes, Mcf per day per well. 20 The last extension to the field was in 21 January of 1980, when Gulf completed its Marquardt Federal 22 Well No. 2 in Unit F, Section 12, Township 25 South, Range 23 26 East, and this well is located in the extreme southeast 24 corner of the field. 25

As mentioned earlier, under the Case

1 8 2 2737 and Order No. R 2429A, the Oil Conservation Commission 3 approved Gulf's request for the adoption of the 640-acre proration unit pattern. 5 Our study of the performance clearly 6 points out that with the exception of two wells, the wells in 7 the pool are not capable of efficiently and effectively 8 draining 640 acres, and the rules should be amended to provide 9 for 320-acre standard proration units. 10 MR. NUTTER: Mr. Kalteyer, before you 11 go any further, this is called the White City Pennsylvanian 12 Gas Pool, so by the nomenclature we think it's producing from 13 the entire Pennsylvanian formation. 14 What formation is it actually producing 15 from? 16 It does produce from the Strawn, Atoka, Α. 17 and the Morrow. 18 MR. NUTTER: Strawn, Atoka, and Morrow. 19 Basically Morrow production. Ā. 20 MR. NUTTER: Thank you. 21 Mr. Kalteyer, was Exhibit Number One <u>n</u> 22 prepared under your supervision or direction? 23 Yes, sir. Α. 24 MR. SOLIZ: Mr. Examiner, at this time 25 I'd like to submit Exhibit Number One into evidence.

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0 1 2 MR. NUTTER: Exhibit One will be admitted 3 in evidence. 4 MR. SOLIZ: I have no other further ---5 or no further questions of Mr. Kalteyer. 6 MR. NUTTER: Does anyone have any 7 questions of Mr. Kalteyer? He may be excused. 8 9 ROBERT R. CASAVANT 10 being called as a witness and being duly sworn upon his oath, 11 testified as follows, to-wit: 12 13 DIRECT EXAMINATION 14 BY MR. SOLIZ: 15 Would you please for the record state Q. 16 your name? 17 Robert R. Casavant. A. 18 And your address and current occupation? Q. 10 P. O. Box 1150, Gulf Oil Building, A. 20 Midland, Texas, 79702. 21 Current occupation, Exploration 22 Geologist for Gulf Oil. 23 MR. NUTTER: How do you spell your last 24 name? 25 C-A-S-A-V-A-N-T. A.

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2	MR. NUTTIR: CHA-S-A-V-A-N-T?
3	A. That's correct.
4	MR. MUTTER: Thank you.
5	0 Mr. Casavant, could you tell us something
6	about your educational and your occupational background?
7	A. Yes. I received a BS in zoology in
8	1976 and a Bachelor of Science in geology in 1977 from Eastern
9	Illinois University, Charleston, Illinois.
10	I also completed an oceanography minor
11	from the same school.
12	I have graduate credits towards an MS
13	at the University of Texas Permian Basin, Odessa, Texas.
14	My employment post my educational back-
15	ground was with Exploration Logging, Incorporated, based out
16	of Houston and Oklahoma City from 1977 to January, 1979, as
17	a Senior Wellsite Geologist and Pressure Engineer. Experience
18	ranged from the Gulf Coast to the Oklahoma, and I'd say
ÎŶ	close to 70 percent of my experience was centered in the
20	Delaware Basin of Texas and New Mexico, as well as the Morrow
21	Anadarko area, Oklahoma.
22	After this I joined - came on with
23	Gulf Oil Corporation in Midland in January of '79 up to the
24	present as an exploration geologist, experienced stratigrapher
25	and explorationist, mainly in the Northwest Shelf of both

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Number Two is a type
Gulf Energy and
1 in Section 19,
hibit Number Two we
mation picked at
the top of the Morrow

1 12 2 at 10830. 3 The purpose of the type log is to demon-4 strate the productive zenes scuaht after through the pool 5 area and the nature of the sediment from a log characteristic. 6 The Strawn is basically a carbonate unit. 7 The Atoka throughout the pool limits is primarily a carbonate 8 unit, interrupted occasionally by clastics; and of course the 9 top of the Morrow is the Morrow limestone and the lower part 10 is the clastic interval, which makes up, like I said, the 11 most percentage of the production in the Pennsylvanian Pool. 12 0 Okay. 13 With these three formations what the --Α. 14 I mean the significance of these things throughout the pool 15 area is basically they represent an overall transgressive 16 sequence of deposition throughout the pool area, represented 17 by periods of standstills, ; hich we will get into with the 18 Morrow Clastics. 19 Okay, that's all. 20 You also have before you an exhibit Ω. 21 marked Number Three. Would you refer to that and explain that 22 to the Examiner? 23 Exhibit Number Three is a structure map Λ. 24 over the White City Penn Pool limits, mapped on top of the 25 Morrow limestone, a structural and stratigraphic detum easily

1 13 2 correlated through the area regionally. 3 The index map shows the regional location of the White City Penn Pool in its relationship to the South 5 Carlsbad Field and other surrounding regional features. MR. NUTTER: What do the contours on 7 the map indicate? 8 Δ. Those are also on the Morrow. 0 MR. NUTTER: Morrow contours. 10 A. Yes. This is a computer map on the ---11 that I originated on the index map and on the left your 12 structure map that you are looking at is an interpretive 13 structure map, ; here the contours are tightened up to accen-14 tuate the structure throughout the pool. 15 Contour interval is 100 feet and the 16 unit outline is indicated in both index as well as interpre-17 tive structure maps. 18 Mr. Casavant, you also have before you Q. 19 Exhibit Nur of Four. Would you explain the significance of 20 your Exhibit Four? 21 Exhibit Number Four is partly interpre-A. 22 tive and partly factual, you might say. We're looking at a combination 3-D, or three dimensional stratigraphic structural 23 overview of the White City Penn Pool. The structural closures 24 25 you see on the top of the 3-D model here are the actual

2 structural contours you have in Exhibit Number Three. those
3 line up. The scale again on the horizontal is greatly exag4 gerated because of the nature of the section, the thickness of
5 it.

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Penonstrated here is the lead-in to not only is the field --- not only is the structural emphasis in the area a reason for the production throughout the pool, but also the stratigraphic and the depositional nature of this field must be looked at in order to determine the problem we have at hand here in determining for breaking down our proration units.

13 One thing you might notice there is the 14 Morrow limestone, the clastics, and the second clastic inter-15 vals are illunstrated. The very discontinuous -- or erratic 16 nature of the sands both in a vertical sense as well as a 17 horizontal sense, the majority of the sands are located in 18 the central part of the field and the north part of the field 19 and they become of lesser frequency to the south and the 20 southeast, and this will be illustrated with later exhibits. 21 So we're looking at here a very erratic

and unpredictable type of deposition from this 3.D. The north arrow there will indicate that when we'll be able to position your full unit for you.

Okay. I'd like now to direct your

1	15
2	attention to Fxhibit Number Five. Would you please now explain
3	this exhibit for Mr. Nutter?
4	A Okay. Exhibit Number Five is up on the
5	wall here, Mr. Nutter, It's a stratigraphic cross section
6	E-E through the central part of the ten pool area. You have
7	that in front of you, I believe, or do you have the copy? It
8	would probably be easier for you to pull that out.
9	MR. NUTTER: This one here?
10	A I'xhibit Number Five.
11	MR. NUTTER: Vell, I didn't want to un-
12	fold that.
13	A. Okay.
14	MR. NUTTER: What's the line of your
15	cross section? Just tell me that and I'll put it on here.
16	A Okay, it's right through the central
17	part of the field. Okay.
18	MR. NUTTER: Okay, what what pool
19	wells are on that cross section? There's one in Section 4
20	on there?
21	A. One in Section 4.
22	MR. NUTTER: Maybe you could just take
23	this map and draw that cross sectional line across that pool
24	there with the orange pen and I'll follow your cross section.
25	A. Sir, the wells circled in orange there

. . 2 | are the wells (inaudible).

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This is a stratigraphic cross section hung on the Morrow limestone as the datum to knock out the structure, so to speak, and what we'd like to illustrate here is the -- in the index part, the dark formation unit lines here are regional formation units that I used for correlation throughout the area.

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0 However, the slashed or the hachured 10 marks that you see here are the genetic sand units that I 11 correlated throughout the pool area, and these are related. 12 based on gamma ray resistivity, as well as sample log charac-13 teristics, and in correlating these clastics throughout the 14 field and pool unit, we're looking primarily at the Morrow 15 Clastics interval, we're noticing a very high degree of 16 variability in a horizontal sense.

17 Taking the first sand we start to deve-18 lop a certain signature of the sand and we come to the next 19 borehole and it changes quite a bit. We keep going, and some 20 places we actually have the sand absent. it's completely 21 gone. We pick it back up, we pick it strong, and as you go 22 down the section you notice the different colors here repre-23 sent the different sand units that we map, and the variability 24 extends throughout your exhibit; taking a closer look at it 25 you'll be able to see that there's a high degree of lateral

1 17 2 variation. 3 Also, between these particular sand units are shale units, which isolate these in a vertical sense, too. 5 So we're looking at more or less small depsotional pods that ó are not continuous and related to one another in the sense of 7 both pressure, porosity, permeability, as well as clastic material. 9 So what we're trying to show by this 10 cross section is that we also have stratigraphic and deposi-11 tional reasons that plays in the production or the nonproduction 12 from borehole to borehole. 13 MR. NUTTER: And this is why you think 14 that these wells on the 640 aren't producing ---15 A. Yeah, I don't believe ----16 MR. NUTTER: -- because they're missing 17 some of these pods --18 Absolutely, and then in some places A. 19 they're present that we don't know about. In other words, 20 we're in between two boreholes, and I think that we're not 21 adequately testing this clastic series in trying to get the 22 maximum reserves from this area. 23 And this is demonstrated both in --<u>24</u> this whole thing was cross sectioned and this is just one of 25 the cross sections, but the Upper Clastic and the Lower Clastic

1 18 2 interval represents this kind of behavior, very, very erratic 3 depositional history to it. Now these lead into the last exhibit, 5 Exhibit Number Six. Fxhibit Number Six, would you explain <u>0</u>. 7 that exhibit? 8 Okay, Exhibit -- I don't know if you can A. 9 the best thing for you to do ---10 MR. HUTTER: There's a pointer down 11 there, if you think you need a pointer. 12/ I thought I was tall enough. Ä. 13 MR. NUTTER: You may be tall enough, 14 your arms aren't long enough. 15 Again here's our position for the full A. 16 outline of the study area involved and what we did was, we 17 went -- this is a type log or just one of the logs out of the 18 field, and broke up all the particular sand units throughout 19 the Upper and Lower Clastic intervals and then assigned to 20 them in an environmental interpretation based on the gamma 21 ray, resistivity, and sample characteristics. This is done 22 many times in an academic sense, but we are applying it to 23 industry, and in this particular case I -- from each of these 24 sands, for instance, sand A, up through sand A, I studied 25 just each sand separately and reconstructed what I call the

1	19
2	paleo-environmental reconstruction of the deposition of that
3	one particular sand at that time.
4	MR. MUTTER: Now these are all Morrow
5	sands, aren't they?
6	A. Yes, sir.
7	MR. NUTTER: I see.
8	A. And what we're looking at here, Stage A,
9	coincides with the deposition of Sand A, Sand B with Stage B,
10	Sand C with Stage C, and so on. And just standing back and
11	looking at this, we can see visually a variability in the
12	position and a variability or quality of these sands, not only
13	in time but in the type of sand throughout the pool unit,
14	and this is the pool unit is mainly centered in the center p
15	tion of these little maps, okay.
16	MR. NUTTER: Now what are the white
17	lines running through the orange colored area?
18	A. Okay, the white lines represent the
19	best sand quality and signature of the channel sand. Okay.
20	And, of course, where we have the orange, or on your exhibits
21	which will be dark blue, represents the most massive accumu-
22	lation of productive sands; I'm saying that could contribute
23	productively.
<u>24</u>	Also, this is the orange or the
25	white area represent where we have the coarsening upwards of

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1	20
2	sand units, which are the and the fining upwards, which are
3	the productive units through this pool.
4	So we come into the green parallel lines,
5	we're starting to break up in our our sand packages are
6	becoming more or less erratic and sand is not being deposited
7	in that one particular place like it was in times previous.
8	So if you pick a point here we have absolutely no sand, just
9	marine shale, we move over in a relative position and the
10	next time we have a deposition of a better sand.
11	So what we're saying here by looking at
12	this thing in layers is we're seeing the variation being
13	spelled out in the story, and the blue, of course, is where
14	we have absolutely no sands present, or if we do, they're
15	very, very broken up and not significant enough for production.
16	So what we're doing, we're unfolding
17	the story of the Morrow deposition from the first sands and
18	the second sands, showing the high the high degree of
19	variability, not only of deposition but as we'll see in our
20	engineering study, this relates to our porosity and permeability
21	per reservoir.
22	Are there any guestions of this exhibit?
23	MR. NUTTER: Not now.
24	A 1 might add that a confirmation on this
25	particular small area of the Northwest Shelf of the Delaware

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21 2 Basin , that representing there those pulses in the dumping 3 of the clastics, truely represents a deltaic type of deposition, so at least through the pool area we have, I feel, a 5 very good handle on the way these things are behaving. 6 Q. Mr. Casavant, do you have an opinion 7 based on your study of the White City Pennsylvanian Gas Pool 8 as to whether or not the now existing wells will actually drain 9 the 640-acre units now applicable to the unit? 10 No, from preliminary study of the poro-A. 11 sity and the sands that we actually perfed, in addition to 12 the depositional history that we've uncovered and cross sec-13 tioned, I do not think they will adequately drain 640 acres. 14 I do see a need to break that down. 15 And do you feel that the drilling of ę. 16 additional wells is the only way which would insure recovery 17 of hydrocarbons that will not be recovered out of the now 18 existing wells? 19 I do, to adequately test it, yes. A. 20 Okay. Is it your recommendation, then, Q 21 that the White City Pennsylvanian Gas Pool rules be amended to 22 provide for 320-acre spacing rather than 640-acre spacing 23 presently applicable to it? 24 I do. Ä. 25 Mr. Casavant, have Exhibits Number Two, Q.

ter series de la cara d
1 22 2 Three, Four, Five, and Six been prepared under your direction 3 and supervision? A. Yes, they have. 5 MR. SOLIZ: Mr. Examiner, at this time 6 I would like to submit Exhibits Two through Six into evidence 7 in this case. x MR. NUTTER: Gulf Exhibits Two through 9 Six will be admitted. 10 MR. SOLIZ: I have no other questions 11 of Mr. Casavant. 12 13 CROSS EXAMINATION 14 BY MR. NUTTER: 15 Mr. Casavant, your Exhibit Number Four, Ω 16 Exhibit Number Five, and Exhibit Number Six, all seem to relate 17 to the producing formations below the Upper Morrow Clastics. 18 Now Mr. Kalteyer stated that the pool was producing from the 19 Strawn, Atoka, and Morrow, and I think one of your exhibits 20 also -- oh, your -- your log --21 Yes, sir. A. 22 Showed the Strawn and the Atoka also. Ω 23 Now does this broken string of pods and lenses and the dis-<u>24</u> continuity that you see here in the Morrow formation apply 25 also to the Strawn and to the Atoka?

2 On a material basis of what the material A. 3 is, no, but porositywise, yes. We don't quite understand yet the carbonate units of the Strawn and the Atoka through the 5 field. Now, there's only, I think we have two Atoka wells that are presently on production and there are three wells that are 7 producing from the Strawn, but the majority of the wells 8 throughout the area, and outside of the pool area, are Morrow 9 prospects, so to speak, or Morrow --- or basically ---

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4

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10 Well, are some of these wells perforated Q. 11 in all of these zones or more than one of these zones, or 12 that would be like Strawn and Atoka and Morrow, or Atoka and 13 Morrow, or are they all either Strawn or Atoka or Morrow?

14 No, they're -- there are some presently Ā. 15 producing out of several of the formations, in the pool area --16 in the pool limit.

17 Well, do you believe that a well that Q. 18 may not be draining 640 acres in the Morrow might be draining 19 640 acres in the Strawn or Atoka?

20 No. sir, not -- not from my experience A. 21 with carbonate rock. I do not believe that we have that kind 22 of drainage characteristics to carbonate rocks.

23 So all of these exhibits apply to Morrow 0. 24 only. You feel that there is this lack of permeability or 25 something in the Strawn and the Atoka that's preventing that

1 24 2 drainage also? 3 A. Yes, sir, that could be the case. 4 Clastics do have a history anyway of - both from a depositional 5 viewpoint and from an engineering viewpoint of having much 6 greater drainage than the carbonates in this area. 7 So we weren't too worried with the 8 porosity through these Strawn and Atoka sections. 9 Q. Now all of the colors on Exhibit Number 10 Five there are down below the top of the Upper Morrow Clastics. 11 As a matter of fact, the Morrow limestone at the top of the 12 cross section, are any of those wells perforated in Strawn 13 and Atoka, do you know? 14 No, I do not know. I'd have to -- we A. 15 may have the data. I could refer that question to the 16 engineer. 17 But the bulk of your study here has been Q. 18 to the Morrow, hasn't it? **1**9 Yes, sir. The nature of the Atoka and Α. 20 the nature of the Strawn and, of course, the production 21 standpoint of drilling -- the spacing, or at least the control 22 involved is very widespread through this area, so if we have 23 better control on the Morrow and the erratic nature of the 24 Morrow, is what we're primarily seeking, but also the porosity 25 in the Atoka and Strawn is just as questionable.

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1 25 2 Q. I see. 3 MR. NUTTER: Are there any other questions 4 of Mr. Casavant? He may be excused. 5 JEFFREY P. ORTWEIN 6 7 being called as a witness and being duly sworn upon his oath, 8 testified as follows, to-wit: 9 10 DIRECT EXAMINATION BY MR. SOLIZ: 11 12 Would you please state your name, address, Q. 13 and occupation for the record? 14 Jeffrey P. Ortwein, O-R-T-W-E-I-N, A. P. O. Box 670, Hobbs, New Mexico. 15 16 And could you tell us your occupation? Q. 17 A. I'm a reservoir engineer for Gulf Oil 18 Corporation. 19 Could you tell us something about your Q. 20 educational background and your occupational experience? 21 A. Yes, sir. I graduated from Penn State 22 University with a BS in petroleum engineering in 1979. Pre-23 vious to that I had worked one summer as an engineer. 24 I joined Gulf in June '79 and have one 25 year and nine months engineering experience with Gulf in

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2	southeast New Mexico.	
3	Q	You said you had some experience in the
4	summer of '78?	
5	Λ.	Yes, sir.
6	Ų.	And who was that with?
7	Α.	This was with Quaker State Oil Company
8	in Pennsylvania.	
9	Q	Are you familiar with Gulf's application
10	in this case?	
11	Á.	Yes, sir I am.
12	Ŭ	And in the course of your employment
13	have you had occasion	to study in detail the White City Penn-
14	sylvanian Gas Pool?	
15	А.	Yes.
16	Ũ	And was this in Hobbs in the Hobbs Area
17	Office?	
18	А.	Yes.
19		MR. SOLIZ: Mr. Examiner, are the wit-
20	ness' credentials acc	eptable?
21		MR. NUTTER Yes, they are.
22	Q	Mr. Ortwein, you have before you what's
23	been marked as Exhibi	t Number Seven, and I'd like to ask you
24	to identify it.	
25	A.	Exhibit Seven is a table of all the

1 27 2 wells in the White City Penn Gas Pool from which I made an 3 engineering study to determine the areal extent that hydrocarbons were being drained in the Pennsylvanian formation from 5 these wells. <u>Ç</u>. What sources of data or information did 7 you review in order to come up with your -- with the informa-8 tion contained on Exhibit Number Seven? 9 Α. The data in Exhibit Seven came from log 10 data, completion data, performance curves, and P/z curves. 11 Q. What do you mean when you refer to P/Z 12 curves? 13 P/Z is a bottom hole pressure versus Α. 14 time versus cumulative production curve, but the pressure is 15 corrected with -- using the Z factor, compressibility, for 16 straight line extrapolation purposes. 17 Approximately for what period of time Q. 18 do the data cover that you reviewed for this study? 19 This data covered a period of time from A. 20 the completion of the discovery well in April, 1960 up to 21 approximately December, 1980. 22 Okay. Now based upon the data that Q. 23 you've just described and the information appearing in Exhibit 24 Seven, do you have any opinion as to the area being drained 25 on an average by the wells presently producing from the White

28
City Fenn Pool?
A Yes, the results of my analysis show
that the average drainage per well is 257 acres.
Q Was Exhibit Number Seven prepared under
your supervision or direction?
λ. Yes.
Q I'd like you now to refer to Exhibit
Number Eight and ask you to identify that exhibit please.
A. Exhibit Eight consists of supportive
reservoir parameters. These parameters were used in the
volumetric calculation of gas in place for the existing wells.
Q. What sources of information did you re-
view in order to come up with the numbers that appear on this
Exhibit Eight?
A. Most of the numbers come from log data
but some came from completion and DST information.
Q. And by DST I assume you refer to drill
stem tests?
A. Yes.
Q. Would you explain how Exhibit Eight
relates to Exhibit Seven?
A. The information in Exhibit Eight was
used to calculate a volumetric original gas in place on a per
acre basis. This appears in column one of Exhibit Seven.

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1 29 2 This volumetric original gas in place 3 per acre then was compared to the original gas in place ob-4 tained from actual well performance projected from the P/Z 5 curve, 6 From this comparison the calculated 7 drainage area per well was obtained. 8 Q. Was Exhibit Number Eight also prepared Ŷ under your supervision and your direction? 10 A. Yes. 11 I'd like to ask you now to refer to Ex-Ω 12 hibit Number Nine, which I believe is broken down into three 13 sub-parts, Nine-A, Nine-B, and Nine-C, and ask you to identify 14 them. 15 Exhibit Nine is broken into three parts, A, 16 A. B, and C. These are bottom hole pressure versus time plots 17 for all the wells in the pool. If you could refer back to 18 Exhibit One it would help me to explain this exhibit, the 19 lease plat. 20 Okay, part A contains plots for the 21 three -- top three rows of sections in the pool. There are 22 seven rows of sections. Part A contains plots for the wells 23 in Rows 1, 2, and 3, Sections 8 through 22. <u>24</u> Part B contains plots for all the wells 25 in the third, fourth, and fifth rows of the pool, which is

1 30 2 Sections 19 through 35, and Part C contains the plots for the 3 wells in Rows 5, 6, and 7, or Section 32 through Section 12 4 of the township below. 5 So in each plot one row of wells is 6 seen in the previous plot. 7 These pressure-time plots illustrate a 8 lack of continuity between offsetting wellbores. You can see 9 that as new wells were drilled nearly all came in at near 10 virgin reservoir pressure, on the order of 5000 pounds, and 11 looking towards the righthand side of the page you can see 12 that at present there exists wide variations in bottom hole 13 pressures of offset wellbores; a range from about 13 to 2400 14 psi -- 3400 psi, 15 Okay, as I understand it, then, it's 0, 16 your testimony that the presently existing producing wells do 17 not adequately drain the 640-acre spacing? 18 That's correct. A. 19 Is it your opinion, then, that if addi-Q. 20 tional wells were drilled the hydrocarbons now underlying the 21 640-acre spacing units will be produced? 22 Yes, that's also correct. Ā. 23 I'd like you now to refer to Exhibit Q. 24 Number Ten and identify that for us. 25 Firstly, Exhibit Ten shows that cumu-A.

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1 31 2 lative gas recovery to date is 62 Bcf. 3 Secondly, it shows that the ultimate 4 recovery expected for each existing well is around 4 Bcf, and 5 finally, each additional well can expect to recover somewhere 6 around 1.5 Bcf. Those additional would be infill wells 7 drilled on 320-acre spacing. 8 Now did you arrive at the average ulti-Q 9 mate gas recovery? 10 The ultimate recovery for the existing A. 11 wells was based on an extrapolated pressure cutoff on the 12 P/Z plots. 13 Were Exhibits Number Nine and Ten also Q 14 prepared under your direction or supervision? 15 A. Yes. 16 Q. Okay. In order to summarize your testi-17 mony, I'd like to ask you whether or not you have an opinion 18 based on a study of all the data you've prepared, relating 19 to the White City Pennsylvanian Gas Pool as to whether or 20 not the now existing wells will actually drain the 640-acre 21 units now applicable to the wells? 22 My study shows that the existing spacing A. 23 is inadequate and that additional wells are needed to recover 24 the hydrocarbons under each proration unit. 25 And you feel like the drilling of addi Q.

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2	tional wells is the only	way which would insure recovery of			
3	hydrocarbons that would not that will not be recovered				
4	out of the now existing	wells?			
5	A. Ye	23,			
6	0. Ar	d based on the present 640-acre spacing			
7	unit, Gulf is prevented	from drilling additional wells, is			
8	that correct?				
9	A. Wo	ould you repeat that, please?			
10	0. Ar	d based on the present 640-acre spacing			
11	unit, Gulf would be prev	ented from drilling some of the addi-			
12	tional wells, is that co	prrect?			
13	A. Ye	es, that's correct.			
14	0 <u>I</u> s	it your recommondation, then, that			
15	the White City Pennsylva	nian Gas Fool rules be amended to			
16	provide for 320-acre spa	cing rather than 640-acre spacing			
17	in accordance with Gulf	s application?			
18	λ. Υε	25.			
19	Q. Is	it your opinion that the granting of			
20	Gulf's application would	result in the prevention of waste,			
21	the protection of correl	ative rights, and be in the interest			
22	of conservation?				
23	A. Ye	25.			
24	0. Do	you have anything further to add			
25	to any testimony you've	already given?			
25	to any testimony you've	already given?			

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1 33 2 MR. SOLIZ: Mr. Examiner, at this time 3 I'd like to submit Exhibits Seven through Ten into evidence 4 in this case. 5 MR. MUTTER: Gulf's Exhibits Seven 6 through Ten will be admitted in evidence. 7 MR. SOLIZ: I have no further questions 8 of this witness. Q 10 CROSS EXAMINATION 11 BY MR. NUTTER: 12 Q. Now, Mr. Ortwein, in your Exhibit 13 Number Seven, you have calculated the original gas in place 14 on a volumetric basis and it's millions of cubic feet per 15 acre. 16 Yes, sir. A. 17 Now, you used the data that's on Exhibit Q. 18 Eight to make that volumetric calculation is that correct? 19 That's correct. A. 20 And I notice two or three wells here Q. 21 don't have any volumetric figures. Is that because logs were 22 not available or you couldn't make an interpretation of the 23 proper data from those logs, or something? 24 Yeah, either we couldn't get the logs Α. 25 or they weren't deep enough to use to adequately get a feel

1 34 2 for the porosity or 3 Now, in using those logs and making this 0 4 volumetric calculation, were some of those wells perforated 5 and completed in the Strawn as well as the Atoka and the 6 Morrow? 7 And are all three of those formations 8 included in these volumetric reserves? 9 A. Yes, sir, if you lookat the bottom of 10 Exhibit Seven. 11 Q Okay. 12 Gulf has three wells, the White City A, 13 Penn Gas Com No. 1, No. 2, and No. 3 No. 1, each of these are 14 listed on two separate entries. One completion was a Strawn 15 and the second Atoka in both wells, and also on the pressure 16 time plots the workovers were indicated. 17 On that No. 1 Well we had perforated 18 the Atoka and Morrow simultaneously but the Atoka came in so 19 good that we set a bridge plug and we aren't producing Morrow 20 right now. 21 <u>O</u>. And so you made your volumetric calcu-22 lation of reserves there. 23 Then you took your P/Z on your -- against 24 your cumulative production and determined what the cumulative 25 production on these wells is going to be.

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1	35
2	A. Yes, sir.
3	And that's the second column on Exhibit
4	Seven.
5	A. Yeah that's an extrapolation to P/Z
6	equals zero.
7	Q And then you took the - the figure in
8	column A and multiplied that by 640 acres to find out what
9	the calculated reserves would be under the 640-acre tract?
10	A. Kind of; kind of skipped that step in
11	that we did the volumetric on the per acre basis but if you
12	did multiply column one by the 640, that will be the original
13	gas in place in the whole proration unit, which would give
14	you the same comparison.
15	Q. And then if you took the P/Z calculation
16	of ultimate gas, you'd find that it's coming from only 268
17	acres on that first well, rather than the calculated volume
18	under the 540.
19	A. Yes, sir.
20	Q. Now, on your Exhibit Ten you show a
21	cumulative gas recovery at 1-1-81 to be 62 billion.
22	A. Yes, sir.
23	Q And there are 23 vells in the pool.
24	Now you also show your average ultimate gas recovery per well
25	to be 4 billion. Now is that based on the 23 wells that are

1		36
2	in the pool?	
3	A	Yes, sir.
4	ŷ.	So that would give us a total for the
5	pool ultimate recover	y of about 92 billion.
6	A	That's correct.
7	Ø	So we're getting 6/9ths we have
8	gotten 6/9ths of the	total reserves so far, is that it?
9	A.	Yes, that's correct.
10	Q.	Now, how did you estimate what your
11	additional infill gas	recovery per well is going to be?
12	Α.	Well, I took the existing wells and went
13	from the calculated d	rainage area into a drainage radius and
14	plotted this up on wo	rksheet, and then proposed 1980/1980
15	infill locations, and	I tried to draw what I thought what
16	I figured these wells	would drain and then I planimetered the
17	additional area that	the existing well wouldn't drain and
18	using the volumetric	and a numerical recovery factor, I
19	backed into an averag	e in additional
20	Q.	So the additional recovery per well is
21	a volumetric calculat	ion that you planimetered out after
22	drawing a radius of d	rainage for the existing well?
23	A.	Yes, sir.
24	Q	And the radius of drainage was based on
25	your 268 acres for th	at first well on Exhibit Seven, is that

1		37
2	it?	
3	Α.	Right.
4	<u>0</u>	And you think that is about 1-1/2
5	billion cubic feet p	er well?
6	Α.	Yes, sir.
7	Ŭ	On an infill program.
8	Α.	Yes, sir, that's - that's the starting
9	point. We may recov	er more.
10	¢	Now I presume some of these tracts that
11	have produced pretty	good, for example, the one well there
12	that's drained over	1000 acres according to Exhibit Seven,
13	you wouldn't have an	infill well in there, would you?
14	۸.	Probably not, but we haven't well,
15	we need to that p	particular well is in a funny location.
16	It's in the very cor	mer of the proration unit. That's our
17	White City Penn No.	1 in Section 29, so we may possibly in
18	that case have a	
19	Ũ	Well, that was the discovery well for
20	the pool.	
21	A.	Yes, sir.
22	Ũ	So it got a head start, didn't it?
23	A.	Yes.
24	õ	And it is right in the corner, the ex-
25	treme corner of the	proration unit.

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1 38 MR. NUTTER: Are there any other ques-2 tions of this witness? He may be excused. 3 MR. SOLIZ: Mr. Examiner, we've completed our case now. 5 MR. NUTTER: Mr. Kalteyer I'll ask you now. On these proposed rules that you've got, you're simply 7 8 proposing that the spacing units be changed from 640 acres 9 to 320 acres, but you're not proposing that the well location 10 requirements, that 320 acres would be under the statewide 11 rules for Pennsylvanian pools in southeast New Mexico but 12 you're not proposing well locations in accordance with those 13 statewide rules. 14 MR. KALTEYER: That's correct because 15 the original rules were 1650 from the boundary. 16 MR. NUTTER So you would --17 MR. KALTEYER: So we left it at that. 18 MR. NUTTER: You don't want to abolish 19 the pool rules; you want to keep the special pool rules be-29 cause you've got a special well location requirement. 21 MR. KALTEYER: Yes, sir that's correct. 22 MR. NUTTER: I see. 23 Are there any questions for Mr. Kalteyer 24 on his well locations? 25 Do you have anything further, Mr.

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1		39
2	Soliz?	
3	MR. SOL	12: No sir.
4	MR. NUT	TFR: Does anyone have anything
5	they wish to offer in Case 72	08?
6	. We'll t	ake the case under advisement.
7	7	
8	(Hearin	g concluded.)
9		
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24	4	
25	5	

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CERTIFICATE

I, SALLY W. BOYD, C.S.R., DO HEREPY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally WBay Core.

ing is 1 do he 7208. d C ť. Examiner

) SALL'Y W. BOYD, C.S.R. kt. 1 Box 193-B Santa Fe, New Mexico #7301 Phone (303) 455-7409

CASE 7208

MARCH 25, 1981

CALCULATED DRAINAGE AREAS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

WELL	VOLUMETRIC ORIG. GAS IN PLACE MMSCF/ACRE	BHP/Z ORIG. GAS IN PLACE MMSCF	CALCULATED DRAINAGE AREA ACRES	ASSIGNED PRORATION UNIT ACRES
Pennzoil-Allied "21" Federal No. 1	30.2	8107	268	640
C & K-C. K. Federal No.] *		667		640
Gulf-Estill "AD" Federal No. 1	20.9	8902	426	640
C & K-Exxon Federal Com. No. 1	15.2	4763	313	640
C & K-Federal "22" Com. No. 1	22.7	9383	413	640
Texaco-J. M. Gates Federal (NCT-1) No.	1 24.8	900	36	640
HNG-Grynberg "11" Federal Com. No. 1	12.2	3345	274	640
Gulf-Marguart Federal No. 1	21.0	1137	54	640
Gulf-Marguart Federal No. 2	19.9	2414	121	640
Mesa-Moore Federal Com. No. 1	8.8	1187	135	640
Texaco-New Mexico "DD" State Com. No. 1	*	1678		640
Mesa-Ogden Com. No. 1	36.3	4653	128	640
C & K-Pennzoil "9" Federal No. 1 *		3823		540
C & K-Pennzoil Federal No. 1 *		1568		640
Mesa-Ringer No. 1	37.6	315	8	640
Mesa-Ringer Federal Com. No. 2	4.4	241	55	640
Mesa-Strong Federal Com. No. 1	26.2	994	38	640
Grace-White Baby Com. No. 1	30.9	6200	201	640
Mesa-White City Federal "10" Com. No. 1	3.8	558	147	640
Texaco-White City Penn Gas Com. No. 1 *		7072		640
Gulf-White City Penn. Gas Com. 1 No. 1	- 14.7	15526	1056	640
Gulf-White City Penn Gas Com. 1 No. 1 .	- 32.8	10586	323	640
Gulf-White City Penn. Gas Com. 2 No. 2	- 16.7	3878	232	640
Gulf-White City Penn. Gas Com. 2 No. 2	~ 17.9	11972	669	640
Gulf-White City Penn. Gas Com. Unit 3 N	0.1 5.1	1372	269	640
Gulf-White City Penn. Gas Com. Unit 3 N	o.1 5.7	1349	237	640

AVERAGE

* Insufficient data to complete calculations.

CASE 7208

MARCH 25, 1981

RESERVOIR PARAMETERS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

WELL	9 (%)	h (Ft)	Sw (%)	Gg	Zi	BHT Bgi (^O F) (SCF/RCF)
Pennzoil-Allied "21" Federal No. 1	6	58	22	.581	.976	189 255.5
C & K-C.K. Federal No. 1*				.579	.992	187 269.9
Gulf-Estill "AD" Federal No. 1	14	14	12	.580	.993	180 278.3
C & K-Exxon Federal Com. No. 1	5	32	18	.573	1.003	195 266.2
C & K-Federal "22" Com. No. 1	17	15	13	.580	.947	182 235.2
Texaco-J. M. Gates Federal (NCT-1) No. 1	20	14	22	.578	.987	192 260.3
HNG-Grynberg "11" Federal Com. No. 1	5	31	32	.630	.984	201 266.9
Gulf-Marquart Federal No. 1	8	28	19	.5/4	.990	187 265.9
Gulf-Marquart Federal No. 2	10	26	34	.568	.989	184 266.3
Mesa-Moore Federal Com. No. 1	5	30	49	.580	.974	180 263.0
Texaco-New Mexico "DD" State Com. No. 1 *	•			.576	.987	174 278.9
Mesa-Ogden Com. No. 1	7	67	29	.572	.969	185 250.1
C & K-Pennzoil "9" Federal No. 1 *				.575	.986	188 262.2
C & K-Pennzoil Federal No. 1 *				.573	.940	196 203.0
Mesa-Ringer No. 1	8	58	29	. 595	.967	182 261.9
Mesa-Ringer Federal Com. No. 2	5	14	19	.627	.895	189 178.1
Mesa-Strong Federal Com. No. 1	10	30	24	. 590	.978	186 264.0
Grace-White Baby Com. No. 1	6	53	14	.574	,983	188 259.8
Mesa-White City Federal "10" Com. No. 1	5	32	77	.580	.961	193 236.5
Texaco-White City Penn Gas Com. No. 1 *				.577	.971	174 267.0
Gulf-White City Penn. Gas Com. 1 No. 1	7	24	29	.575	.975	178 283.1
Gulf-White City Penn Gas Com. 1 No. 1	10	30	18	.635	.998	174 306.3
Gulf-White City Penn. Gas Com. 2 No. 2	9	19	24	.577	.985	160 294.9
Gulf-White City Penn. Gas Com. 2 No. 2	7	27	16	.577	.953	168 258.9
Gulf-White City Penn. Gas Com. Unit 3 Nol	13	11	17	.579	.915	185 98.1
Gulf-White City Penn. Gas Com. Unit 3 Nol	9	12	8	.579	.906	184 131.5



* Insufficient data

CASE 7208

MARCH 25, 1981

RECOVERY

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

CUMULATIVE GAS RECOVERY 1-1-81						
AVERAGE ULTIMATE GAS RECOVERY PER WELL						
AVERAGE ADDITIONAL INFILL GAS RECOVERY PER WELL						

62.44 MMMCF

32.44 MMMLr 4.01 MMMCF + based on presume cut of on f/z peters

BEFORE EXAMINER NUTTER OIL COMSERVATION DIVISION GTUIT'S EXHIBIT NO. 10 CASE NO. 7 Z *0*8

CASE 7208

MARCH 25, 1981

CALCULATED DRAINAGE AREAS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

WELL	VOLUMETRIC ORIG. GAS IN PLACE MMSCF/ACRE	BHP/Z ORIG. GAS IN PLACE MMSCF	CALCULATED DRAINAGE AREA ACRES	ASSIGNED PRORATION UNIT ACRES
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C & K-C. K. Federal No. 1 *		667		640
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HNG-Grynberg "11" Federal ĉom. No. 1	12.2	3345	274	54 0
Gulf-Marguart Federal No. 1	21.0	1137	54	640
Gulf-Marguart Federal No. 2	19.9	2414	121	640
Mesa-Moore Federal Com. No. 1	8.8	1187	135	540
Texaco-New Mexico "DD" State Com. No. 1	*	1678		640
Mesa-Ogden Com. No. 1	36.3	4653	128	640
C & K-Pennzoil "9" Federal No. 1 *		3823		640
C & K-Pennzoil Federal No. 1 *		1568		640
Mesa-Ringer No. 1	37.6	315	8	640
Mesa-Ringer Federal Com. No. 2	4.4	241	55	640
Mesa-Strong Federal Com. No. 1	26.2	994	38	640
Grace-White Baby Com. No. 1	30.9	6200	201	640
Mesa-White City Federal "10" Com. No. 1	3.8	558	147	640
Texaco-White City Penn Gas Com. No. 1 *		7072		640
Gulf-White City Penn. Gas Com. 1 No. 1	14.7	15526	1056	640
Gulf-White City Penn Gas Com. 1 No. 1	32.8	10586	323	640
Gulf-White City Penn. Gas Com. 2 No. 2	16.7	3878	232	640
Gulf-White City Penn. Gas Com. 2 No. 2	17.9	11972	669	640
Gulf-White City Penn. Gas Com. Unit 3 N	0.1 5.1	1372	269	640
Gulf-White City Penn. Gas Com. Unit 3 N	o.1 5.7	1349	237	640

AVERAGE

* Insufficient data to complete calculations.



CASE 7208

MARCH 25, 1981

RESERVOIR PARAMETERS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

WELL	Ø (%)	h (Ft)	Sw (%)	Gg	Zi	BHT Bgi (^o f) (SCF/RCF)
Pennzoil-Allied "21" Federal No. 1	6	58	22	.581	.976	189 255.5
C & K-C.K. Federal No. 1*				.579	.992	187 269.9
Gulf-Estill "AD" Federal No. 1	14	14	12	.580	.993	180 278.3
C & K-Exxon Federal Com. No. 1	5	32	18	.573	1.003	196 256.2
C & K-Federal "22" Com. No. 1	17	15	13	.580	.947	182 235.2
Texaco-J. M. Gates Federal (NCT-1) No. 1	20	14	22	.578	.987	192 260.3
HNG-Grynberg "11" Federal Com. No. 1	5	31	32	.630	.984	201 266.9
Gulf-Marquart Federal No. 1	8	28	1 9	.574	.990	187 265 . 9
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Mesa-Strong Federal Com. No. 1	10	30	24	.590	.978	186 264.0
Grace-White Baby Com. No. 1	6	53	14	.574	.983	188 259.8
Mesa-White City Federal "10" Com. No. 1	5	32	77	.580	.961	193 236.5
Texaco-White City Penn Gas Com. No. 1 *				.577	.971	174 267.0
Gulf-White City Penn. Gas Com. 1 No. 1	7	24	29	.575	.975	178 283.1
Gulf-White City Penn Gas Com. 1 No. 1	10	30	18	.635	.998	174 306.3
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Gulf-White City Penn. Gas Com. Unit 3 No	1 13	11	17	.579	.915	185 98.1
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EXAMPLER HUTTER GIL CONSERVATION DIVISION 7208 CASE NO.

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CASE 7208

MARCH 25, 1981

RECOVERY

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

CUMULATIVE GAS RECOVERY 1-1-81	62.44 M	MMCF
AVERAGE ULTIMATE GAS RECOVERY PER WELL	4.01 M	
AVERAGE ADDITIONAL INFILL GAS RECOVERY PER WELL	1.48 M	MMCF

BEFORE	EXAMINER NUTTER
	NSERVATION DIVISION
Gulf	EXHIBIT NO.
	7208

CASE 7208

MARCH 25, 1981

CALCULATED DRAINAGE AREAS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

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AVERAGE

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CASE 7208

MARCH 25, 1981

RESERVOIR PARAMETERS

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

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Mesa-White City Federal "10" Com. No. 1	5	32	77	.580	.961	193	236.5	
Texaco-White City Penn Gas Com. No. 1 *				.577	.971	174	267.0	
Gulf-White City Penn. Gas Com. 1 No. 1	7	24	29	.575	.975	178	283.1	
Gulf-White City Penn Gas Com. 1 No. 1	10	30	18	.635	.998	174	306.3	
Gulr-White City Penn. Gas Com. 2 No. 2	9	19	24	.577	.985	160	294.9	
Gulf-White City Penn. Gas Com. 2 No. 2	7	27	16	.577	.953	168	258.9	
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Gulf-White City Penn. Gas Com. Unit 3 No.	9	12	8	.579	.906	184	131.5	

DEPORT NAMESEE LEDTER CH. CONSERVATION DIVERDM 74/1/ S EXHIBIT NO. 72.08 CASE NO.

* Insufficient data

CASE 7208

MARCH 25, 1987

RECOVERY

WHITE CITY PENNSYLVANIAN GAS POOL

EDDY COUNTY, NEW MEXICO

GULF OIL CORPORATION SOUTHWEST DISTRICT MIDLAND, TEXAS

CUMULATIVE GAS RECOVERY 1-1-81	62.44 MMMCF
AVERAGE ULTIMATE GAS RECOVERY PER WELL	4.01 MMMCF
AVERAGE ADDITIONAL INFILL GAS RECOVERY PER WELL	1.48 MMMCF

7208-10

BEFORE EXAMINER NUTTER OIL CONSERVATION DIVISION Gulf's EXHIBIT NO. 10 CASE MO. 7208

. e -

The Gulf Companies

LAW DEPARTMENT

William V. Kastler

P. O. Box 3725 Houston, Texas 77001

OF: ISION

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OIL OC

March 17, 1981

Mr. Joe D. Ramey Director, New Mexico Oil Conservation Division P. O. Box 2088 Santa Fe, New Mexico 87501

Re: Case No. 7208, Docket 11-81 Examiner Hearing on Wednesday, March 25, 1981

Dear Mr. Ramey:

Due to the fact that I will be on vacation, I would greatly appreciate your allowing Mr. Joseph G. Soliz, another Gulf Oil Corporation Attorney in Houston, to appear in my place as a representative of Gulf in the above listed case. Mr. Soliz is a member of the Bar of Texas and he has previously appeared on behalf of Gulf under my sponsorship.

Sincerely yours,

William V. Kastler

WVK/lsj

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cc: Ernest Padilla General Council New Mexico Oil Conservation Division

Joseph G. Soliz

Gulf Oil Exploration and Production AC bill a

March 6, 1981

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Case 7208

State of New Mexico Energy and Minerals Department Oil Conservation Division P. O. Box 2088 Santa Fc, New Mexico 87501

Attention: Mr. Joe D. Ramey

n An Anna A Re: Examiners Hearing White City-Pennsylvanian Gas Pool Eddy County, New Mexico

Gentlemen:

J. M. Thacker Several Manager Procidition SCORMET Protect

> This letter will confirm our request to schedule a hearing on your March 25, 1981 Examiners Docket to consider Gulf Oil Corporations request to amend the rules now governing the White City-Pennsylvanian Gas Pool. Our study of this pool indicates that the current wells are not efficiently and effectively draining the reserves under the 640 acre proration unit development pattern.

Gulf will propose that the pool be placed under a rule providing for 320 acre proration units. A spacing rule as proposed will provide that each well shall be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundry nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary.

Yours very truly,

R. H. Peacock

Technical Manager

CFK/pm

cc New Mexico Oil Conservation Division P. O. Box 1980 Hobbs, New Mexico 88240



A DIVISION OF GULF OIL CORPORATION

Page 2 of 4 Examiner Hearing - Wednesday - March 25, 1981

- CASE 7200: Application of Estoril Producing Corporation for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Belco Fed. Well No. 1 located in Unit O of Section 15, Township 23 South, Range 34 East, to produce gas and gas liquids from the Strawn and Morrow formations, Antelope Ridge Field, thru parallel strings of tubing.
- CASE 7201: Application of Layton Enterprises, Inc. for a unit agreement, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Todd Lower San Andres Unit Area, comprising 3256 acres, more or less, of Federal and State lands in Township 7 South, Ranges 35 and 36 East.
- CASE 7202: Application of Layton Enterprises, Inc. for a waterflood project, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the San Andres formation thru 4 injection wells located in Sections 30, 31 and 32 of its Todd Lower San Andres Unit in Township 7 South, Range 36 East.
- CASE 7203: Application of Southern Union Exploration Co. of Texas for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Susco Bough "C" Unit Area, comprising 2560 acres, more or less, of State lands in Township 10 South, Range 33 East.
- CASE 7204: Application of Bass Enterprises Production Company for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Delaware formation in the interval from 3820 feet to 3915 feet in its Federal Legg Well No. 1 in Unit B of Section 27, Township 22 South, Range 30 East, Quahada Ridge Field.
- <u>CASE 7205</u>: Application of Supron Energy Corporation for a non-standard gas proration unit, San Juan County, New Nexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard Blanco Mesaverde gas proration unit comprising the NE/4 of Section 35, Township 31 North, Range 12 West, to be dedicated to a well to be drilled at a standard location thereon.
- CASE 7183: (Continued from March 11, 1981, Examiner Hearing)

Application of Flag-Redfern Oil Company for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its Osudo St. Com Well No. 2 at an unorthodox location 990 feet from the North and East lines of Section 18, Township 20 South, Range 36 East, North Osudo-Morrow Gas Pool.

CASE 7206: Application of Mobil Producing Inc. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Devonian formation through perforations from 12,212 feet to 12,218 feet and the open hole interval from 12,240 feet to 12,555 feet in its Santa Fe Pacific Well No. 3 in Unit M of Section 26, Township 9 South, Range 36 East, Crossroads Field.

CASE 7207: Application of Mobil Producing Inc. for lease commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the commingling of Vacuum Grayburg-San Andres production from the State J and State II leases in Section 22, Township 17 South, Range 34 East.

CASE 7208:

: Application of Gulf Oil Corporation for the amendment of pool rules, Eddy County, New Mexico. Applicant. in the above-styled cause, seeks the amendment of the White City-Pennsylvanian Ges Pool Rules to provide for 320-acre spacing rather than 640 acres with well locations specified as being at least 1650 feet from the end boundary and 660 feet from the side boundary of the proration unit.

CASE 7129: (Continued from February 25, 1981, Examiner Hearing)

Application of Koch Exploration Company for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Dakota formation underlying the N/2 of Section 28, Township 28 North, Range 8 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7169: (Continued from February 25, 1981, Examiner Hearing)

Application of Koch Exploration Company for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Dakota formation underlying the S/2 of Section 22, Township 28 North, Kange 8 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

Called in by Chuck Kalleeger 3/3/81 Septication of Auly Oil Corporation for the amendment of poal ruces Eddy County, New Mexico. applicant, in the avoue - styled cause, meka the amendment of the White Cety-Kennywan gas Pool fices to thange the spacing for tom to 320-acre units prov provide 320-4 320-acre spacing rather han 640 acresmith will location equipied as laing at least 1650 bet from the end leandary and 660 fort from the side looundary of the provation wind

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IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7208

Order No. R-2429-C

APPLICATION OF GULF OIL CORPORATION FOR THE AMENDMENT OF POOL RULES, EDDY COUNTY, NEW MEXICO.

in

ORDER OF THE DIVISION

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on <u>March 25</u> 19 ⁸¹, at Santa Fe, New Mexico, before Examiner <u>Daniel 5. Nutter</u>. NOW, on this <u>day of April</u>, 19 <u>81</u>, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2429-A, entered March 27, 1963, in Case No. 2737, the Division promulgated special pool rules for the White City-Pennsylvanian Gas Pool in Eddy County, New Mexico, including a provision for 640-acre well spacing and proration units and specified well locations.

(3) That by Order No. R-2429-B, entered April 13, 1964, the Division continued said special pool rules in full force and effect until further order of the Division. -2-Case No. 7208 Order No. R-2429-C

(4) That the applicant in the instant case, Gulf Oil Corporation, seeks the amendment of the special pool rules for the spacing and location of wells in the White City Pennsylvanian Gas Pool, and seeks to have said pool governed by the provisions of Rule 104 C II(a) of the Division Rules and Regulations for gas pools of Pennsylvanian age, with respect to acreage dedication, but with certain specified locations for wells in said pool.

(5) That the evidence in this case indicates that the wells in the White City-Pennsylvanian Gas Pool are not draining 640 acres as it had been thought that they would, but that in fact the average well in the pool is draining only 257 acres.

(6) That although the Atoka, Strawo, and Morrow zones of the Pennsylvanian all produce gas in the subject pool, production from the pool is mostly from many separate pay stringers in the Morrow zone which vary greatly in areal extent and in permeability, porosity, and thickness, both within individual stringers and between stringers.

(7) That due to the variation in the areal extent and in permeability, porosity, and thickness of the stringers, there is considerable variation in the amount of original gas in place tapped by the various wells completed in the subject pool, and also in the percent of such original gas in place under each well which may be expected to be recovered by the well.

(8) That due to the variation in the areal extent and in permeability, porosity, and thickness of the stringers in the Pennsylvanian formation in the subject pool, the existing wells (drilled on 640-acre spacing and proration units) are not believed to have encountered many of the smaller stringers in the reservoir, nor are they expected in all cases to effectively and effeciently drain the stringers which they have tapped. (9) That to reduce the size of the spacing and proration units in the subject pool from 640 acres to 320 acres would result in numerous additional wells being drilled in the pool, and would greatly enhance the changes of tapping all of the productive stringers in the reservoir, and could also improve the drainage of gas from stringers previously tapped by existing wells.

(10) That the wells presently completed in the White City Pennsylvanian Gas Pool are not effectively and efficiently draining the 640-acre spacing and proration units assigned to them, but if 320-acre spacing and proration units are adopted for said pool, the wells in the pool should more effectively and efficiently drain the spacing and proration units assigned to them.

(11) That according to the evidence submitted in this case, approximately 1.48 billion cubic feet of additional gas may be expected to be recovered by each additional well drilled as the result of amending the existing pool rules and developing the White City-Pennsylvanian Gas Pool on 320-acre well spacing and proration units.

(12) That the amendment of the Special Pool Rules for the White City-Pennsylvanian Gas Pool as promulgated by Division Orders Nos. R-2429-A and R-2429-B is in the public interest and will not cause but will prevent waste, and will not impair but will protect correlative rights.

(13) That the vertical limits of the White City-Pennsylvanian Gas Pool comprise the Pennsylvanian formation and the horizontal limits comprise the following described lands in Eddy County, New Mexico:

-3-

24 SOUTH, F	RANGE	26 EAST, NMPM
14 through	17:	A11
19 through	22:	A11
28 through	30:	A11
32 through	35:	A11
8	3 and 9: / 14 through 19 through 28 through	24 SOUTH, RANGE 3 and 9: All 14 through 17: 19 through 22: 28 through 30: 32 through 35:

TOWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM Sections 1 through 4: All Sections 10 through 12: All

(14) That Rule 2 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as follows:

> "RULE 2. Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located on a standard unit containing 320 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental section."

(15) That Rule 4 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as follows:

> "RULE 4. Each well shall be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundary nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary."

(16) That the effective date of this order and the provisions hereof should be April 1, 1981.

IT IS THEREFORE ORDERED:

-4-

(1) That Rule 2 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool in Eddy County, New Mexico, as promulgated by Division Orders Nos. R-2429-A and R-2429-B, is hereby amended to read in its entirety as follows: "RULE 2. Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located on a standard unit containing 320 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental section."

(2) That Rule 4 of said Special Rules and Regulations is hereby amended to read in its entirety as follows:

> "RULE 4. Each well shall be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundary nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary."

(3) That the locations of all wells drilled and completed in the White City-Pennsylvanian Gas Pool are hereby approved.

(4) That the operator of each well in the White City-Pennsylvanian Gas Pool shall have until May 1, 1981, to file with the Artesia District Office of the Division new Forms C-102, Well Location and Acreage Dedication Plat, for each of his wells, showing thereon the location of the well and the acreage dedicated thereto pursuant to this order. Failure to so file such plats will subject the well to cancellation of allowable.

(5) That this order shall become effective at 7:00 o'clock a.m. on April 1, 1981, and shall apply to the White City-Pennsylvanian Gas Pool as described in Finding No. 13 above and as it may be subsequently extended by the Division, and to the Pennsylvanian formation within one mile of said pool.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary. DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

-5-

DRAFT

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

			CASE NO.		7208
			Order No.	R	2429-0-1
APPLICAT	ON OF GULF O	DIL CORPORATI			
THE AMEND	MENT OF POOL	RULES,			
EDDY	COUNTY,	NEW MEXICO.			$\int s \int t ds$
	NUN	C PRO TUNC O	RDER		
BY THE DI	VISION:				
It a	ppearing to	the Division	that Order	r No.	R
					prrectly state the
intended	order of the	Division,			
		•			
	S THEREFORE	ORDERED:			
			n page 3 of	0rd	er No. R-2429-C

"(13) That the vertical limits of the White City-Pennsylvanian Gas Pool comprise the Pennsylvanian formation and the horizontal limits comprise the following described lands in Eddy County, New Mexico:

	24 SOUTH, RANGE	26 EAST, NMPM
Sections	8 and 9: All	
Sections	15 through 17:	A11
Sections	19 through 22:	A11
	28 through 30:	A11
Sections	32 through 35:	A11
	25 SOUTH, RANGE	
Sections	1 through 4: A	11
Sections	10 through 12:	A11"

(2) That this order shall be effective <u>nunc pro tunc</u> as of April 7, 1981.

DONE at Santa Fe, New Mexico, on this_____day of April, 1981.

Order No. 7200

(12) That the amendment of the Special Pool Rules for the White City-Pennsylvanian Gas Pool as promulgated by Division Orders Nos. R-2429-A and R-2429-B is in the public interest and will not cause but will prevent waste, and will not impair but will protect correlative rights.

(13) That the vertical limits of the White City-Pennsylvanian Gas Pool comprise the Pennsylvanian formation and the horizontal limits comprise the following described lands in Eddy County. New Mexico:

> TOWNSHIP 24 SOUTH, RANGE 26 EAST, NMPM Sections 8 and 9: All Sections 14 through 17: All Sections 19 through 22: All Sections 28 through 30: All Sections 32 through 35: All

> TDWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM Sections 1 through 4: All Sections 10 through 12: All ¹⁷

(14) That Rule 2 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as rollows:

> "RULE 2. Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located on a standard unit containing 320 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental section."

(15) That Rule 4 of the Special Rules and Regulations for the White City-Pennsylvanian Gas Pool should be amended to read in its entirety as follows:

> "RULE 4. Each well shall be located not closer than 660 feet to the nearest side boundary of the dedicated tract nor closer than 1650 feet to the nearest end boundary nor closer than 330 feet to any quarter-quarter section or subdivision inner boundary."

(16) That the effective date of this order and the provisions hereof should be April 1, 1981.



END OF ROLL

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	ROLL NUMBER
DOCUMENT TYPE	NUM DIL CONSERVATION DIVISION
DATE OF FILMING	OCTOBER 11th 1985
CAMERA OPERATOR	PHIL A. WILDE
ENDING DOCUMENT	Box 18 25/95E# 7208-GULF OIL OPP.
	Box 18 of 25/95E # 7208 - GULF OK (DRP. EDDY COUNTY, NIM (APRIL TH 1981)



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R David SUPERVISOR

STATE OF NEW MEXICO)) COUNTY OF VALENCIA)

and the second second

Sworn and Subscribed to me, A Notary Public,

This 1st day of Alexander, 19 83

SS.

Ageni Grager NOTARY PUBLIC

MY COMMISSION EXPIRES: 10-2-76

CERTIFICATE OF AUTHENICITY

THIS IS TO CERTIFY that the microphotographs appearing on this Roll of Film are accurate and complete reproductions of the records of the, N.M. OIL CONSERVATION DIVISION as delivered in the regular course of business for Micro Filming.

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STATE OF NEW MEXICO)) SS. COUNTY OF VALENCIA)

Chi de l'Aller anna

Sworn and Subscribed to me, A Notary Public,

This 1st day of Alexander, 19 93

BLTC

MY COMMISSION EXPIRES: 10-2-76

CERTIFICATE OF AUTHENICITY

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178 B ROLL NUMBER N MOIL CONSERVATION DIVISION DOCUMENT TYPE OCTOBER 14th 1985 PHIL A. WILDE BOX 18 of 25 / OSE# 7209 - KOCH TNDUSTERES SANJUNI COUNTY (OCTOBER 15T 1981)

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