

CASE 3298: Application of SUNRAY
DX for creation of oil & gas pool
and for special pool rules.

CASE NO.

3298

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

CLASS OF SERVICE
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OIL CONSERVATION COMMITTEE
SANTA FE NMEX=

1966 OCT 10 PM 4 23

Case 3298

I CONCUR WITH FRANKLIN, ASTON AND FAIR IN TEXACO'S
OPINION AS TO THE SEPARATION OF THE GAS FIELD IN T=7S,
R=35E

I CONCUR THAT THE GAS FIELD SHOULD BE DIVIDED INTO
AN "A" AND "B" ZONE AND THAT "B" ZONE SHOULD BE
PRORATED ON A 2000/1 BASIS WITH A 160 ACRE SPACING.
OLEN F FEATHERSTONE II=

THE COMPANY WILL APPRECIATE SUGGESTION FROM ITS PATRONS CONCERNING ITS SERVICE



10/11/66
Hearing

SM
CITIES SERVICE OIL COMPANY

Oil Center Building
Box 300, Tulsa, Oklahoma 74102
Telephone: 918 LU 2-1531

October 5, 1966

MAIN OFFICE 0

Mr. A. L. Porter, Jr.
New Mexico Conservation Division
Box 2088
Santa Fe, New Mexico 87501

'66 OCT 7 PM 1 25

Dear Sir:

Re: Case 3298

It is our understanding that the subject case involves a reduction of gas allowables in the Todd-San Andres Field, Roosevelt County, New Mexico. Although Cities Service Oil Company is not a producer in the Todd-San Andres Field we have a vital interest as the gas processor.

Effective September 1, 1966, Cities Service Oil Company acquired ownership of the Bluit Plant near Milnesand, New Mexico. The economics of this acquisition were based on processing slightly over 3 billion cubic feet of gas annually from the Todd-San Andres Field. We have been advised that the proposed allowable in the Todd-San Andres Field is 8 MMCF per month per well. Such an allowable would reduce the annual volume to about 1.1 billion cubic feet or approximately one-third of our projected volume. The seriousness is further compounded since the producers state that such a volume is below the economic limit of operation and they will be compelled to discontinue operating the Todd-San Andres Field wells.

The Todd-San Andres Field gas presently represents about 25% of the Bluit Plant throughput. We want to emphasize that we have plant capacity dedicated to the Todd-San Andres gas and that there is market demand for the gas. Any substantial reduction in Todd-San Andres Field allowables will severely affect our economic position. We solicit your consideration of these facts.

Very truly yours,

Fred H. Ramseur, Jr.
General Manager
Natural Gas Liquids Department

FHR:dc

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 10/17/66

CASE 3298 (reopened)

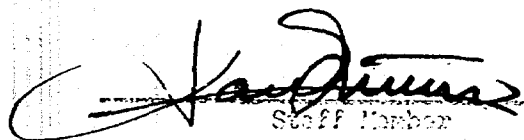
Hearing Date 9am 10/11/66

DSN 1052

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

Enter an order continuing
the effectiveness of Order No
R-1670-6 for the Todd
San Andres Pool indefinitely.

Find that the evidence
presently available indicates
the present formula has
efficiently prevented the
migration of and subsequent
loss of oil into the gas cap
area of the pool.


Staff Member



COLEMAN PETROLEUM ENGINEERING COMPANY

PHONE EXPRESS 3-3313

811 GRIMES

P. O. BOX 1829

HOBBS, NEW MEXICO

ACOUSTICAL WELL SOUNDING RECORD

7A7 No 1

FIELD	TODD SAN ANDRES	DATE	9-29-66
OPERATOR	FRANKLIN ASTON & FAIR, INC.		
LEASE	MARK FEDERAL	WELL	No. 5
TYPE OF TEST	BOTTOM HOLE PRESSURE		
TIME RUN	8:45 AM	SIZE OF TBG	2 3/8"
STATUS OF WELL	SHUT IN	AVG. LENGTH TBG. JTS	30.81'
SHUT IN TIME	72.0 HOURS	BOTTOM OF TBG	4221.43' (137 JTS)
TUBING PRESSURE	PUMP	SIZE OF CASING	5 1/2"
CASING PRESSURE	543# DWT	TOTAL DEPTH OF WELL	-
ELEVATION	4154' GL	LAST TEST DATE	3-28-66
DATUM	(-70) 4224'	BHP LAST TEST	747 BY SONIC
WATER PERCENT	15.0	BHP CHANGE	102# LOSS
DEPTH TO FLUID	4344' TD 4315	DIFF. TOP FLUID TO DATUM	120' BELOW
FLUID GRADIENT	.389 PSI/FT.	JOINTS TO FLUID	141.0
PRESSURE OF FLUID COLUMN	0	PSIG.	
PRESSURE OF GAS COLUMN	102	PSIG.	
CASING PRESSURE	543	PSIG.	
CALCULATED B.H.P. AT DATUM	645	PSIG.	
TEST RUN BY	ALLMAN	CALCULATED BY	COLEMAN
REMARKS:	CHART NO. 1		
SP. G. OIL - .8990, 25.9° API @ 60°F			
SP. G. GAS - .860			

FRANKLIN ASTON & FAIR EX 1
Cc 3298 10/11/66

SUNRAY DX OIL COMPANY
FLUID DATA
FOR
CALCULATING VOLUMETRIC EQUIVALENT
GAS ALLOWABLE
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

<u>Press. Average Reservoir Pressure, Psia</u>	<u>r₂ Solution GOR Ft3/Bbl.</u>	<u>Z Gas Deviation Factor</u>	<u>B_o Oil Reservoir Volume Factor</u>
1533	404	0.789	1.193
1500	398	0.792	1.191
1400	381	0.802	1.186
1300	364	0.813	1.181
1200	347	0.825	1.175
1100	329	0.837	1.169
1000	311	0.850	1.163
900	292	0.863	1.156
800	272	0.878	1.149
700	252	0.892	1.142
600	230	0.907	1.134
500	206	0.923	1.125
400	180	0.938	1.115
300	153	0.953	1.103
200	120	0.970	1.090
100	81	0.985	1.073

EXHIBIT NO. 7
SUNRAY DX OIL COMPANY
DATE 10-11-66

SUNRAY DX OIL COMPANY
RESERVOIR ROCK AND FLUID DATA
OIL ZONE
TODD (SAN ANDRÉS) FIELD
ROOSEVELT COUNTY, NEW MEXICO

<u>ROCK PROPERTIES</u>	<u>PRESSURE BUILDUP</u>	<u>LOG ANALYSIS (1)</u>
Porosity, ϕ		6.3%
Net Pay, ft.		24
Water Saturation, S_w		30.0%
Pore Volume-feet (2)		1.51
Capacity, md-ft. (3)	220	
Average Permeability, md. (3)	8.9	
<u>FLUID DATA</u>		
Formation Volume Factor (4) B_o		1.193
Gas-Liquid Ratio (4) R_{sl}		404 c.f./Bbl.
Viscosity (4) μ_o		2.05
Tank Oil Gravity		24°API

- (1) Average for all 19 Oil Zone completions to September 21, 1966. Footage with less than 4% porosity is excluded.
- (2) (Fraction ϕ) x (Feet of Net Pay)
- (3) Average per well for three wells - Sunray DX Oil Company N. M. State "AY" Nos. 1, 3, and 4.
- (4) P-V-T analysis of subsurface sample from Sunray DX Oil Company N. M. State "AY" #4. Extrapolated to initial reservoir conditions at 1533 Psia and 103°F.

EXHIBIT NO. 8
SUNRAY DX OIL COMPANY
DATE 10-11-66

SUNRAY DX OIL COMPANY
RESERVOIR ROCK and FLUID DATA
GAS CAP
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

ROCK PROPERTIES

Porosity, ϕ
Net Pay, ft.
Water Saturation, S_w
Pore Volume-Feet (2)

LOG ANALYSIS (1)

5.5
29
30.0%
1.59

FLUID DATA

Gas Gravity (Air = 1.0) (3)
Deviation from Boyles' Law, Z (3)
Formation Volume Factor (3),
Res.Bbls./Mcf = B_g
Gas-Liquid Ratio

0.795
0.789
1.46
Dry

*Gas cap
zone + H zone
Gas zone
13 Gas
comp*

- (1) Average for all 13 gas cap completions to September 21, 1966. Footage with less than 4% porosity excluded. Gas productive footage overlying oil column is not included in averages.
- (2) (Fraction ϕ) x (Feet of Net Pay)
- (3) Sample analysis of surface sample from Franklin, Aston & Fair Mark Federal No. 2. Extrapolated to initial reservoir conditions at 1533 Psia and 103°F.

EXHIBIT NO. 9
SUNRAY OIL COMPANY
DATE 10-11-66

SUNRAY OIL COMPANY
SUBSURFACE PRESSURE DATA
PSIG @ -70'
GAS CAP
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	November 1963	September 1964	March 1965	July 26, 1965	March 1966	September 1966
Atlantic Richfield Co. State "BA" #1					978 (72)	918 (72)
Olen F. Featherstone Federal H-27 #1 M-23 #1 M-24 #2					891 (75) 848 (75) 832 (76)	791 (24) 752 (24) 721 (24)
Franklin, Aston & Fair Cunningham Fed. #3 Mark Fed. #1 #2		1,255			857 (73) 879 (72) 848 (73)	751 876 728
McClellan Fed. #1 Nix Yates Fed. #1 Texaco Fed. #1	1,449	1,392			906 (73) 664 (74) 823 (73)	765 619 763
Jack McClellan Federal 22 #1					711 (72)	695 (72)
Skelly Oil Co. Hobbs "S" #1 Hobbs "V" #1			1,442		1,378 (49d) 1,341 (49d)	1,426 (72) 1,150 (72)
Average	1,449	1,392	1,255	1,442	920	843
Average Total Field (Shut in time, hours)					881	807

EXHIBIT NO. 10-11-60
 SUNRAY OIL COMPANY
 DALLAS

SUNRAY DX OIL COMPANY
SUBSURFACE PRESSURE DATA
PSIG @ - 70'

OIL ZONE
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	February 12, 1965	July 9, 1965	July 31, 1965	March 1966	September 1966
Franklin, Aston & Fair					
Mark Federal				393 (72)	355
#4				747 (72)	645
#5				698 (74)	787
#6					834
#7					490
Livaudais					
#1					
A. C. Holder					
State "Bc"	#1			(S)	990 (74)
Skelly Oil Company					
Hobbs "R"	#1			(S)	721 (72)
#2				(S)	505 (72)
				(S)	707 (72)
				(S)	441 (72)
Sunray EX Oil Company					
N. M. State "AY"	#1	1,238		(S)	927 (168)
#2			1,141 (71)	(S)	571 (72)
#3		1,311 (31)		(S)	1,161 (841)
#4		1,234 (30)		(S)	1,009 (143)
#5		1,335 (29)		(S)	1,460 (72)
#6		1,223 (31)		(S)	984 (72)
				(S)	939 (72)
Texaco, Inc.					
N. M. State "CT"	#1				868 (102)
#2					1,144 (127)
#3					1,103 (101)
#4					702 (100)
Average	1,238	1,276	1,141	834	782
Reservoir Temperature - 103°F					
(Shut-in time, hours)					
(S) - Sonic					

SUNRAY OIL COMPANY
DATE 10-11-66

SUNRAY DX OIL COMPANY
 PRODUCTION HISTORY - 1965
 OIL ZONE OIL, BARRELS
 TODD (SAN ANDRES) FIELD
 ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	August	September	October	November	December	Total
Franklin, Aston & Fair													
Mark Federal #4							505	486	106	251	428	729	2,505
#5										265	351	561	1,177
A. C. Holder													
State "BC" #1								70	329	168	388	395	1,350
Skelly Oil Co.													
Hobbs "R" #1					1,198	1,335	1,253	998	964	950	751	751	8,200
#2						90	581	322	401	374	451	451	2,670
Sunray DX Oil Company													
N.M. State "AY" #1	493	788	1,200	1,303	1,162	1,025	1,094	1,138	1,087	1,060	1,642	2,061	14,053
#2			581	1,250	1,161	1,024	1,094	1,138	1,087	1,060	1,642	2,061	12,098
#3			574	1,302	1,161	1,024	1,094	1,138	1,087	1,060	1,643	2,061	12,144
#4				228	1,161	1,024	1,094	1,138	1,087	1,060	1,643	2,061	10,496
#5					792	1,024	1,094	1,137	1,087	1,060	1,643	2,061	9,898
#6						1,000	1,094	1,137	1,086	1,061	1,644	2,060	9,082
Texasco, Inc.													
N.M. State "CT" #1						11	55	12	109	520	355	369	1,371
Total	493	788	2,355	4,083	6,635	7,557	8,958	8,714	8,430	8,889	12,581	15,561	85,044
Cumulative		1,281	3,636	7,719	14,354	21,911	30,869	39,583	48,013	56,902	69,483	85,044	

14
 10-11-66
 DATE
 SIGNATURE
 TITLE

SUNRAY DX OIL COMPANY
PRODUCTION HISTORY - 1966
OIL ZONE OIL, BARRELS
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	Total
<u>Franklin, Aston & Fair</u>								
Mark Federal #4	571	814	184	378	387	406	273	3,013
#5	307	365	237	486	498	452	302	2,647
#6		1,358	1,158	2,379	2,433	2,033	1,363	10,724
#7							1,363	1,363
M. Livardais #1					1,762	1,554	1,924	5,240
<u>A. C. Holder</u>								
State "BC" #1	359	335	383	350	324	306	259	2,316
<u>Skelly Oil Company</u>								
Hobbs "R" #1	776	848	749	821	866	775	815	5,650
#2	403	227	339	231	244	218	230	1,893
<u>Sunray DX Oil Company</u>								
N. M. State "AY" #1	2,682	2,682	415	1,371	2,276	2,069	1,920	13,416
#2	651	651	452	251	273	254	272	2,812
#3	2,682	2,682	1,626	1,371	2,275	1,223	1,920	13,781
#4	2,682	2,682	2,149	1,371	2,275	2,069	1,920	15,150
#5	2,682	2,682	835	1,371	2,275	1,317	1,460	12,624
#6	2,681	2,681	1,423	1,371	2,275	1,386	1,920	13,739
<u>Texaco, Inc.</u>								
N. M. State "CT" #1	392	313	381	314	286	267	271	2,224
#2					1,852	1,578	1,596	5,026
#3						240	1,624	1,864
Total	16,868	18,320	10,331	12,063	20,301	16,147	19,432	113,482
Cumulative	100,562	118,882	129,213	141,296	161,597	177,744	197,176	

SUNRAY OIL COMPANY
PRODUCTION-HISTORY - 1965
OIL ZONE GAS, Mcf
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	August	September	October	November	December	Total
Franklin, Aston & Fair													
Mark Federal #4													
#5													
A. C. Holder (Formerly Atlantic)													
State "Bc" #1													
Skeity-Oil-Company													
Hobbs "R" #1					1,061	1,183	3,110	884	854	862	665	665	7,264
#2						65	422	234	292	272	328	328	1,941
Sunray Oil Company													
N. M. State "AY" #1	986	1,576	2,400	2,606	2,322	2,050	740	770	736	715	2,466	2,062	19,429
#2			552	1,187	1,103	974	378	393	375	365	2,466	2,062	9,855
#3			1,030	2,457	2,191	1,934	2,210	2,298	2,195	2,134	2,467	2,062	20,978
#4				171	871	769	862	896	856	832	2,467	2,062	9,786
#5					1,263	1,635	1,215	1,263	1,207	1,173	2,467	2,062	12,285
#6						795	1,588	1,651	1,577	1,533	2,467	2,060	11,671
Texasco, Inc.													
N. M. State "Ct" #1						474	--	193	292	605	253	168	1,985
Total	986	1,576	3,982	6,421	8,811	9,879	8,525	8,582	9,865	9,227	17,792	15,309	100,955
Cumulative	986	2,562	6,544	12,965	21,776	31,655	40,180	48,762	58,627	67,854	85,646	100,955	

SUNRAY DX OIL COMPANY
PRODUCTION HISTORY - 1966
OIL ZONE GAS, Mcf
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	Total
<u>Franklin, Aston & Fair</u>								
Mark Federal #4	--	--	156	322	289	303	203	1,273
#5	--	--	2,106	4,319	4,135	3,753	3,581	17,894
#6			2,135	4,113	1,041	870	1,610	9,769
#7							1,168	1,168
M. Livavdals #1					724	638	785	2,147
<u>A. C. Holder</u>								
State "BC" #1	359	350	600	600	600	612	400	3,521
<u>Skelly Oil Company</u>								
Hobbs "R" #1	423	462	408	333	352	315	280	2,573
#2	349	197	294	205	217	194	201	1,658
<u>Sunray DX Oil Company</u>								
N. M. State "AY" #1	2,342	1,655	105	930	1,800	1,800	2,800	11,432
#2	2,342	1,655	1,100	305	650	650	1,600	8,302
#3	2,342	1,654	2,300	2,101	4,260	2,222	3,250	18,129
#4	2,342	1,651	2,010	1,975	3,191	3,191	3,500	17,860
#5	2,342	1,654	725	955	1,405	1,405	2,100	10,586
#6	2,344	1,654	300	722	1,038	1,038	1,523	8,619
<u>Texaco, Inc.</u>								
N. M. State "CT" #1	259	328	89	114	--	--	--	790
#2						17	52	69
#3						67	84	151
Total	15,444	11,260	12,328	16,995	19,702	17,075	23,137	115,941
Cumulative	116,399	127,659	139,987	156,982	176,684	193,759	216,896	

SUNRAY DX OIL COMPANY
PRODUCTION HISTORY - 1965
OIL ZONE WATER, BAREILS
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	August	September	October	November	December	Total
Franklin, Aston & Fair													
Mark Federal #4							68	124	--	--	90	93	375
#5										80	174	186	440
A. C. Holder													
State "BC" #1								18	82	72	97	70	339
Skelly Oil Company													
Hobbs "R" #1					48	53	50	40	39	38	30	40	338
#2						4	70	39	48	45	54	53	313
Sunray Dx Oil Company													
N. M. State "AY" #1			150	--	75	75	75	73	78	100	12	--	12
#2											150	1,600	2,381
#3											16	--	16
#4											4	--	4
#5											6	--	6
#6											3	--	3
Texasco, Inc.													
N. M. State "CT" #1										58	35	31	124
Total			150	--	123	132	263	299	247	393	671	2,073	4,351
Cumulative			150	150	273	405	668	967	1,214	1,607	2,278	4,351	4,351

SUNRAY DX OIL COMPANY
PRODUCTION HISTORY - 1966
OIL ZONE WATER, BARRELS
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	Total
<u>Franklin, Aston & Fair</u>								
Mark Federal #4	55	56	56	60	62	60	62	411
#5	29	84	84	90	93	90	62	532
#6		--	--	--	--	--	--	--
#7								
M. Llavdats #1					75	90	62	227
<u>A. C. Holder</u>								
State "BC" #1	33	35	38	35	35	60	60	296
<u>Skelly Oil Company</u>								
Hobbs "R" #1	93	103	91	77	81	73	77	595
#2	52	30	44	52	54	48	29	309
<u>Sunray DX Oil Company</u>								
N. M. State "AY" #1	20	20	25	30	35	40	40	210
#2	1,600	1,400	1,500	1,600	1,680	1,700	1,800	11,280
#3	15	12	14	18	30	35	35	159
#4	12	10	15	20	25	30	35	147
#5	11	9	10	12	35	37	35	149
#6	10	8	11	14	36	20	25	124
<u>Texaco, Inc.</u>								
N. M. State "CT" #1	44	46	57	47	43	40	40	317
#2					--	--	--	--
#3								--
<u>Total</u>	1,974	1,813	1,945	2,055	2,284	2,323	2,362	14,756
<u>Cumulative</u>	6,325	8,138	10,083	12,138	14,422	16,745	19,107	

SUNRAY OIL COMPANY
PRODUCTION HISTORY - 1961 and 1965
GAS CAP GAS, NC:
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	August	September	October	November	December	Total
Franklin, Aston & Fair					1 9 6 4								
Mark Federal #1				350	27,805	39,516	43,411	58,349	48,274	20,602	71,149	62,199	371,675
McClellan Federal #1					6,994	18,625	16,815	17,500	21,392	26,926	42,826	43,421	134,565
Nix Yates Federal #1				277	21,363	31,867	34,119	44,930	16,687	9,924	14,255	12,833	113,663
Texaco Federal #1				78	20,484	30,685	31,415	34,178	27,078	14,279	35,961	28,371	234,279
Total				705	76,646	120,693	125,900	155,557	150,149	85,690	192,576	169,445	1,077,361
Cumulative					77,351	198,044	323,914	479,501	629,650	715,340	907,916	1,077,361	
Atlantic Richfield Co.					1 9 6 5								
State "BA" #1	164		9,515	13,076	13,097	--	12,553	12,386	10,627	11,216	10,763	12,146	105,963
Olen F. Featherstone													
Federal H-27 #1	47,903		73,741	50,494	28,974	55,917	40,296	45,644	53,311	42,586	41,704	32,019	512,629
M-23 #1								87	330	910	1,256	1,615	4,198
M-24 #2								1,445	3,227	3,591	3,798	4,434	16,495
Franklin, Aston & Fair													
Cunningham Federal #3	70,924	41,978	30,809	39,127	49,259	53,298	41,496	51,050	50,097	46,380	40,084	--	401,590
Mark Federal #1	46,466	38,601	42,230	18,981	40,598	43,077	29,552	46,832	31,220	39,578	32,545	46,375	523,535
McClellan Federal #1	13,652	10,370	12,195	13,069	32,173	33,955	27,124	27,861	26,142	27,737	22,350	25,115	369,545
Nix Yates Federal #1	27,104	24,640	23,538	30,444	9,403	7,883	8,452	8,392	7,456	6,910	5,470	6,411	109,663
Texaco Federal #1	35,519	24,889	30,702	28,220	21,160	25,715	28,109	25,287	22,423	22,021	17,121	18,658	290,120
Jack McClellan Federal "22" #1					19,613	24,695	26,118	23,496	22,240	21,474	17,672	24,095	299,333
Skelly Oil Company													
Hobbs "S" #1													
Hobbs "V" #1													
Total	193,665	140,478	204,152	171,019	172,206	188,623	162,141	185,267	162,622	168,925	139,848	124,381	2,013,327
Cumulative	1,271,026	1,411,504	1,615,656	1,786,675	1,958,881	2,147,504	2,309,645	2,494,912	2,657,534	2,826,459	2,966,307	3,090,688	

SUNRAY DX OIL COMPANY
PRODUCTION HISTORY - 1966
GAS CAP GAS, MCF
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Operator & Well	January	February	March	April	May	June	July	Total
Atlantic Richfield Co. State "BA" #1	10,327	8,906	10,106	7,699	6,874	8,343	10,550	62,805
Olen F. Featherstone Federal H-27 #1	16,746	14,369	15,239	15,629	17,992	21,211	22,156	123,342
M-23 #1	1,510	1,491	1,409	1,784	1,884	1,949	1,788	11,815
M-24 #2	3,296	3,278	3,759	3,323	3,304	2,252	2,353	21,565
Franklin, Aston & Fair Cunningham Fed. #3	23,413	15,540	14,575	21,693	19,373	14,456	22,881	131,931
Mark Fed. #1	22,627	11,432	10,432	17,784	17,552	18,745	20,284	118,856
McClellan Fed. #2	16,689	9,752	13,757	21,719	18,646	12,939	17,911	111,413
Nix-Yates Fed. #1	5,801	5,056	5,939	2,611	4,478	6,147	6,073	36,105
Texaco Fed. #1	18,108	16,308	15,275	16,214	15,218	13,523	14,190	108,836
	22,461	20,003	19,426	21,613	20,795	18,879	20,607	143,784
Jack McClellan Federal 22 #1	5,868	5,014	3,188	3,400	4,736	3,825	3,875	29,906
Skelly Oil Co. Hobbs "S" #1	--	--	--	--	4,417	1,379	8,408	14,204
Hobbs "V" #1	--	--	--	--	9,236	8,102	--	17,338
Total	146,846	111,149	113,105	133,469	144,505	131,750	151,076	931,900
Cumulative	3,237,534	3,348,683	3,461,788	3,595,257	3,739,762	3,871,512	4,022,588	

SUNRAY DX OIL COMPANY
 PRODUCTION HISTORY - 1964-1965-1966
 GAS CAP OIL AND WATER - PRODUCTION, BARRELS
 TODD (SAN ANDRES) FIELD
 ROOSEVELT COUNTY, NEW MEXICO

Atlantic State "BA"

	OIL		WATER	
	1964	1965	1964	1965
January				362
February				318
March				290
April				252
May				297
June				40
July				129
August				
September				
October				
November				
December				
TOTAL	1,096	2,233	1,193	1,688
Cumulative	1,096	3,329	1,648	3,336

January	241
February	212
March	193
April	168
May	182
June	34
July	110
August	471
September	251
October	125
November	152
December	269

January	486
February	654
March	55
April	
May	
June	
July	
August	
September	
October	
November	
December	

January	186
February	269
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER



P. O. BOX 2088
SANTA FE

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

MEMORANDUM

TO: THE COMMISSION
FROM: EXAMINER DANIEL S. NUTTER
SUBJECT: CASE NO. 3298

The subject case is the application of Sunray-DX Oil Company for creation of a pool and the establishment of special rules, including the definition of oil wells and gas wells and the assignment of volumetric allowables to the gas wells.

The history of the pool is brief: It was discovered as a gas pool in October, 1963. Oil was discovered in January of 1965. To date 13 gas wells have been drilled and 9 oil wells. Production is from two zones of the San Andres formation separated by an impervious layer of anhydrite. The "H" zone, or upper zone, appears to be productive of gas only, but the "J" zone, or lower zone, appears to be productive of oil and gas, depending upon structural position.

It is the contention of Sunray (which owns six oil wells and no gas wells) that high rates of withdrawals from the gas wells completed in the "J" zone have caused migration of oil into the dry gas-cap sand, thereby resulting in 30,000 barrels of oil already having been wasted.

Sunray's opponents, Franklin, Aston & Fair (who own six gas wells and one oil well) contend that there is probably some kind of permeability barrier separating the oil wells and the gas wells and point to certain inconsistencies in well characteristics to bear out this claim. Sunray explains the inconsistencies as being "anomalies." The Examiner believes that the oil wells and the gas wells are in communication with each other.

-2-

Memorandum to the Commission
October 8, 1965

Sunray urges immediate action to limit takes from the gas wells to prevent further waste of oil in wetting the gas sands. Franklin, Aston & Fair believe that an additional period of at least six months will be necessary before adequate information is available.

The main effect of adopting Sunray's proposed rules will be the reduction of gas takes of from 50 to 66 per cent. At the current rate of withdrawal from the oil reservoir, the equivalent volume which could be produced from the gas cap (assuming that it is in contact with the oil rim) would be approximately 523,000 cubic feet of gas per day. Past withdrawals from the better wells have been from less than one million to more than two million cubic feet of gas per day. The average has been approximately one million. The financial loss to the gas well operators in having their production deferred to a later date is regrettable. However, the same situation occurred in the Devils Fork Gallup Oil Pool in Rio Arriba County in 1960, and although the gas well operators suffered severe temporary loss of income, the development and depletion of the pool has progressed very orderly and with practically no migration of oil up-structure.

In the interest of conservation and the protection of correlative rights, the Examiner believes that Sunray's application for continuation of 320-acre gas units, establishment of 80-acre oil proration units, and the adoption of the volumetric formula for gas well proration should be adopted.

DANIEL S. NUTTER
Examiner

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF
SUNRAY DX OIL COMPANY FOR AN ORDER
ESTABLISHING THE CREATION OF THE
TODD SAN ANDRES OIL AND GAS POOL
AND FOR SPECIAL TEMPORARY POOL RULES,
INCLUDING UNIFORM PRORATION UNITS FOR
THE FURTHER DEVELOPMENT OF THE SAN
ANDRES FORMATION UNDERLYING SECTIONS
22, 23, 24, 25, 26, 27, 28, 34, 35
AND 36, TOWNSHIP 7 SOUTH, RANGE 35
EAST, AND SECTIONS 30 AND 31 OF TOWN-
SHIP 7 SOUTH, RANGE 36 EAST, ROOSEVELT
COUNTY, NEW MEXICO.

MAIN OFFICE
'65 JUL 29 PM 1:00
ORDER NO. 3298

A P P L I C A T I O N

TO THE HONORABLE OIL CONSERVATION COMMISSION OF THE STATE OF NEW
MEXICO

COMES NOW, Sunray DX Oil Company, and respectfully states
and alleges as follows:

1. It is the owner and operator of certain oil and gas
leases within the above described area located in Roosevelt County,
New Mexico.
2. Applicant has drilled and completed its New Mexico
AY Wells No. 1 through No. 6 in Section 36, Township 7 South,
Range 35 East. The San Andres Formation was encountered at a depth
of approximately 3,500 feet below the surface of the ground and is
productive of oil and gas in commercial quantities.
3. Applicant believes the San Andres Formation underlies
all or a major portion of the above described area.
4. In the interest of preventing waste of oil, the
elimination of unnecessary wells, the recovery of the greatest
amount of oil and the protection of correlative rights, the vertical
and horizontal limits of the pool should be defined and designated
and temporary special pool rules established, including a provision
for 80-acre oil proration units.
5. Applicant requests that an administrative procedure
be established whereby the operators in the pool will be permitted
to conduct interference tests and to transfer allowables among pro-
ducing wells on the same lease during the temporary one-year period
in order to facilitate the gathering of information pertaining to
reservoir characteristics.
6. Applicant requests that the rules include a provision
for the limiting of withdrawals from gas cap wells to the volumetric
equivalent of wells in the oil portion of the reservoir.
7. Attached hereto is a list of names and addresses of
all principal lessees or operators known to applicant to be
interested in this application and the hearing thereon.

DOCKET MAILED

Date 8/12/65
H

8. This application may be set for hearing before an examiner, if it is so desired.

WHEREFORE, Applicant prays that this application be set for hearing, that notice thereof be given according to law and that upon the hearing of this application an order be entered establishing this unnamed San Andres Pool and temporary special pool rules, including 80-acre proration units for the development and production of oil from the San Andres Formation, common source of supply, and for such other and further relief as the Commission may deem proper in the premises.

DATED at Santa Fe, N. M., this 29th day of July, 1965.

SUNRAY OX OIL COMPANY

By

William R. Loar
William R. Loar

By

R. C. Spurlock
R. C. Spurlock

GILBERT, WHITE & GILBERT

By

Leah White

LIST OF INTERESTED LESSEES OR OPERATORS

SHELL OIL COMPANY
Post Office Box 1509
Midland, Texas

TEXACO, INC.
Post Office Box 3109
Midland, Texas

FRANKLIN, ASTON & FAIR, INC.
Post Office Box 1090
Roswell, New Mexico

FEATHERSTONE TRUST

SKELLY OIL COMPANY
Post Office Box 730
Hobbs, New Mexico

J. L. McCLELLAN

ATLANTIC REFINING COMPANY
Post Office Box 1978
Roswell, New Mexico

AUGUST 25, 1965 EXAMINER HEARING

CASE 3299: Application of Sinclair Oil & Gas Company for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an amendment to Order No. R-2268-A which authorized the expansion of applicant's Keel-West Waterflood Project, Township 17 South, Range 31 East, Grayburg Jackson Pool, Eddy County, New Mexico, in four stages; applicant seeks said amendment to permit the commencement of Stage IV prior to the completion of Stage III.

CASE 3269 (Continued from the June 30th Examiner Hearing):

Application of Shell Oil Company for an amendment to Order R-2182, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an amendment to the special pool rules for the Henshaw-Wolfcamp Pool, Eddy County, New Mexico, as promulgated by Order R-2182 and Order R-2182-B, to include a provision for a gas-oil ratio limitation of 6,000 to 1.

CASE 3271 (Continued from the June 30th Examiner Hearing):

Application of Shar-Alan Oil Company for the creation of a new pool, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a Gallup-Mesaverde Gas Pool for its Rosa Unit Well No. 49 located in Unit M of Section 27, Township 31 North, Range 4 West, Rio Arriba County, New Mexico, which well is perforated in the Gallup formation from 6895 feet to 7025 feet, and the Mesaverde formation from 6115 feet to 6275 feet.

Docket No. 24-65

DOCKET: EXAMINER HEARING - WEDNESDAY - AUGUST 25, 1965

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

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

CASE 3294: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Harold J. Sechler, dba S. & S. Oil Producers, and all other interested parties to show cause why the Bond Well No. 1 located in the SW/4 NE/4 of Section 17, Township 9 North, Range 14 West, Valencia County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program.

CASE 3295: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit W. C. Powers and J. E. Marshall, dba Powers Marshall Company, and all other interested parties to show cause why the W. Perry Smith Well No. 1 located in the NW/4 SE/4 of Section 34, Township 21 South, Range 30 East, Harding County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program.

CASE 3296: Application of Pan American Petroleum Corporation for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in its Horton Well No. 31 located in Unit M of Section 29, Township 8 South, Range 35 East, Milnesand-San Andres Pool, Roosevelt County, New Mexico.

CASE 3297: Application of Southland Royalty Company for a dual completion and salt water disposal authority, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion of its J. D. Guye Well No. 5 located in Unit N of Section 12, Township 11 South, Range 33 East, Lea County, New Mexico, to produce oil from the Inbe-Pennsylvanian Pool through 2 7/8 inch tubing set in 5 1/2 inch casing and to dispose of produced salt water into the San Andres formation through the intermediate casing annulus.

CASE 3298: Application of Sunray DX Oil Company for the creation of an oil and gas pool and for special pool rules, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks the creation of the Todd-San Andres Oil and Gas Pool in Sections 22 through 28 and Sections 34 through 36, Township 7 South, Range 35 East, and Sections 30 and 31, Township 7 South, Range 36 East, Roosevelt County, New Mexico. Applicant further seeks the promulgation of temporary special pool rules, including a provision for 80-acre oil proration units and 320-acre gas proration units; applicant also requests a provision for limiting withdrawals from gas cap wells to the volumetric equivalent of wells in the oil portion of the reservoir. Applicant further requests an administrative procedure to permit the transfer of allowables among wells on the same lease while conducting pressure interference tests.

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination.

WESTERN UNION TELEGRAM

SYMBOLS	
DL	Day Letter
NL	Night Letter
CT	International Letter Telegram

1201 (4-00)

LA167 SSA448

1965 AUG 24 PM 6 19

L RWA068 NL PD=ROSWELL NMEX 24
NMEX OIL CONSERVATION COMMISSION=
SANTA FE NMEX=

MAIN OFFICE 0.0

65 AUG 25 AM

AS WORKING INTEREST OWNER IN CASE 3298 IN TODD SAN
ANDRES FIELD ROOSEVELT COUNTY THE ENGINEERING DATA
AVAILABLE AT THIS TIME DOES NOT ALLOW AN ADEQUATE
EVALUATION OF OIL AND GAS FIELDS RECOMMEND THAT
COMMISSION WITHHOLD ANY ACTION UNTIL MORE INFORMATION
IS AVAILABLE=
CHAS B READ=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
This is a fast message
unless its deferred char-
acter is indicated by the
proper symbol.

WESTERN UNION

TELEGRAM (25).

W. P. MARSHALL, PRESIDENT

1220
(R11-54)

SYMBOLS
DL=Day Letter
NL=Night Letter
LT=International
Letter Telegram

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

LA059 DA181

1965 AUG 25 AM 9 51

D MDAO39 LONG PD 2 EXTRA=FAX MIDLAND TEX 25 1020A CST=
OIL CONSERVATION COMMISSION=

STATE LAND OFFICE BLDG SANTA FE NMEX=

ATTN: MR. A. L. PORTER=

RE CASE 3298 TEXACO BELIEVES TODD-SAN ANDRES IS TWO
SEPARATE RESERVOIRS SEPARATED BY AN IMPERVIOUS ANHYDRITE
SECTION INTO A GAS RESERVOIR ABOVE AND OIL RESERVOIR BELOW.
INSUFFICIENT PRODUCTION AND RESERVOIR DATA PRECLUDES
DEFINITE PROOF AT THIS TIME. CLASSIFYING THIS AS ONE LARGE
GAS RESERVOIR IS NOT SUBSTANTIATED BY AVAILABLE PRODUCTION
HISTORY AND WOULD TEND TO LIMIT THE DEVELOPMENT IN THE
FIELD. HOWEVER, TEXACO DOES NOT CONCUR WITH THE APPLICANT'S
POSITION THAT THIS IS AN OIL RESERVOIR WITH A GAS CAP.
RECOMMEND THAT DOCKET BE LEFT OPEN FOR HEARING WHEN
PERTINENT DATA BECOMES AVAILABLE=

TEXACO INC J H MARKLEY DIVISION MANAGER=

=3298=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Order No R-1670-next.

Date 10/11/65

CASE NO. B298

HEARING DATE 9 am 8/25/65
DSN @ SF

My recommendations for an order in the above numbered case(s) are as follows:

Enter an order redesignating the Todd-Dan
Andres Gas Pool, as the Todd Dan Andres
Pool and redefine the horizontal limits as follows:

Township 7 South Range 35 East

Secs. 22 & 23: All

Sec 24: 1/2

Secs 25 through 28: All

Secs 34 through 36: All

Township 7 South Range 36 East

Sec 31: 1/2

~~But that the~~

Write piece as continued on ~~attached~~
yellow sheets.


Staff Member

Rules for Todd San Andres

- ✓ R- 1. Same as Rule 1 of Devils Fork P109
- ✓ R 2(A) Same SDX proposed Rule 4
- ✓ 2(B) Same SDX proposed Rule 5
- ✓ R 3 Same as Rule 5 of Todd San Andres (P183)
- ✓ R 4(A) Same as SDX proposed Rule 2(a)
- ✓ 4(B) Same as Devils Fork Rule 4 b: (P110)
- ✓ R 5A Same as SDX proposed Rule 2(a)
- ✓ 5B Same as Devils Fork Rule 5 B (P110)
- ✓ R 6A Rule Rules Applicable (See vol. # 1670, 251)
- ✓ 6B " " "
- ✓ 7A " " "
- ✓ 7B " " "
- ✓ R 8 Same as SDX proposed Rule 7 (Blank in 2nd para should be November 1965, Blank in 2nd para of (a) should be Hobbs Dist Ofc.
- R 9 Same as SDX 8 a b c d
- ✓ R 10 A Rule Rules Applicable
- ✓ 10B " " "
- ✓ R 11 " " "
- R 12 Same as SDX Rule 9
- ✓ R 13 " " " Rule 10 Jan 1 1966 to July 1 1966
Jan 1 and July 1
Jan 1 and July 1
- Rule 14A Rule Rules Applicable
- 14B Rule Rules Applicable
- ✓ R 15A Same as Rule 15A except three times its current allowance rather than six times
- ✓ 15B ~~Same as Rule 15A~~ Rule Rules Applicable
- ✓ 15C Rule Rules Applicable
- ✓ R 16A " " "
- ✓ 16B " " "
- ✓ R 17 " " "
- ✓ 18 " " "
- ✓ 19 " " "
- ✓ 20 " " "

R 21A Real Power Application
 21B " " "
 21C " " "
 21D " " "
 R 22 Same as SDX proposed Rule 13
 R 23 Real Power Application
 R 24 " " "
 R 25 Same as SDX proposed Rule 15
 R 26 Same " " " " 16
 R 27 " " " " " 17
 R 28 " " " " " 18
 except BHP should be taken during
 March and September of each yr.
 R 29 Same as SDX proposed Rule 19
 R 30 " " " " " 20
 R 31 " " " " " 21

His further Ordered

same as SDX p 14 15 & 16 except:
 p 14 { 1st para: well lot regiments of Rules CA & CB
 1st blank Hobbs
 2nd blank Dec 1 1965
 p 15 blank @ bottom - Oct 1 1966

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO

November 3, 1965

C
O
P
Y

Capitan, Inc.
P. O. Box 19598
Dallas, Texas 75219

Gentlemen:

Your attention, as a gas purchaser in the Todd-San Andres Pool, Roosevelt County, New Mexico, is called to Commission Order No. R-1670-G, entered October 29, 1965, in Case No. 3298, which was heard by the Commission's Examiner August 25, 1965.

This order finds that wells in the Todd-San Andres Pool are producing from an associated oil and gas reservoir, and that to prevent waste, withdrawals of gas from the gas cap should be limited. The Order further provides that effective December 1, 1965, the gas wells in said pool will be prorated, their allowable being based upon gas purchasers' nominations which will, however, be subject to adjustment in order to relate takes from the gas cap to the volumetric equivalent of takes of oil and gas from the oil zone of the pool.

First nominations for gas from the pool will be considered at the November 17, 1965, hearing of the Commission. We will appreciate receiving your nomination for the purchase of gas from the Todd-San Andres Pool during December, 1965, and for each month from January, 1966, through June, 1966, as soon as possible. A supply of Form C-121-A, Purchaser's Gas Nomination, is enclosed for your convenience.

Very truly yours,

Daniel S. Nutter
Chief Engineer

DSN:sg

cc: Oil Conservation Commission - Hobbs
Case File 3298

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

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

P. O. BOX 2088
SANTA FE

October 29, 1965

Mr. Charles White
White, Gilbert, Koch & Kelly
Attorneys at Law
Post Office Box 787
Santa Fe, New Mexico

Re: Case No. 3298
Order No. R-1670-G
Applicant:

SUNRAY DX OIL COMPANY

Dear Sir:

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

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC

Other Mr. Bill Loar, Mr. George Selinger and Mr. Jim Jennings
Copy sent to Supreme Court Law Library

DOCKET MAILED

Date 9-30-66
[Signature]

DOCKET: EXAMINER HEARING - TUESDAY - OCTOBER 11, 1966

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

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

CASE 3439: (Continued from the September 7, 1966 examiner hearing)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Scanlon and Shepard and all other interested parties to show cause why the following Scanlon and Shepard wells in Township 20 North, Range 9 West, McKinley County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program: Santa Fe Pacific Railroad Lease: Wells Nos. 1, 3, 4, 5, 7, and 8, all in Unit P, No. 10 in Unit H, and No. 2 in Unit L, all in Section 21; Well No. 6 in Unit L and Nos. 9 and 12 in Unit M of Section 22 and Nos. 11 and 13 in Unit D of Section 27. Ray Well No. 1 in Unit C, State Wells Nos. 1 and 2 in Unit A, and State K-1883 No. 1 in Unit B, all in Section 28.

CASE 3440: (Continued from the September 7, 1966 examiner hearing)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Osborn & Weir, and all interested parties, to show cause why the following Osborn & Weir wells in Township 20 North, Range 9 West, McKinley County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program: Scanlon Well No. 17 in Unit P of Section 21 and Nos. 14 and 18 in Unit M of Section 22, Scanlon Ray Wells No. 5 in Unit A and No. 6 in Unit C of Section 28.

CASE 3441: (Continued from the September 7, 1966 examiner hearing)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit LaMar Trucking, Inc., and all interested parties, to show cause why their State Well No. 1 located 495 feet from the North and West lines of Section 28, Township 20 North, Range 9 West, McKinley County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program.

CASE 3471: Application of Chambers & Kennedy for an exception to Rule 301(b), Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the provisions of Rule 301(b) of the Commission rules and regulations which provides for the cancellation of allowables for wells with delinquent Forms C-116. Applicant seeks reinstatement of eleven days' allowable to its Delhi-Taylor State Well No. 2 in Unit O of Section 34, and its Abo Well No. 1 located in Unit N of Section 27, Township 17 South, Range 28 East, Empire-Abo Pool, Eddy County, New Mexico.

CASE 3472: Application of Monsanto Company for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the Shoe-Bar Pennsylvanian Oil Pool, Lea County, New Mexico, including a provision for 80-acre proration units.

CASE 3473: Application of Len Mayer for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the NE/4 SE/4 of Section 1, Township 8 South, Range 30 East, Chaves County, New Mexico.

CASE 3474: Application of Tenneco Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute the waterflood project by the injection of water into the Premier zone of the Grayburg formation through four wells located in Sections 18 and 19, Township 16 South, Range 30 East, West Henshaw-Grayburg Pool, Eddy County, New Mexico.

CASE 3298 (Reopened)

In the matter of Case 3298 being reopened pursuant to the provisions of Order No. R-1670-G to permit all operators in the Todd-San Andres Pool, Roosevelt County, New Mexico, to appear and present all available information concerning the effectiveness of the temporary special rules promulgated by Order No. R-1670-G for said pool, particularly as they relate to the effectiveness of the volumetric formula established for limiting withdrawals or gas from the gas-cap area of said pool, and to the area which can be economically and efficiently drained by one well.

CASE 3475: Application of Marathon Oil Company for an unorthodox location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its Indian Hills Unit Well No. 6 "Comm" at an unorthodox location 1440 feet from the South and East lines of Section 17, Township 21 South, Range 24 East, Indian Basin-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico.

ir/

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

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

October 19, 1966

Mr. Booker Kelly
White, Gilbert, Koch & Kelly
Attorneys at Law
Post Office Box 787
Santa Fe, New Mexico

Re: Case No. 3298
Order No. B-1670-G-1
Applicant:

Sunray DX Oil Company

Dear Sir:

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

Very truly yours,

A. L. Porter, Jr.
A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC

Aztec OCC

OTHER Mr. Bill Loar, Mr. James Jennings, Mr. George Selinger
and Mr. Bob Baker

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO

January 11, 1966

Sunray DX Oil Company
P. O. Box 1416
Roswell, New Mexico

Attention: Mr. B. F. Brawley

Re: Well Interference Tests
Todd-San Andres Pool
Roosevelt County, New Mexico

Gentlemen:

Reference is made to your application dated December 9, 1965, for administrative approval to conduct interference tests on your New Mexico State "AY" Lease located in the Todd-San Andres Pool, Roosevelt County, New Mexico.

It is our understanding that you wish to shut in your State "AY" Well No. 3 located in the SE/4 NW/4 of Section 36, Township 7 South, Range 35 East, Roosevelt County, New Mexico, for a period of from three to ten days and to divide said well's allowable equally among your State "AY" Wells Nos. 1, 4, 5, and 6 for production from said wells.

Pursuant to Paragraph (3) of IT IS FURTHER ORDERED of Order No. R-1670-G, Sunray DX Oil Company is hereby authorized to conduct said interference tests and transfer the allowable as described above.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP:DSN:sg

cc: Oil Conservation Commission (with enclosure) - Hobbs
Oil & Gas Engineering Committee - Hobbs

C
O
P
Y

①
Sunray DX Oil Company

District Office



DEC 13 1965

P. O. Box 1416
Roswell, New Mexico
December 9, 1965

*20 - 1001
W. B. Smith
filed Jan 3*
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

Re: Application to conduct interference tests and transfer allowable
New Mexico State "AY" Lease
Todd San Andres Field
Roosevelt County, New Mexico

Gentlemen:

Sunray DX Oil Company hereby requests administrative approval to conduct interference tests on the New Mexico State "AY" Lease located in the Todd San Andres Field, Section 36, R-35E, T-7S, Roosevelt County, New Mexico. We further request that the allowable of the New Mexico State "AY" No. 3 well be transferred to, and equally divided between the New Mexico State "AY" wells No. 1, 4, 5, and 6. This allowable will be transferred for the period of time the well shall be shut-in while conducting the interference test. This period of time will be at least three days but not greater than ten days as described in the attached proposed method for conducting the test.

As required by this request, the following information is submitted:

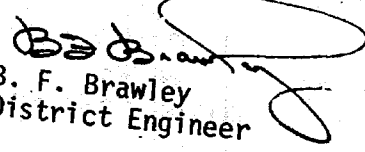
1. Form C-116 showing the results of the last 24 hours of a 72 hour pre-shut-in gas-oil ratio test for the New Mexico State "AY" No. 3 well.
2. Proposed method for conducting the interference test.
3. Plat showing all wells within a two mile radius of the subject lease and identifying each as to ownership or operating rights.

New Mexico Oil Conservation Commission
Page 2
December 9, 1965

4. Evidence that all offset operators to the lease have been furnished a copy of this application.

Sincerely,

SUNRAY DX OIL COMPANY


B. F. Brawley
District Engineer

BFB/ JBH/cm

Attachments

cc: N. Mex. Oil Conservation Commission, Hobbs
Attn: Joe Ramey (2)
~~Skelly Oil Company~~ *waiver 12/27*
~~Texaco, Inc.~~ *waiver 12/29*
~~Atlantic Refining Company~~
~~Franklin, Aston & Fair~~ *waiver 12/21*
Mr. H. L. Sanderson
P. O. Box 432
Monte Vista, Colorado

Waiver

and 12/13

NEW MEXICO OIL CONSERVATION COMMISSION
GAS-OIL RATIO TESTS

C-116
Revised 1-1-65

Operator		Pool		County													
Sunray DX Oil Company		Todd San Andres		Roosevelt													
Address		TYPE OF TEST - (X)		Completion <input type="checkbox"/> Special <input checked="" type="checkbox"/>													
P. O. Box 1016 - Roswell, New Mexico		TEST - (X)		SCHEDULED <input type="checkbox"/>													
LEASE NAME		WELL NO.	LOCATION	DATE OF TEST	CHOKE SIZE	TBG. PRES.	DAILY ALLOW-ABLE	LENGTH OF TEST HOURS	PROD. DURING TEST			GAS - OIL RATIO CU. FT./BBL.					
		U	S	T	R				WATER BBL.	GRAV. OIL BBL.	GAS M.C.F. BBL.						
N. M. State "AY"		3	F	36	7S	35E	12-04-65	0	18/64	225	80	24	2	24.8	117	234.11	2000
* Special test taken for request to transfer allowable during interference test.																	

No well will be assigned an allowable greater than the amount of oil produced on the official test.
During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Commission.
Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 10° F. Specific gravity base will be 0.60.
Report casing pressure in lieu of tubing pressure for any well producing through casing.
Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Commission in accordance with Rule 301 and appropriate pool rules.

I hereby certify that the above information is true and complete to the best of my knowledge and belief.

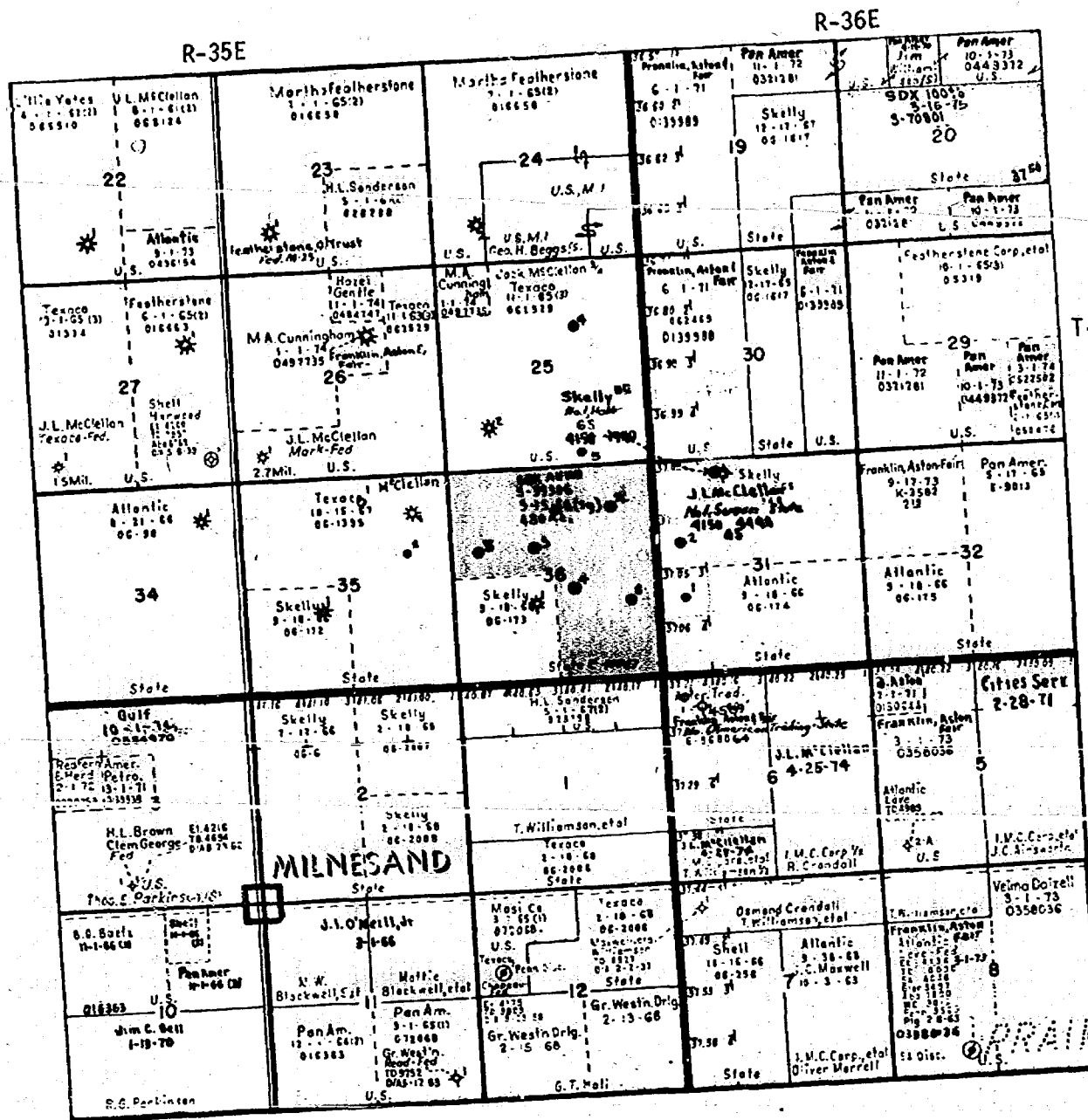
B. F. Brawley
B. F. Brawley
(Signature)
District Engineer
(Title)
December 9, 1965
(Date)

DEC 13 1965

Procedure for Fluid Sampling
and Interference Tests
Sunray DX Oil Company's
New Mexico State "AY" Lease
Todd San Andres Field
Roosevelt County, New Mexico

DEC 13 1965

1. Flow well no. 4 at a minimum rate. Attempt to maintain a continuous flow rate and measure separator gas and oil rate until stabilization has occurred. Record rates every 8 hours.
2. Shut in all wells on the lease after stabilization is achieved. Request all other operators producing from the oil zone to shut in their wells at this time. Period of shut in will not be less than 72 hours.
3. Run 2 bombs in tandem for build up in well no. 3. Leave bomb in well for a total of 72 hours. Observe approximately 72 hours B.H.P. on well nos. 4, 5 and 6. Establish gradient on latter wells. Only single point B.H.P. required.
4. Position bottom hole fluid sampler in well no. 4. Open well to lower tubing pressure 50-100 psig. Take duplicate bottom hole fluid samples.
5. Open well nos. 1, 2, 4, 5 and 6 for flow rates of approximately 80 BOPD per well. Record prod. rate daily of oil, gas and water. Request other operators to resume production at this time. If possible, observe and record production from all other wells, including gas wells, in the field and record daily during the test period. Observe B.H.P. on no. 4 and no. 5 daily during flow period.
6. Pull bombs in well no. 3 after 72 hr. build-up. Run bombs back and continuously record pressure until 15-20 psig decrease is noted. Continue testing as above until interference in the magnitude of a 15-20 psig decrease in B.H.P. is noted in well no. 3. Minimum test period should be 3 days. Maximum 10 days.
7. When test period ends, shut in well nos. 1, 2, 4, 5, and 6. Pull rods and pump on well no. 1. Observe continuous B.H.P. buildup in well no. 3 for 72 hours. Also run B.H.P. bombs in well nos. 1, 4 and 5 daily to record B.H.P.



Sunray DX Oil Company
N. Mex. State "AY" Lease
Todd San Andres Field
Roosevelt County, New Mexico

No. 862825

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO		Skelly Oil Company		POSTMARK OR DATE
STREET AND NO.		P. O. Box 730		ROSWELL, N. MEX. NOV 1964
CITY, STATE, AND ZIP CODE		Hobbs, New Mexico		
EXTRA SERVICES FOR ADDITIONAL FEES				
Return Receipt Shows to whom delivered		Shows to whom, when, and where delivered		Deliver to Addressee Only
<input checked="" type="checkbox"/> 10¢ fee	<input type="checkbox"/> 35¢ fee	<input type="checkbox"/> 50¢ fee		
POD Form 3800 NO INSURANCE COVERAGE PROVIDED— Nov. 1964 NOT FOR INTERNATIONAL MAIL (See other side)				

No. 862827

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO		Atlantic Refining Company		POSTMARK OR DATE
STREET AND NO.		P. O. Box 1978		ROSWELL, N. MEX. NOV 1964
CITY, STATE, AND ZIP CODE		Roswell, New Mexico		
EXTRA SERVICES FOR ADDITIONAL FEES				
Return Receipt Shows to whom delivered		Shows to whom, when, and where delivered		Deliver to Addressee Only
<input checked="" type="checkbox"/> 10¢ fee	<input type="checkbox"/> 35¢ fee	<input type="checkbox"/> 50¢ fee		
POD Form 3800 NO INSURANCE COVERAGE PROVIDED— Nov. 1964 NOT FOR INTERNATIONAL MAIL (See other side)				

No. 862830

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO		Mr. H. J. Sanderson		POSTMARK OR DATE
STREET AND NO.		P. O. Box 432		ROSWELL, N. MEX. NOV 1964
CITY, STATE, AND ZIP CODE		Monte Vista, Colorado		
EXTRA SERVICES FOR ADDITIONAL FEES				
Return Receipt Shows to whom delivered		Shows to whom, when, and where delivered		Deliver to Addressee Only
<input checked="" type="checkbox"/> 10¢ fee	<input type="checkbox"/> 35¢ fee	<input type="checkbox"/> 50¢ fee		
POD Form 3800 NO INSURANCE COVERAGE PROVIDED— Nov. 1964 NOT FOR INTERNATIONAL MAIL (See other side)				

No. 862829

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO		Franklin, Aston & Fair, Inc.		POSTMARK OR DATE
STREET AND NO.		P. O. Box 1090		ROSWELL, N. MEX. NOV 1964
CITY, STATE, AND ZIP CODE		Roswell, New Mexico		
EXTRA SERVICES FOR ADDITIONAL FEES				
Return Receipt Shows to whom delivered		Shows to whom, when, and where delivered		Deliver to Addressee Only
<input checked="" type="checkbox"/> 10¢ fee	<input type="checkbox"/> 35¢ fee	<input type="checkbox"/> 50¢ fee		
POD Form 3800 NO INSURANCE COVERAGE PROVIDED— Nov. 1964 NOT FOR INTERNATIONAL MAIL (See other side)				

No. 862826

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO		Texaco, Inc.		POSTMARK OR DATE
STREET AND NO.		P. O. Box 2248		ROSWELL, N. MEX. NOV 1964
CITY, STATE, AND ZIP CODE		Roswell, New Mexico		
EXTRA SERVICES FOR ADDITIONAL FEES				
Return Receipt Shows to whom delivered		Shows to whom, when, and where delivered		Deliver to Addressee Only
<input checked="" type="checkbox"/> 10¢ fee	<input type="checkbox"/> 35¢ fee	<input type="checkbox"/> 50¢ fee		
POD Form 3800 NO INSURANCE COVERAGE PROVIDED— Nov. 1964 NOT FOR INTERNATIONAL MAIL (See other side)				

Sunray DX Oil Company

District Office



P. O. Box 1416
Roswell, New Mexico
December 16, 1965

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico


Re: Application for Administrative
Approval to Conduct Interference
Tests and Transfer Allowables
New Mexico State "AY" Lease
Todd San Andres Field
Roosevelt County, New Mexico

Gentlemen:

Subsequent investigation has shown that the South offsetting lease to our New Mexico State "AY" Lease has been sold by Mr. H. L. Sanderson to Mr. H. L. Brown, Jr., 704 Vaughn Building, Midland, Texas. Consequently, Mr. Brown has been mailed a copy of our application to Conduct Interference Tests and Transfer Allowables as required by NMOCC Order No. R-1670-G. Attached is a copy of the Receipt For Certified Mail indicating the date this notification was sent.

Sincerely,

SUNRAY DX OIL COMPANY


C. T. McClanahan
District Production Manager

CTM:JH:sk

cc: N.M.O.C.C., Hobbs, Attn. Joe Ramey

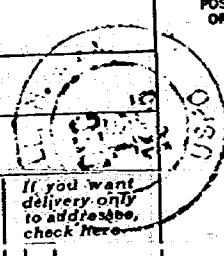
Sunray DX Oil Company

Application to conduct Interference Tests
and Transfer Allowables
New Mexico State "AY" Lease
Todd San Andres Field
Roosevelt County, New Mexico

DEC 13 1963

RECEIPT FOR CERTIFIED MAIL—20¢

No. 323056

SENT TO			POSTMARK OR DATE
Mr. H. L. Brown, Jr.			
STREET AND NO.			
704 Vaughn Building			
CITY, STATE, AND ZIP CODE			
Midland, Texas			
If you want a return receipt, check which		If you want delivery only to addressee, check here	
<input checked="" type="checkbox"/> 10¢ shows to whom and when delivered	<input type="checkbox"/> 35¢ shows to whom, when, and address where delivered	<input type="checkbox"/> 50¢ fee	
FEES ADDITIONAL TO 20¢ FEE			
POD Form 3800 July 1963 NO INSURANCE COVERAGE PROVIDED— (See other side) NO. FOR INTERNATIONAL MAIL			

FRANKLIN, ASTON & FAIR, INC.
P. O. Box 1090
Roswell, New Mexico

New Mexico Oil and Gas Commission
P. O. Box 2088
Santa Fe, New Mexico

W A I V E R

Franklin, Aston & Fair, Inc. hereby advises that we have been notified by Sunray DX Oil Company of their request for administrative approval to conduct interference tests and transfer allowables in the Todd San Andres Field, Roosevelt County, New Mexico.

By this letter, Franklin, Aston & Fair, Inc. advises that we have no objections to the plan as presented and have no objections to the immediate administrative approval of their request.

Sincerely,

R. R. Aston

Franklin, Aston & Fair, Inc.

SKELLY OIL COMPANY
P. O. Box 730
Hobbs, New Mexico

New Mexico Oil and Gas Commission
P. O. Box 2088
Santa Fe, New Mexico

W A I V E R

Skelly Oil Company hereby advises that we have been notified by Sunray DX Oil Company of their request for administrative approval to conduct interference tests and transfer allowances in the Todd San Andres Field, Roosevelt County, New Mexico.

By this letter, Skelly Oil Company advises that we have no objections to the plan as presented and have no objections to the immediate administrative approval of their request.

Sincerely,

SKELLY OIL COMPANY

George M. Selinger
12/20/65

TEXACO INC.
P. O. Box 2248
Roswell, New Mexico

New Mexico Oil and Gas Commission
P. O. Box 2088
Santa Fe, New Mexico

W A I V E R

Texaco Inc. hereby advises that we have been notified by Sunray DX Oil Company of their request for administrative approval to conduct interference tests and transfer allowable in the Todd San Andres Field, Roosevelt County, New Mexico.

By this letter, Texaco Inc. advises that we have no objections to the plan as presented and have no objections to the immediate administrative approval of their request.

Sincerely,

W. M. Rowan
Texaco, Inc.

ATLANTIC REFINING COMPANY
P. O. Box 1978
Roswell, New Mexico

DEC 13 1965

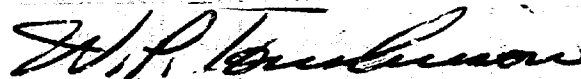
New Mexico Oil and Gas Commission
P. O. Box 2088
Santa Fe, New Mexico

W A I V E R

Atlantic Refining Company hereby advises that we have been notified by Sunray DX Oil Company of their request for administrative approval to conduct interference tests and transfer allowables in the Todd San Andres Field, Roosevelt County, New Mexico.

By this letter, Atlantic Refining Company advises that we have no objections to the plan as presented and have no objections to the immediate administrative approval of their request.

Sincerely,

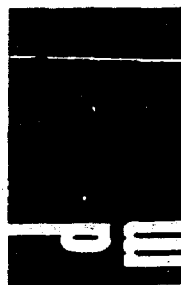


ATLANTIC REFINING COMPANY

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PAGE 1

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 25, 1965

EXAMINER HEARING

IN THE MATTER OF:

Application of Sunray DX Oil Company
for the creation of an oil and gas
pool and for special pool rules,
Roosevelt County, New Mexico.

Case No. 3298

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order, please. The next case will be Case 3298, the application of Sunray DX Oil Company for the creation of an oil and gas pool and for special pool rules, Roosevelt County, New Mexico.

MR. WHITE: If the Examiner please, Charles White of White, Gilbert, Koch and Kelly, Santa Fe, New Mexico, appearing on behalf of the applicant. I have associated with me Mr. William R. Loar of the Oklahoma Bar, who will present the testimony.

MR. NUTTER: Are there any other appearances in Case 3298?

MR. JENNINGS: James T. Jennings. I would like to appear on behalf of Franklin, Aston and Fair, the operator of six gas wells in the area.

MR. SELINGER: On behalf of the Skelly Oil Company, George W. Selinger, operator of one gas well and three oil wells.

MR. NUTTER: Will you have your witness stand to be sworn, Mr. Loar?

MR. LOAR: We will have two witnesses, Mr. Nutter.

(Witnesses sworn.)

MR. LOAR: Mr. Nutter, we have the geological exhibits put together in a group, if you'll accept them that way. We will hand you a set of them. They have been marked.

They do not have the docket number on them.

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

EDWARD V. STINE

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A My name is Edward V. Stine. I am division exploitation geologist for Sunray DX out of their Southwest Division in Midland, Texas.

MR. NUTTER: How do you spell your name?

A S-t-i-n-e.

Q (By Mr. Loar) Have you previously testified before the New Mexico Oil Conservation Commission?

A Yes, sir.

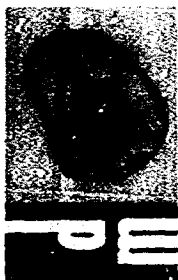
Q Are you a graduate of an accredited geological school?

A That's right. I have a Bachelor's Degree from the University of Wichita in Kansas and one year of graduate work at the University of Oklahoma.

Q Have you made a geological study on the Todd-San Andres field in Roosevelt County, New Mexico?

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A Yes.

Q Would you please refer to what has been marked as Exhibit No. 1 and state what that is?

A Exhibit No. 1 is an area map of the Todd-San Andres field located in Township 7 South and Ranges 35 and 36 East. The scale of the map is one to four thousand. All producing gas and oil wells are so designated thereon. The actual yellow coloring designates Sunray held properties.

Q On this area plat approximately where does the Todd field lie?

A Essentially it's all north of the common South Line of Range 7 South, in 35 and 36 East.

Q Is there a location not shown on this map?

A Yes, sir. Franklin and Aston and Fair have spudded a well in the Southeast Quarter of Section 25 of 7 South, 35 East.

MR. NUTTER: What quarter-quarter section is that?

A The actual footage, I believe, is 1650 from the south and 990 from the east.

MR. NUTTER: So that would be in the Northeast-Southeast?

A It's 330 from the south.

MR. NUTTER: So it would be the Southwest-Southeast.

Q (By Mr. Lear) Will all of your exhibits that you

will present need that similar correction?

A Yes, sir, they will, 1650.

Q What formation does the Todd field produce from?

A It produces from the San Andres.

Q Would you refer to what has been marked Exhibit No. 2?

A Exhibit 2 is a type log of the area. It's the Schlumberger formation density log and on Sunray's No. 5 "AY" N. M. State. This well is located 1980 from the north and 660 from the west of Section 36, 7 South, 35 East. The vertical scale on the log is one inch equals fifty feet. If you will look down at a depth of 3505 we did not designate that, however, that is the top of the San Andres formation.

On to the lower part of the log we have designated a San Andres "H" zone, an anhydrite bed and a San Andres "J" zone. These are, the "H" and the "J" are the producing intervals of oil and gas in the Todd field. And the final marker at the bottom is the San Andres "K" zone.

Q Does the San Andres "K" zone produce in this area?

A It does not produce oil or gas. It tested water in a few cases.

Q What does the San Andres "J" zone produce?

A Basically oil, in some cases it does produce gas.

Q And what about the San Andres "H" zone?



A It's predominantly a gas zone.

Q Is there any production above the "H" zone?

A No, sir, not to our knowledge.

Q Are the "H", "J" and "K" your own correlative nomenclature?

A Yes, sir. They're Sunray's designations in an effort to be more definitive on stratigraphic units in this general area for structural contour.

Q Would you now refer to Exhibit No. 3? State what that is.

A Exhibit 3 is a structural map on top of the previously mentioned San Andres "H" zone. The scale of this map is one inch to two thousand feet, and the contour interval is 25 feet. The red coloring around the various wells designates the depth of penetration of the various San Andres markers, in this case the red designates penetration of the San Andres "K" zone.

The green color designates penetration only to the San Andres "J" zone. The actual datums of the "H" formation appear under the well along with the initial potentials. Also the alphabetical designations below the well show which zones we feel the wells are producing from.

Q Again, do we need to spot the new location of Franklin, Aston and Fair?

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A Yes, sir, it should be in the Southwest of the Southeast of Section 25, 7 South, 35 East.

Q What, in general, does Exhibit No. 3 reflect?

A Exhibit 3 reflects a structural closed condition to the north part of the field with indicated dip to the north and fairly firm dip to the south with nosing conditions on the southeast part of the field across the southeast part of Sunray's "AY" lease.

Q Would you now refer to Exhibit No. 4?

A Exhibit No. 4 is another structural map on top of the San Andres "J" zone, and as in the case of the previous exhibit the scale once again is one inch to two thousand feet, the contour interval is 25 feet, the color combination is the same as the previous map in that the red is "K" penetration and the green is "J" penetration, and here again, the alphabetical designation is what we feel the wells are producing from, and also in this case Franklin, Aston and Fair's new well should be spotted in the Southwest of the Southeast of Section 25, 7 South, 35 East.

Q How many gas wells are there in this area?

A There is a total of 13 gas wells.

Q How many oil wells are there?

A Nine oil wells.

Q Would you point out to the Examiner which are the

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oil wells?

A The oil wells are located, all six of Sunray's wells in Section 36 are oil wells, and Franklin, Aston and Fair's No. 4 Mark Federal in the Southwest of the Northeast of Section 25 is an oil well. Then Skelly has two oil wells in the Northwest Quarter of Section 31, 7 South, 36 East.

Q What is the status of the well in the Southwest of 31 of 7, 36?

A This is Atlantic's No. 1 State "BC", which is in the process, from the information we have, is in the process of completion from the San Andres "J" zone.

MR. NUTTER: Will it be an oil well?

A We feel it will be.

MR. NUTTER: Is the completion far enough along that you know yet?

A I don't know. We know they're in the process and that's about all I know.

MR. NUTTER: You have no potential yet?

A No, I don't believe it has been potentialized.

Q (By Mr. Loar) Again, what does this exhibit reflect, Mr. Stine?

A As in the previous exhibit, with a few minor modifications, this exhibit exhibits a structural closure on the north part of the Todd field area with indicated dip

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1120 SIMMS LOG. • P.O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO
1213 FIRST NATIONAL BANK EAST • PHONE 256-1294 • ALBUQUERQUE, NEW MEXICO



FILE 9

to the north and a sharp dipping condition to the south.

Q Let's go to Exhibit No. 5.

A Exhibit No. 5 is a structural cross section more to the south part of the Todd field. It starts, this is Section A to B, starts with Well No. 1 being Jack McClellan No. 1 Texaco Federal and progresses across the lower part of the field and ends up at Franklin and Aston and Fair No. 1 American Trading, a low well and dry hole in the southeast edge of the field.

The vertical scale is one inch to 40 feet and we have applied no horizontal scale whatsoever. The actual section is hung on a sea level datum plus one hundred feet. Now, in all cases the logs used are Schlumberger porosity logs. Here again we have our own Sunray designated markers, being the "X", the "H" and the "J" zones. In all cases the tops of these formations along with the tops and the bases with their corresponding data do appear to the left side of these logs.

Also core data and perforations along with any DST does appear in the bore hole portion of the log. We have also added the specific perforated interval along with the testing or the treatment and potential and completion data on the bottom of the log.

Q What does this exhibit reflect, Mr. Stine?

A It reflects the uniformity and continuous nature

of the San Andres "H" zone as well as a like situation on the San Andres "J" zone through the main part of the field area.

Q In your opinion is the "H" zone continuous and connected throughout?

A In my opinion it is.

Q Is the "J" zone continuous and connected throughout?

A Yes.

Q You have shown an anhydrite bed in there within the limits of your cross section, is that continuous and connected?

A Yes, sir. We can correlate that throughout the area.

Q Based on the information available to you, is that an impermeable section?

A Yes, it would be.

Q You have, I believe, one core which cut that?

A Yes, sir. Our State "AY" No. 2 cored that entire interval and did go over the anhydrite section.

Q Did that reflect that it was an impermeable section?

A Yes, sir.

Q Let's refer to Exhibit No. 6 now.

A Exhibit No. 6 is Cross Section C to D, which is a south to northeast section starting at Sunray's No. 5 "AY" State and ending on the northeast with Franklin, Aston and

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Fair's No. 4 Mark Federal.

Here again, as in the previous No. 5 Exhibit, the vertical scale is one inch to 40 feet with no horizontal scale applied. All logs are porosity tools run by Schlumberger. The actual section, again, is hung on a sea level datum plus one hundred feet. Our own designations of the "X" and the "H" and the "J" zone are so designated with their tops, along with the tops and the base of the perforations.

Also the completion data and perforated interval is designated on the bottom of the log. The No. 5 well of ours on the left side of the section is the tie log with the No. 5 well on the previous exhibit of A to B.

Q From all your work in this field, in your opinion is the "H" zone continuous and connected throughout?

A Yes, sir, it is.

Q Is the "J" zone continuous and connected?

A Yes, sir.

Q Have you detected any permeability barrier or any faulting any place in the field?

A None within the field limits.

Q Again, is the anhydrite bed impermeable lying between the "H" and "J"?

A Yes, sir.

Q Even though the Commission has treated the San

Andres as all one complete formation, and you are showing anhydrite separation here, from a geological standpoint is there any objection to considering this all one?

A No, sir, we would have no objection.

Q Is there any geological reason why one well would not drain in excess of 80 acres?

A In my opinion one well would drain 80 acres.

Q Is there any reason, from a geological standpoint, why one gas well would not drain 320 acres?

A In my opinion one gas well will drain 320.

MR. LOAR: That's all we have of this witness.

We will have an engineering witness follow.

MR. NUTTER: Are there any questions of Mr. Stine?

MR. JENNINGS: I have just a couple of questions.

CROSS EXAMINATION

BY MR. JENNINGS:

Q Mr. Stine, as I understood your testimony, the "J" zone is connected throughout the field?

A Yes, sir.

Q Didn't one of the wells, I think it's the Texaco well in Section 27, have water in the "J" zone?

A Yes.

MR. NUTTER: So it's agreed that the well is the McClellan Franklin, Aston in the Southwest-Southwest of 27?

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That's the question, did that well test water?

A Yes.

Q (By Mr. Jennings) Did it flow water, do you know?

A I don't know. My indications on Exhibits 3 and 4 say the "J" zone did test gas and water and was plugged back. I don't have any amount. I believe -- I stand corrected. I believe I have the amount on the cross section.

MR. NUTTER: No reference to the amount of water that was -- oh, yes, there is, flowed 400 MCF of gas per day and 160 barrels of salt water per day, is the notation on the exhibit.

Q (By Mr. Jennings) How is that well located geologically? Is it high or low to your oil wells in Section 36?

A It's high.

Q Doesn't that indicate that there might be some barrier between those two wells?

A It's a possible indication. Now, I have thought about this well considerably; of course, the actual volume, we feel that possibly this well is in a tighter nature and possibly might have given up water as opposed to giving up oil from a reservoir standpoint. It is true, I can't really explain the reason there other than a possible tightness that could exist.

Q Then there's a possibility that this zone isn't connected throughout there?

A There's a possibility on the west side, the McClellan well that we're speaking of now, along with McClellan No. 1 Nix Yates Federal in the Southwest of the Southeast of 28, that we could be getting a slightly different type of development.

Now we evidenced that by log characteristics, but my reference to the continuity, I was referring mainly to the main part of the field.

Q Well, the main part of the field that concerns you--

A No, I am referring now to the wells in, for example, the wells in 26 and 27, which from our information the particular zones are continuous throughout, and appear to be uniform in our opinion.

Q Well, if there is a barrier, then where would you establish it?

A It would be difficult for me to establish a barrier of any kind. I think when you are dealing with a stratigraphic type situation, which in this case we are concerned with stratigraphic development in conjunction with the structural picture, that it would be difficult to say that there is an actual barrier, say, for example, to the east of the McClellan No. 1 Texaco Federal.

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In my opinion I don't have enough positive information from the log appearance up there and also from the fact of what they tested, which was a reasonably low amount, that I could definitely say it would be a definite barrier or that a barrier exists.

Q It is not certain, is that the way I understand your testimony?

A Right.

Q Mr. Stine, how long have you been working on this and preparing your information to present this and to show this correlation?

A Well, I can backtrack a little bit to further substantiate or bring out the actual correlative markers that we were using. There was an extensive survey done by Sunray in this general area where we derived these alphabetical correlations by tying back into the Leveland-Slaughter area in the Hockley and Cochran County portion of Texas. These were done mainly, like I said previous, we broke these down into what we felt were stratigraphic units in an effort to be more realistic on our structural interpretation of the San Andres in this Whole area of New Mexico.

For my own part we have come in pretty strong in our evaluation of this area after the completion of our No. 1 well. Now the general area I have been in contact with and

under my supervision from an exploitation standpoint for the last year and a half plus.

Q When did you complete your first oil well?

A January of '65.

Q And only Sunray acreage shown on Exhibit No. 1 is that acreage in yellow which is roughly 800 acres?

A Yes. We have other acreage outside the limits of this.

Q Outside the limits of this particular field?

A Right. Off the exhibit.

Q Could you designate by section designation for me the area which you feel is covered by your oil pool?

A I would feel that, or in my opinion this South Line of Township 7 South and 35 East is a pretty good spot in a southern direction as to the limits of the oil production.

Now, I would feel that there is a good chance that the South Half of 33, 34, and 35 from our interpretation would probably be oil productive.

Now, as far as the oil pool to the north, the only indications we have is that we do have turnover from a structural standpoint. There's no reason to assume that there would not be an oil rim of some kind up there. I couldn't prove that. In an easterly direction, I would say the East Half or the center line of Section 31, and where it

goes to the north it could branch out in a northeasterly direction, but I'm basing this on the eastern limits on the four potentials and wells that Skelly has in the Northwest Quarter of Section 31.

Q Your northern limits would be the -- have you established those?

A No, I would say that from the structural indications or the closure here and the fact that we did establish some dip in a northern direction, that possibly somewhere up in here is another oil rim or an oil section comparable to what we have established here on the southeast part.

Q In this pool or in a separate pool?

A I couldn't really say. In my opinion I don't think it would be separate. I think it would probably be in conjunction with this.

Q How do you explain the Skelly gas well in the Northeast Quarter, Southwest Quarter of Section 36?

A That particular well in the "J" zone portion was structurally comparable and, from our opinion, was comparable to our existing oil production. Now, as far as why is it making gas, there again, I think in this respect possibly similar to the wells of McClellan in the South Half of the Southeast Quarter of Section 28 and the Southwest Quarter of Section 27, that you may be dealing with tightness within

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the "H" zone. Now the "J" zone was squeezed off on Skelly's well and they are completed in the "H" zone. Their actual potential was relatively low on capacity or deliverability.

Q Don't we have a lot of unanswered questions in connection with this pool at this time, Mr. Stine?

A There are a few isolated cases that I feel that you have brought out here that I can't really answer myself and I don't know that anybody can answer.

Q Wouldn't we be in a much better position to evaluate this pool in six months than we are at this time?

A I don't feel that's up to me to say.

Q In your opinion wouldn't we?

A In my opinion I see nothing wrong with the continuation of the evaluation or the development of this field.

MR. JENNINGS: I believe that's all.

MR. SELINGER: May I ask the witness a question?

MR. NUTTER: Yes, sir.

BY MR. SELINGER:

Q If you drilled an additional five or ten wells, Mr. Stine, you would still be faced with determining the exact limits of the field, isn't that correct?

A I feel we would, due to the actual locations of the wells, we have covered a pretty good area here right now.

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Q As I understand your testimony, you indicated that there were thirteen gas wells and nine oil wells at this time?

A Yes, sir.

Q And it roughly covers approximately five thousand acres?

A Yes, roughly.

MR. SELINGER: That's all.

BY MR. NUTTER:

Q You have two zones here, you have the "H" zone and the "J" zone. They're separated by an impermeable barrier of anhydrite and you believe that these two zones are continuous and that the anhydrite is continuous throughout the area. Now, in observing your Exhibits 3 and 4 I notice that all of the oil wells apparently are completed in the "J" zone.

A Yes, sir.

Q And the "J" zone only, is this correct?

A Yes, that is right.

Q Are there any gas wells completed in the "J" zone and in the "J" zone only, and if so, how many?

A We have designated the McClellan well in the Southwest Quarter of 26 is a "J" zone completion in the gas, and I believe that's the only one that we have. We have combinations of "H" and "J" on the gas.

Q I meant just "J" alone.

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A That's the only one that we have as a single "J" completion.

Q Let's just break them into two separate pools and consider them as two separate pools for the time being, so if we consider we have an oil pool in the "J" zone, then we have one gas well in the "J" zone also?

A Yes.

Q Do you know anything about the liquids that that one gas well makes?

A I don't know. I have no information on it.

Q It has an indicated 2700 MCF of gas per day on the exhibit here. Evidently it must be an extremely high ratio well making little liquids. Anyway, it's definitely a gas well if it has an IP of 2700?

A Yes, sir.

Q Are there any gas wells completed in the "H" zone only?

A Yes, sir. There's the McClellan No. 1 Nix in the Southwest of the Southeast of 28 is an "H" zone single completion. The Atlantic No. 1 "BA" State in the Northeast corner of 34 is a single "H" zone completion.

Q I notice on your exhibit, while we're on that well, that you indicate that it potentialled for seven hundred and either eighty-two or ninety-two MCF?

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A Yes.

Q Plus four barrels of oil, plus three barrels of water? Was that oil or condensate?

A No, this is from our scouting information that we had and it was indicated to be formation oil.

Q This is the nearest thing we have to an oil well, then, in the "H" zone?

A Yes, sir, I believe there was one other well, yes, in the Southwest corner of Section 27, the McClellan No. 1 Texaco Federal tested the gas and the water, this one Mr. Jennings and I were discussing previously, and it is now completed in the "H" zone.

Q Only?

A Only, yes, sir. Then, pardon me, Skelly's well is completed in the "H" zone.

Q You don't have any knowledge on all these other gas wells in the northern part of the field that are completed in the "H" and "J", you don't have any knowledge of what quantity of gas is coming from either of the two zones?

A No, sir, we do not.

MR. NUTTER: Are there any further questions of Mr. Stine?

MR. LOAR: An additional question.

REDIRECT EXAMINATION

BY MR. LOAR:

Q Mr. Stine, in any oil field or oil and gas field are you apt to find isolated instances which are difficult to explain from a geological standpoint?

A Yes, that's not uncommon.

Q Are you apt to find that no matter what stage of the development the field is in?

A Yes, it could happen anywhere along in the development of it.

MR. NUTTER: Now, Mr. Stine, when we're talking about the "H" zone and the "J" zone, are those zones in every case continuous throughout the zone or do they have little layers of permeability and porosity separated by impermeable streaks in them?

A Within the actual "H" and "J" zone that we have, now I am basing this back on our core on our "AY" 2, the actual anhydrite content within the "H" zone itself was of a negligible nature and the same existed in the "J" zone. Now, basically on the development that you have, as far as the porosity, it appears to be uniform to us and correlative for the most part throughout the field.

Q (By Mr. Loar) So there's no indication then of any little stringers of permeability and porosity and non-

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permeable sections that would help to explain the sudden appearance of gas or the sudden appearance of water in the gas zone?

A None other than the indications which we feel could exist to the west and possibly in Skelly's 1 "S" Well of maybe just being a tightness. We're dealing with a stratigraphic type trapping agent here in conjunction with the structural position on the north end of the field, and, as you know, I mean the stratigraphic nature of this development could vary within the interval, but basically it appears to be uniform to us.

MR. NUTTER: Are there other questions?

MR. JENNINGS: I would like to ask just one more question.

RE CROSS EXAMINATION

BY MR. JENNINGS:

Q I think you stated there were thirteen gas wells and nine oil wells. Approximately how much acreage is dedicated to the gas wells and how much to the oil wells?

A Well, using Mr. Selinger's roughly 5,000 acres for the over-all field, of course in this case you could say maybe 4,000 of it is already in this area designated gas wells.

Q And 500 oil?

A 720 for nine wells.

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MR. JENNINGS: That's all.

MR. NUTTER: Any other questions of Mr. Stine?

He may be excused.

(Witness excused.)

H. A. SEIDEL, JR.

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A Herbert A. Seidel, Junior. I am a petroleum engineer by profession. I'm working right now at Sunray DX Oil Company as a division reservoir engineer in their Southwest Division at Midland, Texas.

Q Are you a graduate engineer from an accredited petroleum school?

A Yes, I graduated in June, 1951, from the University of Texas with a B. S. degree in Petroleum Engineering.

Q Have you been employed by Sunray DX Oil Company as a reservoir engineer responsible for our operations in Roosevelt County, New Mexico?

A Yes, sir, for the last five years.

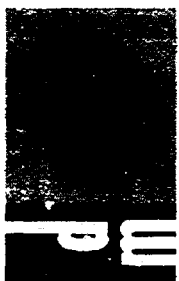
Q Have you made a study of the Todd-San Andres field?

A Yes, sir, I have.

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

Q Would you please refer to what has been marked Exhibit 7 and state what that is?

A This is a summary of the reservoir and fluid data from the oil zone in the Todd-San Andres field. We have listed the reservoir data from log analysis interpretation of Sunray's six New Mexico State "AY" wells. Footage with less than four percent porosity is excluded and average porosity is 6.5%; net pay is 25 feet, water saturation of 30%, and this gives us a pore volume feet which is a fraction, porosity times the net feet of pay of 1.63.

From core analysis data on the New Mexico State "AY" No. 2 we have 3.3% average porosity for 46.8 feet of pay. This gives us a 1.55 pore volume feet value. If this data is cut off at this 4% porosity cutoff, we have 13.9 feet of pay for an average porosity of 5.2% and pore volume feet of 0.72.

It's obvious from this later correlation to the log analysis average data that this well is a poor well. It initially would not flow and had to be placed on artificial lift to be produced. The core analysis data provided us with some capacity information and permeability for the footage with permeabilities less than ten millidarcies, we had 39 millidarcy foot permeability and an average permeability of 0.9.

From pressure buildup data on the New Mexico State "AY" No. 3 we have a capacity of 144.7 millidarcy feet reflected for an average permeability of 4.7 millidarcies. For the fluid data, this is empirically determined fluid data, we have a formation volume factor of Beta O of 1.16. Gas-liquid ratio, solution gas of 275 cubic feet per barrel, of viscosity, 6.8 centipoise. The produced tank oil gravity is 24 degrees API.

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

Q Have you prepared similar reservoir data for the gas cap?

A Yes, sir, we have.

Q Will you refer to what has been marked as Exhibit 8?

A For the gas cap I took an average of five gas cap wells. Footage again with less than 4% porosity is excluded. The gas productive footage overlying oil column is not included in these averages. The porosity is 5.8%. The net pay of 33 feet and water saturation of 30%, for a pore volume feet value of 1.92. For the fluid data we calculated or ran through some vapor-liquid equilibrium from a separator gas sample of the oil zone production. The gas gravity is placed at 0.799. Deviation is the factor of 0.841. The formation volume factor of Beta G, reservoir barrels per MCF is 1.47.

The gas produced is dry.

Q Have you calculated a reserve for the oil zone?

A Yes, sir, we have.

MR. LOAR: I would like to have that marked as Exhibit No. 9.

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

A Utilizing the reservoir rock properties presented in Exhibit 7, the porosity of 6.5%, water saturation of 30%, formation volume factor of 1.16 reservoir barrels per stock tank barrel and utilizing a recovery of 16% of the oil in place, we calculated 49 barrels per acre-foot from the oil zone.

If this value is applied to the average net pay presented in Exhibit 7 of 25 feet, and to an area of drainage of 80 acres, we have a reserve ultimate recovery of 98,000 stock tank barrels. For 40-acre spacing, same thickness would provide an ultimate recovery of 49,000 barrels.

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

Q Would you please refer to what has been marked as Exhibit 10?

A This is a reserve calculation for gas cap well. Here we used the average reservoir rock properties presented in Exhibit 8. Average porosity of 5.8%, water saturation,

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30%, formation volume factor of 1.47 reservoir barrels per MCF and 85% recovery factor of the gas in place.

We have 182 MCF per acre foot indicated to be recoverable. Recoverable reserves per well for 320 acres drainage and 33 feet of net pay mentioned in Exhibit 8 provides an ultimate recovery of 1,920,000 MCF.

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

Q Would you please refer to what has been marked as Exhibit No. 11?

A This is a detailed estimated cost analysis of a development well in the field. It excludes costs of surface facilities, any lift equipment or additional equipment that might be required to get the product to the market. The total cost is \$41,700 to build and complete. This cost is made up from a total tangible cost of \$11,000 and total intangible cost of \$30,700.

Q Have you considered a pumping unit or tank battery or compressors or similar equipment in this cost?

A All of these costs have been excluded from this cost.

(Whereupon, Applicant's Exhibit No. 12 was marked for identification.)

Q Would you refer to Exhibit 12 and proceed?

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A This is an economic analysis for a development well in the oil zone in the Todd field. We have compared the 80-acre spacing case versus the 40-acre spacing, using the reserve values presented in Exhibit 9. We have a net oil barrels to the producer on 80-acre spacing of 85,800, for the 40-acre, 42,900, which results in gross income at \$2.47 per barrel of \$212,000 for 80 and \$106,000 for 40 acres.

The operating costs included for the 40-acre and 80-acre case, a well cost of \$41,700. Operating expenses for the 80-acre case of \$18,000; \$9,000 for the 40-acre case. Production taxes amount to \$9,800 and \$4,900 for the 80 and 40 respectively. This amounts to total operating cost of \$69,500 for the 80 and for the 40, \$55,600. This leaves a profit before Federal income tax of \$142,500 for the 80-acre spacing and \$50,400 for the 40-acre spacing. Discounted at 5%, using 13-year life for the 80-acre well and 8-year life for the 40-acre well, we have \$122,700 present worth for the 80-acre spacing case and \$42,400 for the 40-acre.

Discounted profit before Federal income tax per dollar invested amounts to \$2.94 for the 80-acre and \$1.02 for the 40-acre case.

Q Have you considered any dry hole costs, exploration costs or things of that nature in these expenses?

A No, sir, I have not.

Q Have you prepared a similar analysis for the gas cap?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. 13 was marked for identification.)

Q Would you please refer to what has been marked as Exhibit 13?

A This is an economic analysis for the development well in the gas cap. Using total reserves presented previously of 1,920,000 MCF, net to the producer of 1,680,000 MCF for value of 12¢ per MCF, the gross income is placed at \$201,600. Operating costs are the same as previously presented.

The well cost of \$41,700, operating expense of \$24,000, and production taxes of \$9,400, total operating costs are \$75,100., leaving a profit before Federal income tax of \$126,500. This discounted at 5% per 20-year life amounts to \$83,700. Discounted profit before income tax per dollar invested is \$2.00.

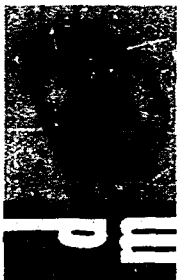
Q Again, have you considered acreage costs or dry hole or overhead costs in this analysis?

A No, sir, I have not.

Q Now, Mr. Seidel, you have done some talking about 80-acre drainage and 320-acre drainage. How have you reached that conclusion?

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A Well, we have conducted some pressure buildup tests on our N. M. State "AY" No. 3.

MR. LOAR: Let's have that marked as Exhibit 14.

(Whereupon, Applicant's Exhibit No. 14 was marked for identification.)

A This is a conventional plot of the pressure buildup measured, as previously stated, on the N. M. State "AY" Well No. 3 on July 28 through the 31st, 1965. If you start at the lower right-hand corner and proceed upward and to the left the shutin time increases, the shutin time in hours increases. The later time slope with 310 psi per cycle indicates that the permeability in the immediate vicinity of the well bore is 4.7 millidarcies for 31 feet of pay, or 144.7 millidarcy feet capacity mentioned previously.

This straight line has been extrapolated to infinite shutin time, which is the factor of one for this parameter that's plotted, and initial shutin pressure, or the initial pressure in the reservoir would have been expected to be 1680 psig at minus 31 feet.

It's also very interesting to note that we have evidence of interference in these latter two points to the left, the next to the last point is 66-hour shutin pressure at 1139 pounds. The next point to the left is at the same pressure, 1139 pounds, five hours later for a shutin time of

71 hours. Had we not had interference we would have expected the pressure at the 71-hour shutin point to have been about ten pounds higher.

Q Is this one acceptable reservoir engineering method for determining interference between wells?

A Yes, it is the preferred method.

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

Q Would you refer to Exhibit 15?

A This is a tabulation of subsurface pressure data we have available in the Todd field. From the previous Exhibit 14 we established a reservoir pressure initially to be 1680 pounds at minus 31 feet. This is corrected to minus 70-foot datum of 1694 pounds.

First pressure on Franklin, Aston and Fair's Mark Federal No. 2 in September, 1964 of 1,392 pounds is about 300 pounds below this initial pressure. This is an initial pressure too, by the way, for the Mark Federal No. 2 Well. The next pressure we have is for the Sunray New Mexico State "AY" No. 1, which is in the oil zone, 1,238 pounds, which is again well below the initial reservoir pressure determined from Exhibit 14. Other pressure data is presented as well.

Q Why don't we see a wide range fluctuation in some of these later pressures, Mr. Seidel?

A This is because of the transient flow behavior in this particular reservoir with relatively high viscosity fluids and relatively low order of permeability. We find that it takes a little longer for the shutin times we have listed here in brackets to establish a static reservoir pressure in the vicinity of the well. The pressures are probably still building up.

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

Q Has this data been placed on a curve, Mr. Seidel?

A Yes, sir. This is a graphical presentation of the pressure data.

Q What exhibit are you referring to?

A This is Exhibit 16. It's a graphical presentation of the data tabulated from Exhibit 15. We have erroneously placed the initial pressure at the left-hand, upper part of this curve at 1680 pounds. This was at a datum of minus 81 feet and should be 1694 pounds at minus 70 feet.

The next, or really the first pressure point we have is on the gas well in August, excuse me, in September, 1964, after the gas cap had only produced about 480 million cubic feet. This is an initial pressure and we feel that this pressure is low because of the withdrawals of other wells completed in the reservoir prior to this well's completion.

Subsequent pressure points are also plotted for the oil zone and additional initial pressure for a gas well, and these are all lower than the initial reservoir pressure, even lower than the initial pressure measured in the gas well in September, '64. Again, I might point out that some of these pressures, especially in the oil zone, are not built up because we haven't conducted buildup pressure tests or been able to leave the wells shut in long enough to observe the static pressure.

Q Have you tabulated the oil production from the field?

A Yes, sir, we have.

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

A Exhibit 17 tabulates the production history for the oil zone. The latest information in the table is for May, 1965.

Q Now, this is Exhibit 17 you are referring to?

A Yes, Exhibit 17.

Q Go ahead.

A For May of 1965 the oil production amounted to 6,450 barrels for the month. Gas production was 8,648 MCF, water production, 366 barrels.

Q What has the production for the life -- did you give the production for the life of the field?

A No, sir, the cumulative production to date from

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January, 1965 is 14,169 barrels of oil, 21,613 MCF of gas.

Q Now, this 21,000 is gas production from the oil wells, is that right?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. 18 was marked for identification.)

Q Would you please refer to what has been marked as Exhibit 18 and identify it?

A This is a production history from the gas cap of the Todd-San Andres field. It briefly reflects that the May production, May, 1965 production is 214,277 MCF.

Q What is the cumulative total from the field?

A Cumulative total to June 1st, 1965 was 2,245,932 MCF.

Q Based on the preliminary work that you have done and the data available to you in this field, in your opinion will one oil well drain in excess of 80 acres?

A Yes, sir, it will.

Q Will one gas well drain in excess of 320 acres?

A Yes, sir.

Q Are you recommending to the Commission that the present 320-acre rules be maintained?

A Yes, sir, I am.

Q Are you recommending to the Commission that 80-acre rules be established for the oil portion of the reservoir?

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A Yes, sir, I am.

Q Are you recommending that they be given a factor of two to determine their production?

A Yes, sir.

Q Are you recommending this on a temporary basis?

A Yes, sir, for one year we would like to request the Commission's authority to permit us to conduct an interference test in the oil zone area. This would briefly consist of shutting in Sunray DX No. 3 New Mexico State "AY" well producing the Northeast No. 1 offset, the Southeast No. 4 offset, and the West No. 5 at approximately 80 barrels per day each, for a period of approximately fifteen days. We would like to transfer allowable to other wells so that the allowable would not be lost. We feel that this test will provide us with the information that would conclusively prove that 80 acres can be effectively drained.

Q Are you also requesting that authority be granted for administrative approval for additional interference tests that may be conducted over the ensuing year?

A Yes, sir.

Q But your initial test would be as you described it to Mr. Nutter?

A That is correct.

Q Mr. Seidel, does this Todd-San Andres field have a

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gas cap on it?

A Yes, it does.

Q Does it have an oil column?

A Yes, sir.

Q Are they in communication with each other?

A I'm convinced they are, between wells or in the well bore, the two zones are together. We have found some information that might suggest the two zones were initially separated, however, not conclusively.

Q Are you referring to the "H" and the "J" on the oil column and the gas cap?

A The "H" and the "J" zone.

Q Now, what about the oil column and the gas cap?

A We feel they are definitely in contact in the "J" zone.

Q What happens if a gas cap is produced at a greater volumetric equivalent rate than the oil column?

Q The oil zone will expand and the oil will migrate to the gas cap area, and in doing this, even if the gas cap gas-oil contact is moved back to its previous position, a certain amount of residual oil saturation will remain to wet the cap rock.

Q Can this be substantial?

A Yes, sir, it can. We feel that something on the

order of 30,000 barrels has already been lost in this manner.

Q Can this in any way be recovered?

A No, sir, it cannot.

Q In your opinion does this constitute waste?

A Yes, sir, it does.

Q What happens if the oil column is produced at a greater rate than the gas cap?

A The gas cap would migrate or expand into the oil zone. Nothing would be lost, however, actually you would receive some beneficial pressure energy from the gas cap to help produce the oil zone.

Q Would this interfere with correlative rights among various leases and among various working interest owners?

A Yes, it would.

Q In your opinion does some type of volumetric equivalent rule need to be adopted to prevent waste and protect correlative rights?

A I feel this is necessary.

MR. LOAR: We would like to have our next exhibit marked as Exhibit 19.

(Whereupon, Applicant's Exhibit No. 19 was marked for identification.)

MR. LOAR: Mr. Nutter, we have prepared a several page, sixteen-page tabulation of some suggested rules. We

have attempted to follow as closely as possible the existing Todd-San Andres gas rules. We have attempted to suggest standard 80-acre oil rules and we can go through these one by one, with the exception of a few corrections that we would like to make, the only rule that might be in controversy as we picture it is Rule 10. So rather than have Mr. Seidel go through them one by one, I am wondering if we can cover Rule 10 and cover the modifications that need to be made.

MR. NUTTER: I don't think he needs to go through them in detail.

MR. LOAR: Fine.

MR. NUTTER: I think he should point out what each one pertains to. For instance, Rule 2 (a) pertains to gas, 320 acres, without reading the whole thing into the record.

A Rule 1 pertains to oil spacing on 80 acres. Rule 2 (a) is for gas. I wasn't repeating. 2 (b) is for oil acreage, 80-acre spacing.

MR. NUTTER: With any half of a quarter section being eligible for dedication?

A Yes, sir. Rule 4 are the distance rules for the gas and this is one of the rules where we have a correction that we would like to place. Third line down, "located no nearer than 660 feet," rather than 990 feet.

Q (By Mr. Loar) Why are you recommending that

correction?

A This is a change for the existing rules, and the main reason for this correction is to permit the future development operations to have some small amount of flexibility in locating the well for either oil zone or gas.

Q For instance, what would be the situation if the Franklin, Aston and Fair location in the Southwest-Southeast of 25 were drilled under this rule without this modification?

A He would not, by these rules, be permitted to, I don't know whether he's drilling it at a gas well location or not, but if he is drilling it at a gas well location, I assume that he is, he could not complete as an oil well.

Q But these rules, as now modified, will allow him to complete as an oil well?

A Yes.

Q In line two of Rule 4 there's a typographical error, the "of" at the next to last word needs to be changed to "or". Go ahead.

A No. 5 is the distance for oil, 200 feet from the center of the governmental quarter-quarter section. Rule 7 is the allocation of gas cap allowable, permits the allowable for a marginal well to be deducted from that of the total reservoir, and this would be assigned to capable wells in the cap area. Continuing on page 3, No. 7, the last line of the

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first paragraph should read "five days prior to the Hobbs hearing." This pertains to --

Q No.

A I'm sorry, we still have a blank there.

MR. LOAR: Whatever date the Commission would like to establish for the first allocation.

A Rule 7 (a) is the necessary forms for allowables, temporary gas allowables for recovery of load oil. Rule 7 (b) is the proportional factor for the oil zone of two. Run back up to the second paragraph in 7 (a) and that blank should be the "Hobbs District Office."

Rule 8 (a) establishes the acreage factor for the gas well in relation to the 80-acre oil well. 8 (b) is again the allowable assigned to a marginal gas well. 8 (c), the limiting gas-oil ratio for the oil zone at 2,000 to 1. 8 (d), allowables for wells reclassified from either oil to gas or gas to oil.

Rule 9, the designation of what gas will be held accountable to this ratio penalty in the oil zone. Rule 10 sets out the method of initially getting this method of proration established.

Q Now, Mr. Seidel, is Rule 10 a direct contribution from a rule now in operation in this state?

A Yes, sir, it is taken from the rules of the

Devils Fork-Gallup sand field.

Q Has that rule been in operation in a similar type reservoir?

A Yes, it has. This reservoir has a gas cap with an associated oil column.

Q Basically what does Rule 10 accomplish?

A It provides for equivalent reservoir voidage from a gas cap well, or the gas cap area, relative to the voidage in the reservoir in the oil zone. The equation as written at the top has been continued. If you take the brackets, or the second larger bracketed formula and the latter part of it that is also in brackets, this can be modified to 0.33 per reservoir B_0 divided by Z , and we have taken this last produced gas-oil ratio in May, 1965 from the oil zone of 1,342 cubic feet per barrel and used a reservoir pressure average of 1200 pounds.

Turning to page 9, we have some empirical fluid data that we have introduced into the equation for 1200 pounds. We have 217 solution ratio cubic feet per barrel subtracted from the produced ratio of 1342. The formation volume factor of 1.129 for 1200 pounds and the Z factor of 0.871 for this same pressure.

To simplify the situation to get to what a gas cap well might produce, we have assumed the one-well oil zone

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completion and a one-well gas cap completion. We have for the Q in the first bracket of the equation, assuming a 40-barrel a day unit allowable times the two factor, 80 barrels per day times the acreage in the gas cap well at 320 acres divided by the acreage in the oil zone of 80 for four, or this bracketed factor would be 320. This amounts to 525 MCF per day producing rate for the gas cap well with the 320 acres assigned to it.

Q On page 7 do you need to make any corrections?

A Yes, the temperature of the reservoir is mentioned in two places, opposite the temperature of your reservoir should read 125 degrees Fahrenheit or 585 Roentgen, and in the Z factor we mentioned the 107, it should be 125 reservoir temperature.

Q What's on page 8, basically, Mr. Seidel, is that an explanation?

A This is an explanation of the formula, the parameters of the formula.

Q Page 9 is what?

A Is the tabulation of empirical fluid data, which we, during our interference test, if we are able to conduct it, we hope to obtain fluid samples and actually obtain or have PBT analysis run on them for more accurate, more reliable data.

Q On page 10 would you take up items 11 and 12,

et cetera?

A Rule 11 provides for a balancing of the gas well production, if a well is produced over three times its monthly allowable it is shut in. Rule 12 again is for the marginal gas wells, mentioning that its allowable will be deducted and the net status for the cap would be readjusted accordingly. Rule 13 prevents flaring of gas. Rule 14 provides for transporters or users of gas filing connection notices with the Commission.

Rule 15 defines the gas well or the oil well at 30,000 to one as the break-even point with ratio greater than 30,000 stock tank liquids produced a gas well; anything less than this would be an oil well.

Rule 16 deals with the actual gas-oil ratio tests which will be introduced into the proration equation. Again, no gas will be flared for more than sixty days after the well begins to produce. Rule 17 deals with the nature of conducting gas-liquid ratio tests and obtaining bottom hole pressure data which will be used to get values in the proration equation.

Rule 18 specifies the time in which the reservoir pressures will be determined and for how long the buildup pressure will exist, minimum time for it. 18-1 provides for a method to obtain bottom hole pressures for wells in which

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bottoms can't be run, sonic pressures. 18-2 provides for the reporting of this data.

Q Back up in 18, the top of page 13, what would you recommend for a datum?

A Minus 70 feet would probably be a good datum. Rule 19 is a gas-oil ratio limitation, 2,000 cubic feet per barrel. Rule 20 provides that no acreage will simultaneously be dedicated to the gas and oil. Rule 21 defines the vertical limits of the field.

Q Would you read item 1 on the top of page 14 and make a minor correction there?

A All right. "It is further ordered: (1) That any well presently drilled to or completed in the San Andres Formation within the Todd-San Andres Pool or within one mile of said pool that would not comply with the well location requirements of Rules 4 and 5," this is written as 5 and 6 and should be corrected to Rules 4 and 5, "is hereby granted an exception to said rule."

Q Now, then, Rule 8 (d) on page 4, does what?

A It provides for reclassification of either gas to oil or oil to gas.

Q Is it your recommendation that any well changing classification under those conditions should be covered by this Rule 1 or this item 1?

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A Yes, it is.

Q Proceed.

A "The operator shall notify the Hobbs District Office of the Commission in writing of the name and location of the well on or before the effective date of the rule."

Q Explain briefly what item 2 is.

A This item 2 provides for transfer of allowable for interference tests. No allowable will be permitted, no transfer well will be permitted to receive --

Q Does it also provide for administrative approval of interference tests?

A Yes, it does.

Q What about item 3 on page 15?

A This provides for the reopening of this hearing in August, 1966.

Q Or whatever date the Commission might decide?

A Right. To review the spacing rules recommended.

Q Were Exhibits 7 through 19 prepared by you or under your supervision?

A Yes, sir, they were.

MR. LOAR: At this time we would like to offer Exhibits 1 through 19.

MR. NUTTER: Sunray DX's Exhibits 1 through 19 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 19 were offered and admitted in evidence.)

Q (By Mr. Loar) Mr. Seidel, in your opinion will more than one gas well on 320 acres be an unnecessary well?

A More than one?

Q Yes.

A Yes.

Q Will more than one well, more than one oil well on 80 acres be an unnecessary well?

A Yes.

Q Would it be economic waste to drill more wells?

A I feel that it would.

Q In your opinion is it necessary to stabilize the gas oil contact between the oil and the gas zone?

A I think we should make every effort to prevent further migration of the oil to the gas cap. This would require stabilized withdrawals from the gas and oil zones.

Q If this gas-oil contact is not stabilized, would there be a substantial loss of producible oil?

A Yes, sir, I feel that there would be.

Q Can there also be a violation of correlative rights?

A Yes, sir, there could be.

MR. LOAR: That's all we have of this witness,

Mr. Nutter.

MR. NUTTER: I am sure nobody has any questions to ask this witness about these exhibits, but in the event they do, we will recess the hearing until 1:30.

The hearing is recessed until 1:30.

(Whereupon, a recess was taken.)

* * * * *

MR. NUTTER: The hearing will come to order, please. Were you finished with your witness, Mr. Loar?

MR. LOAR: Yes, sir.

MR. NUTTER: Are there any questions of Mr. Seidel?

MR. JENNINGS: I might ask a few.

CROSS EXAMINATION

BY MR. JENNINGS:

Q Mr. Seidel, referring to your exhibit Number 16, I believe you stated that according to your calculations the original pressure was 1694 pounds?

A Yes, sir, that is correct.

Q How did you determine that, upon what did you base this determination?

A I would have to refer you to the exhibit that precedes this one, Exhibit Fourteen, the one before that even, two or three exhibits. I think it's recognized by almost anyone that works with trans-flow behavior that initial reservoir pressure

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can be determined by extrapolating the build up curve. We use this quite a bit in an infinite reservoir or one in which very little production has been taken out. It's from this curve that we have determined this initial reservoir pressure. I might mention that this is a grading of about .43 psi, per feet which is slightly low what you would be expecting in this area formula grading .43 to .45.

Q Again referring to your exhibit, I believe, it is 13, Mr. Seidel.

A Economy Analysis for the Gas Cap.

Q Gas Cap, yes, sir. I think this analysis shows the price of the gas to be 12 cents per thousand?

A Yes, sir.

Q Where did you get those figures?

A That was prior to the FPC new pricing method that I worked this exhibit up.

Q Then the figures --

A And the area price I believe in this area is 16 cents, if I am not mistaken, I believe the retail gate of the plant that you sell your gas to is 16 cents and since I had know that we were selling our gas into a 300 pound line, I assumed there would be a charge for compressing this gas and our fluid data indicates that you have possibly a low BTU content so I have discounted that 16 cents to 12 cents.

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Q Do you actually know what the gas operators in the area are getting for their gas?

A I have no idea. I know what the retail gate of the plant though is selling their gas at.

Q But that isn't what the operators are getting?

A It isn't.

Q Or do you know?

A I don't know, no, sir.

Q Does your company sell any gas?

A We have a contract to sell our casinghead gas and we are right now waiting for the purchaser to set a compressor and take our gas.

Q But you don't sell any dry gas as such?

A That is correct.

Q And did you make any inquiry to determine in connection with this exhibit what the other operators in the area were getting for their gas when they sold it to the pipe line company?

A Well, I made an inquiry for other information and have gotten unsatisfactory results. I didn't see any point in pursuing this particular inquiry.

Q Did you try to get it from the purchaser at Capitan?

A I tried to get it from the man who was selling it.

Q Is it possible they are getting it as low as eight

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cents?

A It's possible.

Q Now, I notice again in your exhibit that you make reference to the royalty being one-eighth. Do you know that this is a royalty which most of the operators are operating under in the area?

A No, sir, I don't.

Q Assuming that the gas is bringing eight cents, how would that affect your calculation in connection with that exhibit?

A It would decrease the income value.

Q Considerably?

A Would you care to establish that the gas is selling for eight cents? I would have to go through that gyrations of calculating --

MR. NUTTER: Mr. Seidel, he said assuming.

A Oh, I see. Would you repeat your question then, please, sir.

Q Assuming that the gas is selling for eight cents in the area, how would that affect your calculations?

A Well, the gross income number of \$201,600 would be reduced by eight-twelfths. The well operating cost would stay the same and I would actually have to run through the calculation to see what the other values would be.

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Q It would substantially decrease the operators income?

A It would decrease the income. I don't know whether it would be substantial or not.

Q Well, it would be about one-third, wouldn't it?

A Well, it's three-fourths of the gross income reduced by twenty-five on a gross income.

Q Again assuming that the leases have a 20 percent royalty including the overriding royalty, this likewise would decrease the income?

A That's true, yes, sir.

Q It would make a much more grim picture, would it not?

A Yes, sir, it would. I don't know, you got a pretty good picture to work on.

Q Referring to Exhibit, I believe it's 19, which are your proposed rules, Mr. Seidel:

A Yes, sir.

Q Now, in particular, I believe it's Rule 10 in which the formula is established?

A Yes, sir.

Q What did I understand you to say that the gas allowable per gas well would be for the existing wells in the pool according to your calculations?

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A I made some assumptions, do you want me to repeat the assumptions or do you just want the actual number I came up with, 523 MCF a day.

Q All right. Now, what were your assumptions?

A My assumptions were that the oil zone gas oil ratio would be 1342 which is what we actually experienced in May of 1965, that the oil zone solution gas oil ratio would be 217 cubic feet per barrel, reservoir pressure 1200 pounds, formation volume factor 1.129 and the 2 factor for the gas is 0,871.

Q Did you make any other assumptions?

A None.

Q Did you assume that the conditions would be the same in the field in the future as they are today, that is that there are 13 gas wells and 9 oil wells?

A The way this rule is written, it makes no difference how many gas wells you have or how many oil wells you have, that's the reason I simplified it to this, if you had 100 gas wells and 8 oil wells the rate for the gas would still be the same, its voidage per acre, that we are looking at on each surface acre.

Q Excuse me if I seem a little bit dense, but this formula is a little beyond me and that's the reason I am asking for some explanation.

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A Right.

Q Then if there are 100 gas wells and eight oil wells, assuming this situation, then each of the gas wells would still be allowed 500,000 cubic feet per day or 523,000.

A That's true, if the basic assumptions are still under your gas-oil ratios and pressures.

Q Assuming that the oil wells declined, would this in any way affect the allowable for the gas wells?

A If they decline to a point below the allowable we have requested?

Q Yes.

A It depends on how they decline, if the gas-oil ratio didn't change, the voidage, of course, would change for the oil zone well and it would reduce the take from the gas cap.

Q Then if these wells say in an area are substantially down, there is a likelihood that under your formula that the gas wells would then be cut to maybe 250,000 feet a day?

A I don't visualize this occurring. I don't think it will occur.

Q It's not possible?

A It's possible but I do not think it will occur.

Q And as I understand you then, additional gas wells, the drilling of additional gas wells would not reduce the

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allowable for the existing wells?

A Not unless, not as far as these rules apply. Now the man that is purchasing the gas may limit your sales from the field, of course, by his limitation.

Q Assuming there is a market?

A Right.

Q Mr. Seidel, have you considered any other formula for the withdrawals from this pool?

A No, sir.

Q Or have you considered any other rules?

A No, sir, I haven't.

Q Are you familiar with the order of this Commission in Case Number 3246 in connection with the Macy-Queen Pool?

A No, sir. I am not.

Q Would it materially affect the correlative rights of anyone concerned if the gas liquid ratio was increased to four or five thousand cubic feet of gas per liquid hydrocarbons as was done in Case 3246?

A Let me see if I can rephrase your question or understand it. Do you want to know if it would be good conservation practice to produce the Todd Oil Zone with the limiting ratio of 4,000 to 1?

Q That's right.

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A It would appear to me that the gas-oil contact should remain the same and the rate of withdrawal from the oil zone, as long as this occurs, would be detrimental to the recovery from the oil zone.

Q Are you familiar with the Macy-Queen Pool in Lea County?

A No, sir, I am not. I don't believe we have any production in this field.

MR. JENNINGS: Mr. Examiner, do you have at your fingertips the contact with the Macy-Queen Pool.

MR. LOAR: Sixteen is the oil and 1631 is the gas.

Q Then you don't know whether that's a comparable pool to this or not?

A I would have to study it to see if it were.

MR. NUTTER: Mr. Jennings, is that a pool we had a hearing on quite recently?

MR. JENNINGS: Yes, sir.

MR. NUTTER: Is that the one where Cactus Drilling Company has some, and Shell Oil Company has some wells?

MR. JENNINGS: I don't know, sir. This was on a caption for amendment to rules, this was an order entered on July 13, 1965.

MR. NUTTER: Just answering offhand, I would say

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there is not a great deal of difference. You have high ratio oil wells in there, poor gas wells here. You have got a solution gas oil ratio of 217 evidently. I don't think you have got any high gas oil ratio wells here, have you?

A I think we are probably producing some free gas. Our ratios as being reported now are on the order of 1300 cubic feet per barrel. We are probably producing some free gas.

MR. NUTTER: I didn't realize you were producing at that high a ratio.

A It's not to the second step of 4,000 cubic feet per barrel and I might add that I think our free gas is a result of free gas association created by the withdrawal from the gas cap reducing the pressures. I think our free gas is probably coming from the oil zone.

MR. NUTTER: Do you have a bubble point on this oil?

A No, sir, we have assumed that it would be the original reservoir pressure. We do plan to get fluid data and see if we can't come up with some further parameter for this equation.

Q Mr. Seidel, how do you explain this gas well that Skelly has in Section 36 which is offset by your two oil wells?

A I think almost any anomalous data in practically,

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or apparently anomalous data you will have a separate interval below what appears to be your contact, gas-oil or oil-water, and your permeability could affect the production from that particular interval. We have actually observed this in one reservoir in the Gulf Coast area that is off of Texas that has the whole south end of the dome that is watered out. The only explanation you can have for this, it goes right up to the top of the structure. That is the only explanation we can come up with for this occurrence. Of course, any time you have a gas-oil contact, it is never clean cut unless you have a real nice highly permeable unstratified heterogeneous reservoir, you are going to have anomalous tests such as the one you are describing here on this Skelly Hobbs State Number One.

Q Is this well producing any fluids?

A We have had some difficulty in trying to determine what any of the gas wells may be producing in the way of fluids in this field. I have had some difficulty --

Q Did you make any investigation to determine if the Skelly well was producing any fluid?

A Well, it's difficult when it's not reported to determine this. If the information is not available to us we can't find out. Actually, the well can be producing a barrel a day and we can have storage and the gas wells would have storage to handle three months production and then you run

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your oil and report it to the Commission.

Q Mr. Seidel, I believe you stated that there was a contact between the oil and the gas in the "J" zone?

A Yes, sir.

Q Do you have any evidence of any contact whatsoever in the "H" zone?

A I think so. We probably have some hint of this evident in the Atlantic Number One State "BA" in the Northwest Northeast Quarter of Section 34. This well actually reported some oil production to the Conservation Commission to more or less substantiate this three barrels of oil that is reported here on the test. I would have to check it. I think it reported about 180 barrels of oil in June of '65, May or June.

Q That's the only one?

A I would admit this is very slim evidence and we don't have any strong evidence that an oil column exists in association with this gas cap in the Yates Zone, neither do we have any evidence that there does not exist an oil column.

Q The only evidence you have is that in the Atlantic Well, which is the three barrels?

A That's the only one I am aware of now.

Q Have you checked the other wells to determine if there is any oil?

A I found no evidence in the information that was

available to me.

MR. NUTTER: Do you have any knowledge of the gravity of the liquid that was produced at that one?

A No, sir, I do not. I don't think that there would be much liquid in this cap gas, I think it would be pretty dry, but there would be an indication where there was an oil column.

Q Mr. Seidel, how long has it taken you to gather together the material upon which you based your observations today?

A I imagine the total time I spent, just myself, and I didn't gather all the data, I had some help, just my own time amounted to two to three weeks?

Q Over how long a period?

A Oh, since January, 1965, when we became involved in this.

Q And you have been working at it ever since you got the first oil well?

A Yes, that's right.

MR. JENNINGS: I believe that's all, I have no further questions.

MR. NUTTER: Are there any questions of Mr. Seidel?

CROSS EXAMINATION

BY MR. NUTTER:

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Q Mr. Seidel, as you know, and as evidenced by one of your rules here, a gas pool in New Mexico has two proration periods during the year?

A Yes, sir.

Q I think your Rule 10 calls for the initial gas proration period to be from 7:00 o'clock A.M. on one date to 7:00 o'clock A.M. on another date; and subsequent dates being the gas balancing periods also?

A Yes, sir.

Q Now, these rules are generally patterned after the Devil's Fork-Gallup Rules which also have two six-month balancing periods a year?

A Yes, sir.

Q Now, the Devil's Fork rules call for two bottom hole pressures to be taken a year, one for each of those two balancing periods?

A And ours call for one.

Q What would we use here, the same bottom hole pressure twice?

A Either that or a trend of the pressure data. Here again, we are trying to save a little money in conducting semi-annual pressure data tests. I think that we don't feel that so strictly that we wouldn't be willing to incorporate pressures every six months.

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Q It would provide for a more accurate application of the formula if the formula were applied to the pool?

A Yes, sir.

Q Now, in working out your estimate under assumed conditions as to what the gas allowable would be --

A Yes, sir.

Q -- I missed your producing GOR, what was it?

A 1342.

Q And 217 for the solution GOR?

A Yes, sir.

Q 1200 for the reservoir pressure?

A Yes, sir.

Q 1.129 formation volume factor?

A Yes, sir.

Q 0.871, 2 factor?

A Yes, sir.

Q Now, on your Exhibit Number 1 -- no, Exhibit 7, I beg your pardon, you compared the porosity, net pay, water saturation, and pore volume from the log analysis with the comparable data from the core analysis?

A Yes, sir.

Q One being taken from an average of six wells and the other being taken from the core of one well. How does that specific data by log analysis compare with the analysis on

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the well that was cored and was analyzed with the core data?

A Yes, sir, very well.

Q Very close approximating?

A Yes, sir, as a matter of fact, the log analysis on this particular well will check out with this pore volume within ten percent, this 0.75, not the 1.55 I have.

Q Do you remember what your net pay is on the figures on the analysis?

A I have them. I would have to dig for them.

Q And also what you calculated the porosity to be from the log?

A All right. I had fourteen feet of pay and 6.66 percent porosity?

Q What's that, your analysis?

A Yes, sir, this is on the basis of excluding footage with four percent porosity or less on this table. From the core analysis data, I didn't present it, but I had 13.9 feet as opposed to 14.

Q 13.9 feet of net pay with the porosity --

A Greater than four percent. I had a 5.2 percent average porosity and pore-volume feet of 0.72, and from the core log analysis I had 14 feet of pay, porosity of 6.66 and the pore-volume feet of 0.652.

Q So, this well is actually a poor well; the one that

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is cored is a much poorer well than the six?

A Yes, sir, it is well below average.

Q Well, when you were making the analysis of the gas area wells, you showed an average for five wells; which were those five wells and are they typical?

A I ran into a problem there as to how to treat this, and I thought if we could contain it to the wells that had no oil column and had the "H" and "J" present, I would be better off for an average value. Let's see, if I can find those. Those five wells would have been the Featherstone Federal H-27 Number 1, the Cunningham --

Q Federal H-27?

A Yes, sir.

Q Cunningham --

A Do you want the footage data or anything on this?

Q No, I just want to be able to identify them.

A That is in the Northeast Quarter of Section 27.

Q Right.

A And then Franklin, Aston & Fair's Cunningham Mark Federal 13, Section 26, Northeast Quarter; McClellan and Franklin, Aston and Fair's McClellan Texaco Federal Number 1, Section 27, Southwest Quarter. Franklin, Aston and Fair's Mark Federal Number 1, Southwest Quarter of Section 26; Franklin, Aston and Fair's Number 1 McClellan Federal -- am I repeating now?

Q Yes.

A Section 28, it's the Northeast Quarter of Section 28, McClellan Federal Number 1.

Q Yes, evidently McClellan is the operator of those.

MR. JENNINGS: I don't believe so, Franklin, Aston and Fair is the operator of all the wells in question.

MR. NUTTER: He is the operator of all the wells in question?

MR. JENNINGS: Yes, sir.

Q And those are the five wells you included in this average then?

A Yes, I had a total of 163 feet for all of the footage, with that in these wells divided by five wells, gives the thirty-three feet average.

Q What do you mean there in this explanation that the "gas productive footage overlying the oil column is not included in the averages?"

A I was trying to come up with an actual total net pay for the gas area, if I had worked on down into an area structurally lower with pay that actually had oil column in it, I think that we would have had an unfair assumption.

Q That's what I would like to know is where this oil column is, just what the area would be that would have a gas cap and an oil column. We have got one well that evidently produces a little bit of oil with that gas, and would there

be an area here that these wells could be perforated to produce oil and gas?

A Yes, sir, there would be. As a matter of fact, any one of Sunray's New Mexico State "AY" northernmost four wells.

Q If they were open in the "H" zone would also be producing gas?

A Yes, sir, although we don't have definite proof.

Q Were drill stem tests made in the "H" zone on any of these wells?

A We have drill stem tests in the "H" zone and I believe it's our Number 6 well, and it didn't give up any fluid.

Q Which one is the 6?

A This is the one in the Northeast of the Southwest Quarter of Section 36, it would be our --

Q The Northeast of the Southwest?

A The Northeast of the Southeast, I am sorry.

Q It was tested in the "H" but the "H" didn't produce gas or DST?

A No, sir, it did not give up any fluid at all. I believe that is probably characteristic of almost any drill stem test in this area if one were to be conducted.

Q Do you know of any of these wells that are completed in the "H" and the "J" zones both? They are all gas wells.

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of course, do you know if any of them were separately tested in the "J" zone?

A To my knowledge, none were.

Q But the ones that are marked "H" and "J" on Mr. Stine's exhibits are open in both zones, is that correct?

A Yes, sir, that's correct.

Q And as far as you know they are all relatively dry wells?

A Yes, sir. As far as I know they are. The ones that are structurally high are all dry gas producers.

Q Now, what was the earliest actual purchase in this Pool, Mr. Seidel that you know of?

A I would suspect that the Conservation Commission would require that the first gas completion would have to report potential and probably would have a bottom hole pressure calculated from the potential or reported on the potential. I would hazard a guess that the McClellan Number 1 would have been one of the earliest.

Q But on your Exhibit 15, September of '64 is the earliest recorded pressure you used?

A Yes, that's the earliest I could get my hands on.

Q Now, what did you estimate the initial pressure would have been; it was corrected to 1694 at a datum of minus 70. What was the initial pressure, is it --

A Initial pressure that we determined in the New Mexico State "AY" Number 3, build up pressure was 1680 at minus 31 feet.

Q Minus 31 feet, corrected to minus 70 at 1694?

A Yes, sir.

Q Now, you made the remark, Mr. Seidel, in your opinion 30,000 barrels had already been lost by the oil migration into the gas cap. What is that 30,000 based on?

A I went back to this empirical fluid data I had and calculated the expansion of this oil assuming no oil production, in other words, the cap was produced to the pressure of some 1200 pounds and about five percent of that swelling or migration of oil is gas saturation by my calculation; and then I assumed that this oil that was migrating into the cap would subsequently be pushed back down into the oil zone and recovered from the gas cap well.

Q What percentage of it would go back?

A I assumed that 95 percent of it would go back.

Q Leaving oil saturation of five percent?

A Yes, sir, which is, there again you have got your time consideration tied up there, a long time, I think it might be thirty percent rather than five percent.

Q And as a result of that calculation you came up with the 30,000?

A Yes, sir.

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Q Are there any wells producing with anywhere near either gas wells or oil wells producing anywhere near this dividing line of thirty cubic feet of gas per barrel, which is the separation point between oil wells and gas wells?

A To my knowledge there is not, Mr. Nutter.

Q So this would be a clear cut definition as far as the present is concerned?

A Yes, sir, it would.

Q You wouldn't have any well fluctuating back and forth?

A I wouldn't expect any change from gas to oil unless recompletions were effected on any of the wells.

Q Do you know what the gravity of any liquid produced from the gas wells is?

A No, sir, I didn't take the time.

Q Do these gas wells have separators on them?

A I haven't been to the field and I don't know. I would imagine they would have heaters or something of the sort because of hydrating problems.

MR. NUTTER: Are you going to have a witness?

MR. JENNINGS: Two witnesses. Now about this, we will have someone state right now for the purpose of the record what they have on it.

MR. McCLELLAN: We have the combination heater-treater.

We are producing no fluids whatsoever.

MR. NUTTER: It's all dry gas?

MR. McCLELLAN: Bone dry, we don't know ourselves; there is no gravity to be ascertained.

MR. NUTTER: No gravity of distillate. Well, that answers my question. You put your temperature at maybe one hundred fifty degrees?

MR. McCLELLAN: Well, I don't know exactly what heat it takes, we put them on there because our lines were freezing and as far as I know, no fluids at all. We have checked with the person who operates the property and he states there was no fluid whatsoever.

MR. NUTTER: Are there any further questions of Mr. Seidel?

Q (By Mr. Jennings) I passed this up, Mr. Seidel, under your proposed rules and the new Federal Power Commission regulation, do you know if the production from these gas wells will be treated as casinghead gas?

A No, sir, I don't know.

Q You don't know?

A I wouldn't think they would. You are talking about the gas wells or the oil wells?

Q Gas.

A I must confess, I have very little knowledge about

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the new FPC rule. I am aware of the various aspects of it but not in detail.

Q But you don't know what effect these proposed rules when applied to the new FPC regulation would have upon the production, upon the price of the gas? You said something about it, this is the reason I was ---

A No, sir, I don't, I understand the law does have some loopholes in it, though, like all other rules.

Q Do you know of any other fields where this Devils Fork formula is being used?

A As far as I know, this is the only field in New Mexico that is operating with this rule at this time.

Q Do you know of any other fields elsewhere?

A Well, of course, this is much better controlled than the standard old 6-B Texas rule, but the basis for it is the same to provide equal voidage in the cap in the oil zone to permit stabilization to prevent it from migrating into the gas cap.

MR. JENNINGS: That's all.

MR. NUTTER: Are there other questions of Mr. Seidel? You may be excused.

(Whereupon, the witness was excused.)

MR. NUTTER: Do you have anything further at this time, Mr. Loar?

MR. LOAR: No, sir, we do not.

MR. NUTTER: Does anyone wish to present any further testimony in this case?

MR. JENNINGS: I would like to present two witnesses, Mr. Aston and Mr. Gray. Do you want to swear them?

(Witnesses sworn.)

MR. JENNINGS? Mr. Examiner, it might be irregular but Mr. Gray feels he would like to have an informal discussion with Mr. Seidel concerning this formula. He would like to have it at this time. Now, I don't know what it would accomplish but he does feel he would like to discuss the formula.

MR. NUTTER: Do they want to discuss it here in this room or withdraw and talk it over a little more?

MR. GRAY: It doesn't matter to me, I am just trying to clear up some ideas. I want to be sure I know what they are talking about. If it's all right, we could have a discussion right here now off the record about the formula if that's satisfactory.

MR. NUTTER: Is that agreeable with you, Mr. Loar?

MR. LOAR: We have got nothing to hide, Mr. Nutter.

MR. NUTTER: Off the record.

(whereupon, a discussion was held off the record.)

MR. NUTTER: We will go back on the record, then,

Mr. Jennings.

RALPH L. GRAY, a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. JENNINGS:

Q Would you state your name and occupation, please?

A Ralph L. Gray, occupation, consulting engineer.

Q Mr. Gray, have you testified before this Commission on many occasions in the past?

A Yes, sir.

MR. JENNINGS: Do the other parties wish me to qualify Mr. Gray further?

MR. NUTTER: Mr. Gray's qualifications are acceptable.

Q (By Mr. Jennings) Mr. Gray, have you heard the testimony with reference to the initial pressure as determined and explained under Exhibit 16 offered by Sunray DX?

A Yes, sir.

Q Do you agree with the calculations and the result that the initial pressure is approximately 1694 pounds?

A Well, in the data that has been secured on the Franklin, Aston and Fair wells, we have never encountered a bottom hole pressure near the vicinity of this 1694 pounds, and that may be the situation over there in the oil part of the reservoir, but based upon what information we have on our

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shut-in pressures, we haven't encountered anything much over 1400 pounds in the gas part of the reservoir; so that I would question that this maximum reservoir pressure that they show here would be applicable to the entire reservoir and also I would think that it would probably take more than one well, in other words, to really prove this thing.

Of course, bottom hole pressures can depend upon a lot of things, including time and permeability, your reservoir and the amount of fluid that comes into your well bore and other things, and quite often we have a certain amount of error in these measurements, and I would like to see more than one well contribute to what we think might be the maximum reservoir pressures.

(Whereupon, Franklin, Aston, and Fair's Exhibit Number 1 was marked for identification.)

MR. JENNINGS: Do you want to proceed, Mr. Examiner?

MR. NUTTER: Go ahead.

Q (By Mr. Jennings) Mr. Gray, referring to what has been marked Franklin, Aston, and Fair's Exhibit Number 1, I wish you would just explain what this is?

A Exhibit 1 is a cross section which runs generally in a west to east direction through the gas reservoir and finally terminates in the Mark Federal Number 4 Well, operated by Franklin, Aston, and Fair, which is in the oil reservoir.

All of these logs are gamma ray logs, I think, except for the Number 4 Well over on the extreme right side, and that is a gamma ray density log. The cross section shows what we call the top of the Slaughter C. I think, that might represent the top of what Sunray calls the "H". Is that their "H" zone, the top of the Slaughter?

No, the "H" zone is indicated on the cross section, and we show that as the top of the Slaughter, and then our next correlation line is on top of the anhydrite marker, and you can follow it across the cross section. The anhydrite marker separates what we commonly refer to as the upper zone and lower zone.

MR. NUTTER: That would be the "H" and the "J" of Sunray's?

A The log on the extreme left side of the cross section is the Franklin, Aston, and Fair McClellan Number 1 Well and we show in the color blue which indicates water bearing, and that occurred in the lower zone when the well was initially completed, tested water in the lower zone and consequently was plugged back. The cross section indicates the location of the plug, and that well is now producing from the upper zone only.

The second from the left shows the Franklin, Aston, and Fair Texaco Federal Number 1. This well flowed water out of the

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lower zone at the rate of 153 barrels of water per day with a small amount of gas, and that zone was subsequently snubbed off and the well is now producing from the upper zone.

I think the other pertinent thing is the Franklin, Aston, and Fair Number 4 Well which is shown on the extreme right side of the cross section, and that indicates that oil production is being obtained out of the upper zone which is lower structurally than wells on the left part of the cross section which produced water.

So we have a rather complicated situation in that we have water being produced higher on the structure out of the lower zone in that vicinity than we do over on the right where oil is being produced. So we think that is probably an indication that there is some type of permeability barrier between the oil reservoir or the reservoir over to the west.

Now, there is another thing that we think is a pertinent thing. The Franklin, Aston, and Fair Number 2 Well, which is in the Southwest Quarter of Section 25, had perforations in the gas reservoir which are actually lower than the uppermost perforations in the oil zone in the Mark Federal Number 4 Well which is in the Northeast Quarter of Section 25. The fact that the Mark Federal Number 2 Well produces dry gas only and no oil whatever makes us think that there can very

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well be some barrier between the Number 2 and Number 4 well. We can't conceive of a gas well being that close to an oil well and producing out of the same zone, and not producing some liquids. So we think it's significant that the Number 2 Well produced dry gas only whereas if they were connected, then you would think that there would be some liquids being produced.

The vicinity map on the cross section, of course, shows the relatively small area of the oil producing area as compared with the gas producing area. We are not certain in our minds yet just how much of the area is going to be oil producing and how much will be gas producing. We know that the area is still undefined on the north side here as far as the gas reservoir is concerned, and on the south, so there are several directions in which this reservoir has yet to be defined. So far as it has the appearance of a very small oil accumulation and a great large gas accumulation.

Under those conditions, well, it's our opinion that we need to determine some additional information. We don't feel that you can let, say, a small part of this thing really wag the big part. We think it is essentially a gas reservoir rather than an oil reservoir, and it's our opinion that additional development will be required in order to actually determine these conditions and to determine whether it is

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essentially a gas reservoir or combination, one or the other.

Q Mr. Gray, what significance do you attach to this water in the Texaco Federal that you mentioned, I think it's the second well?

A Well, this just shows that water was produced from the lower zone at a datum of as high or higher than oil is being produced in the eastern part of this area.

Q Then, it's the same zone from which gas is being produced also in the eastern part of the zone, is that correct?

A Correct.

Q Mr. Gray, have you had any experience with the application of this formula that has been proposed, the Devils Fork formula?

A No, I haven't.

Q Do you feel there is sufficient information available to establish rules for the development of this pool at this time?

A No, sir, I don't think that we have enough information to definitely realize what all of our conditions are in the reservoir and I think it's going to take some additional development in order to determine these factors.

Q Do you have any idea how much additional development it would take?

A Well, I would say that a reasonable time would be

somewhere between six months and a year.

MR. JENNINGS: I believe that's all.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, when was the pool discovered as far as the gas wells are concerned?

A The discovery well was the Jack McClellan's it was called at that time, Jack McClellan Federal Number 1 Well and this well was completed October 18, 1963.

Q October 18, 1963. What is the location of that well, please? That's the one in 28 or 22?

A It's located in the Northeast Quarter of Section 28.

Q And the oil, I believe it was stated, was discovered about the first of the year?

MR. ASTON: January, '65.

MR. NUTTER: Are there any questions of Mr. Gray?

REDIRECT EXAMINATION

BY MR. JENNINGS:

Q I forgot one thing, Mr. Gray, do you agree with the statements that have been made concerning the development of the pool on an 80-acre basis for oil and 320-acre basis for gas?

A Yes, I think those are reasonable.

MR. NUTTER: Do you have any questions?

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CROSS EXAMINATION

BY MR. LOAR:

Q I believe you stated that the discovery well was completed in October of 1963, I want to get my notes right.

A I believe that's right.

Q What was the initial pressure on that well?

A The initial pressure that we have is 1209 psi.

MR. NUTTER: 1209.

A That's at a depth of 4143 which is a plus 98.

Q First of all, what production had been had prior to the taking of that pressure?

A A very small amount, I don't think I can give you a definite figure. Of course, at that time these wells weren't connected to a market facility and so the well was produced in order to take a pressure test but the amount of production was comparatively very small.

Q Would you care to estimate it?

A I don't have any idea except in a relative way.

Q Following the production, what kind of shut-in time was used to get --

A This was seventy-two hours.

Q Seventy-two hours. Have you taken any initial pressures on any of the other wells you have completed in this field?

A The Texaco Federal Number 1 Well after seventy-two

hour shut-in period had a pressure of 1446 psi at a depth of 4206 which is plus five datum.

Q How much production had preceded the initial taking of that pressure?

A Well, there again, that well was not connected to the marketing facility and had produced only a small amount.

Q All right. Do you have any other pressures?

A Shut-in pressure on the Mark Federal Well Number 2 was 1143 psi.

MR. NUTTER: 1143?

THE WITNESS: 1143.

MR. NUTTER: Do you have the datum for that, and the shut-in time?

A That was a shut-in time of seventy-two hours. This doesn't show the depth on that. We would have to get that.

Q Again, has there been any production from the well prior to the taking of that pressure?

A Only on a small time interval comparatively like the other well.

Q Had the field been on production at this time?

A The Mark Federal Number 2 was completed on January 8, 1964, and sales from the field were started in April, 1964, so there had been some production marketed prior to that time.

Q In your opinion, was this Mark Federal Number 2

pressure a stabilized pressure?

A It's difficult to state without taking more elaborate tests, these tests were made by shutting the wells in for seventy-two hours and running a measurement, and we are not able to state definitely just what the characteristics of the buildup might be.

Q Are these bond measurements or top hole measurements?

A These are bond measurements.

Q What, in your opinion, is the reserve of a 320 acre gas well in this field?

A It's my opinion that the testimony that Mr. Seidel made previously, I think those are reasonable estimates on both the amount of gas and oil that might be expected to be recovered. We essentially agree.

Q First of all, what is the gas price in this field?

A The gas being, the price being received by the producers is approximately eight cents per MCF, it will be slightly less than that after you deduct taxes. But, essentially, we can say that the price being paid now is eight cents per MCF, however, that won't apply throughout the life of the wells. There is a provision in the contract of the purchaser which provides that at such time as compression facilities are required, there will be a one cent deduction from that in order to pay for the compression cost.

Q Assuming that Mr. Seidel's reserves are right, and assuming that eight cent price, what is the value of the gas under each 320 acre unit?

A Well, now, I believe in order to answer you, I would have to take a little time here and go through some calculations.

Q You have agreed to Mr. Seidel's gas reserve of a 1,920,000 MCF, haven't you?

A Essentially; that didn't apply to all the gas wells, I mean, they are all different but that's a reasonably good average, yes, sir.

Q Now, if we multiply eight cents times that, what kind of gross to the producer are we looking at?

A On the entire amount of gas, that would be \$152,000. Now, the working interest is about 80 percent interest, so we have to take 80 percent of that.

Q No, I am just talking about gross, Mr. Gray.

A Approximately \$152,000. That isn't entirely right because sometime later in the life of these wells the compression facilities will be required, so at that time the price of gas will drop another cent. It will be somewhat less than that.

Q Assuming the eight cents and the 1,920,000 MCF, and since we don't know when the seven cents will come into the picture, let's take your \$152,000, we have 13 gas wells in this field.

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A Yes, sir.

Q Do we have 13?

A Yes, sir.

Q 13 times 152,000 is what, Mr. Gray?

A That would be almost \$2,000,000.

Q All right. Now then, taking Mr. Seidel's numbers of a working interest income of \$212,000.00 to the operators -- and I realize we are taking apples and oranges -- times 9 wells, what is the value of the reserves in the oil portion of this reservoir, Exhibit Number 12?

A Would you repeat your question?

Q If we multiply 9 times 212,000, which is the working interest ownership income, times 9 wells, what kind of value do we come up with for the present oil column at the present time?

A I am not sure whether we are in agreement here on what we are doing. Let me go back just a minute.

Q All right.

A We are going to have to make some adjustment here. There again we have got this one-eighth royalty thing and at least as far as the Franklin, Aston, Fair property is concerned, they have about a twenty percent royalty.

Q Mr. Gray, the purpose of my question is this. You stated, I believe, some place in there that there was a very

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large gas accumulation, that there was a relatively small oil accumulation; that we should not restrict the gas. My inference that I drew is that we should not restrict the gas reserves to the oil reserves because of the vast difference in the value. I understood that you agreed that Mr. Seidel's reserve numbers and dollar numbers were someplace in the general ball park.

A As far as the reserve figures.

Q So that in effect, under the present state of development, aren't the oil reserves and gas reserves approximately the same value?

A Well, let's see. You have got a gross income of \$212,000 on 80-acre spacing and 9 wells. So, as far as your comparative values are concerned, they are close to the same value for the gross, approximately, yes, sir.

MR. JENNINGS: Thank you, sir, thank you. That's all the questions, Mr. Nutter.

MR. NUTTER: Are there any other questions of Mr. Gray? You may be excused.

(Whereupon, the witness was excused.)

MR. JENNINGS: Mr. Aston.

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

DIRECT EXAMINATION

BY MR. JENNINGS:

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Q State your name and occupation, please?

A Rodgers Aston, president, Franklin, Aston, and Fair, Incorporated.

Q You are the operator of a number of gas wells in the Todd Pool, Mr. Aston?

A This is correct.

Q Mr. Aston, to date what is your overall expenditure for the gas wells that you have drilled in the pool?

A Tom, you ran your calculation yesterday, give me --- roughly \$300,000.00

Q What is your recovery to date?

A We have got, approximately one-half on the wells that have been drilled to date has been recovered.

Q Generally, what is the recovery or the daily gas sales for each of the wells?

A Well, it varies considerably as you can see from these figures here. Your average production from the Mark Federal Number 1 is 530,000 cubic feet per day, and the low well is McClellan Federal Number 1, 415,000 MCF per day so there is a wide variation but it averages somewhere in the neighborhood of a million cubic feet per day across all the wells.

Q Who drilled the first well in this pool?

A The well was actually spudded by Mr. McClellan and

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taken over by us. We drilled the first well and are the preponderant interest owners in this area.

Q And you have developed the field to the western portion of the pool?

A This is correct. We have to the extent that we had the same indication that there might be a small fringe of oil production around the flank of this field to the extent that we drilled the -- if you will hand me that map. Just a moment. We drilled the American Trading down here on the same theory that Sunray then proceeded to make their development in Section 6, 8, 36, Northwest of the Northwest.

Q Could you tell me what that exhibit is that you have in your hand, Mr. Aston?

A This exhibit here, this is merely a placing of our lease ownership in pink on the exhibit as presented by Sunray.

Q How is that exhibit identified?

A This exhibit appears to be in the Todd San Andres field, is the designation on it. Exhibit Number 1, I beg your pardon.

Q And what have you done to that exhibit since it was offered?

A Merely colored in in red the ownership and lease of Franklin, Aston, Fair, Incorporated, I might just say that

in the area which we are discussing right now, Franklin, Aston, Fair owns 5,680 acres and Franklin, Aston, and Fair, Incorporated in the field proper as designated by this particular plat, the statement was made this morning that in round figures, the acreage involved in this case was 5,000. If this is the case, approximately 3750 acres to 5,000 is in lease to Franklin, Aston, Fair who discovered the field in the first place.

Q How do you feel that the proposed rules would affect you, Franklin, Aston, and Fair?

A I can't speak as an engineer, I just happen to be the guy that signs the check and pays the bill, but I can't help but feel that economics is vitally important in any of the considerations. These wells on an average, I would say, would take a minimum of 30 to 34 months to pay out under the present circumstances. If we cut back to the formula that these gentlemen are proposing, for example, our highest well would be cut back approximately 66 percent in production, so that it would have not only a detrimental effect, it might make it impossible for us to continue to drill these wells. These gas wells will be such tremendously long pay, it is questionable whether they will be economically feasible.

Q Do you feel that you can continue the development of your acreage in the area on this basis?

A It would be subject to extremely careful analysis and soul searching. For example, at the present time, as was pointed out this morning, we have staked the Mark Federal Number 5 well designated to the Oil Conservation Commission as oil combination, which is a north offset to the Northeast offset to the Number 1 Sunray well; and we feel that while we are still actively drilling in the area trying to delineate the scope and side of this oil deposit on the fringe of what we have considered to be a gas field, we certainly would hate to see any rules promulgated that would preclude the orderly development of this field until we have more information. We have got another \$45,000 on the line right now, and we would like the privilege of evaluating before we determine what our situation, what our positions are going to be on some of the suggested rules and regulations.

Q Do you have any suggestions to make?

A Yes, I do have one suggestion. Certainly I felt Mr. Gray's observations concerning the need for more time were extremely to the point. We have been in the area actively drilling and making the discoveries since October of '63, and it does seem to me that when oil was discovered in January of '65 that suddenly we were in such a drastic situation. It was a little bit unfair to those who have been out on the firing line for several years now and have discovered the area

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that is now in question. We certainly have dedicated our lives to conservancy and good oil field operations and we intended to do so the rest of our operational life. We certainly don't want to be placed in the position that investments made in good faith over a long period of time are suddenly and completely changed. For example, the one question that comes to my mind, and maybe Mr. Nutter, the Examiner, can clarify this for me, I still don't know if this is a declared gas cap because we are producing casinghead gas from our wells.

MR. NUTTER: I am not on the FPC, I think they recognize gas wells as being wells that are defined by regulatory agencies, I don't know.

A - That is what I understand but what I am asking what is the Oil Conservation Commission's viewpoint on this if this designation as listed -- as I understand it here, it says an oil and gas field; are we classed in our gas production as gas production from an oil field; or are we classed as a combination gas and oil field? The reason I asked, this in itself would be an additional twelve and a half percent drop in the volume of our products up there because we will have to share two cents per MCF with the pipeline which means that on eight cents, we would be getting seven cents, which is another twelve and a half percent dock that would merely prolong

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the payout and seriously and adversely affect the interests and development in this area.

MR. NUTTER: I don't think that this matter has caused any great problem anywhere. Now, you take some of our main gas pools, the Jalmat, ^{Summit} ~~Maljamar~~, and Blinebry are just three of our biggest pools and we classified oil wells, in those gas pools, and gas wells in the oil pools, whatever you want to call them, and I don't think it's created any great problem, having two types of well in a single reservoir.

A I think anyone who has been in the oil business any length of time can look back over a great many of the companies when they turn deals down on the basis of an eighth being carved off, that made the deal no longer economically feasible. This would have tremendous interest to us. I can't help but almost be a little amused at times when I see projection of economics on these things that don't take into consideration the working interests. One of the questions directed to Mr. Gray was not net but gross, I am talking about gross but unfortunately we pay out bills out of net, not out of gross. I am always interested in the net dollars after you have paid your working interest, but thank you for the information you supplied, Mr. Nutter.

Q Mr. Aston, did you color in that exhibit to show your interests?

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A Yes, I did.

MR. JENNINGS: I have no further questions.

A May I say this in conversation, some little time back, oh, I would say about a week or so ago, I was rather assured by Sunray that I needn't be too alarmed about this hearing; that the formula they had, would not adversely affect the take from these wells and when I see the formula actually applied and see cuts in the neighborhood of anywhere from thirty to sixty percent, I think it's obvious that my concern grows by leaps and bounds and I feel that the interest we had become so intense now that certainly it not only is wise from a financial standpoint that we know more about this reservoir and why we have, for example, water production in a well above a point where we have gas production in another well, and why we have oil production below water production in the same general formation, what happens on these permeability barriers and so forth. I think it is vital that we have more time to give this, the consideration that in fact the multimillion dollar deal merits.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Aston, when you mentioned that it would take thirty to forty months, were you discussing a well under Sunray's proposed allowable or under the average take you have

been getting?

A Under the experience in the field which we have had and have been living under, the take that the pipeline --- actually there is no allowable, as you well know. The only allowable that has been instituted has been the ability to take the product and the ability of the wells to deliver the product to the market. And on this average deliverability over a period of time our average payout on good wells, indifferent wells, and poor wells has been approximately thirty to thirty-four months; and I merely extrapolated that forward to what a reduction of even one-third would do to our payout here, and it can't help but cause grave alarm on the part of our organization.

Q Now, some of your better wells, just for example your Mark Federal Number 1 in all probability has paid out in much less than thirty or forty months?

A It's paid out, but how many months was that in paying out, what was the completion date on that? Approximately two years; not this, of course, is one of our best wells.

Q Well, the first full month of production was May of 1964, according to Sunray's Exhibit 18, and it's produced 626,000 MCF of gas in a year.

A Yes, as I say, this average is across all of our interests in that area and we always intended to look at a thing more or less in the unified sense, because the good

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wells have to pay for the sorry wells, you know.

Q Is this Sunray Exhibit correct, Mr. Aston, in that it shows you to have six gas wells in the pool?

A We have six gas wells and this Mark Number 4 which is an extremely light oil well.

MR. NUTTER: I see. Are there any questions of Mr. Aston?

MR. LOAR: I have no further questions, Mr. Nutter.

A If I might, I would like to add in support of our request that this field be given time to evaluate, I would merely like, in closing, to quote Mr. Seidel's remark. He said, "We plan to get better data." That's exactly what we plan, and we have got \$45,000 on the line right now to try to determine that.

MR. NUTTER: I only have one copy which I colored in. The number of acres became a part of the testimony in this and I think it's pertinent we have this exhibit. It will be identified as FAF Exhibit Number 2 on the wall.

(Whereupon, FAF Exhibit Number 2 was marked for identification.)

MR. NUTTER: Does anyone have any further questions of Mr. Aston? You may be excused.

(Whereupon, the witness was excused.)

MR. JENNINGS: I would like to recall Mr. Gray for

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the purpose of offering this exhibit which I put up.

MR. NUTTER: Mr. Gray.

MR. JENNINGS: Mr. Gray, was FAF Exhibit Number 1 prepared by you?

MR. GRAY: Yes, sir.

MR. JENNINGS: We will offer that in evidence.

MR. NUTTER: Franklin, Aston, Fair's Exhibits 1 and 2 will be admitted into evidence. You are excused, Mr. Gray. Does anyone have anything they wish to offer in Case Number 3298?

MR. JENNINGS: I understand Mr. Ben Coppes of Capitan, Incorporation has a statement.

MR. COPPES: I could clarify your FPC rulings insofar as this gas is concerned. Any gas from a gas well would be eight cents, but any gas from either an oil well or a gas well the allowable of which is determined by an oil allowable would be seven cents; so in other words, what I think the crux of it is, if you classified and set this gas, presuming it's not associated now, if you made it as a gas reservoir, depending upon the oil allowable the price would be reduced.

MR. NUTTER: Would this also be true in the case of a pool where the gas wells are assigned an allowable based upon the GOR limits where the oil pool is multiplied by the oil allowable --

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A Yes, sir.

Q -- by an acreage factor?

A Yes, that's correct, if it's controlled in any way by your oil allowable.

MR. NUTTER: I see. Does anyone have anything else they wish to offer in Case 3298?

MR. KAMMACK: We would like to concur with the Applicant on 80-acre spacing in the oil pool and we have no objection to the 320-acre spacing provision in the gas cap. However, I might mention that under the original hearing for establishing the pool, we recommended 640 acres and we still think this would be a desirable feature with flexibility to come back to 320 if an operator desires; and then I think as all people in the conferece here agree, we agree and think that oil can be lost from the oil column by allowing this oil column to expand into the gas cap, and for this reason we think that it's necessary to balance in some way the withdrawal from the gas cap against the withdrawal from the oil zones and we think the method that the Applicant has set out here is a method that will prevent any migration of oil into the gas cap and we therefore recommend that the Commission adopt the rules that Sunray has proposed.

MR. NUTTER: Mr. Kammack, would you give your full name?

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MR. KAMMACK: Van Kammack.

MR. NUTTER: What is your address, please?

MR. KAMMACK: Roswell.

MR. NUTTER: Anyone else have a statement to make?

MR. SELINGER: Skelly operates one gas well and three oil wells and I believe at this time we have the advantage of experience because we operate two oil wells and have had similar experience to this in the Devil's Fork, and I believe that the Commission there has established the proper policy for combination fields in New Mexico, in desiring to use engineering and reservoir information with respect to the proper withdrawal on equivalent volumetric basis between all types of wells form a reservoir.

The proposed order in itself indicates that it is of a temporary nature, the maximum limit being August, 1966 for a review or redetermination by the Commission based upon this past year's performance. However, there is nothing in the proposed rules nor is anybody prohibited in coming before the Commission at an earlier date if anything is going wrong with the formula.

It is true that the discoverer and the one having the most acreage should have preferential treatment; and I for one would take off my hat to the man who discovered the field. However, we have got to look at it from not "proration is

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good for the other fellow," we have got to look at it that proration is good for all of us.

We have a gas well with 872,000 cubic feet. If this formula goes into effect, we will be cut down to 200,000 cubic feet per day. We are going to take a loss on that. We have got one oil well that can only make 33 barrels. We have got another oil well that is a top allowable.

We are going to take a cut in our current daily income from the institution of these temporary rules, but we believe that the matter of principle of a volumetric equivalent to equal treatment of all wells in a reservoir necessitates an action on the part of the Commission in doing your duty to protect correlative rights, to prevent drainage and prevent economic waste, which certainly will occur if there is any possibility that oil will be drained into the dry gas cap. We don't know, maybe nobody knows. Now, I would rather be on the safe side and until 1966, or a year's time, prevent any possibility of waste.

MR. NUTTER: Anyone else have a statement? I believe the Applicant can go last. Mr. Jennings, would you care to make a statement? Do you have some telegrams?

MR. DURRETT: I have a telegram from Charles B. Reed to the Oil Conservation Commission reading as follows: "Working interest owners in Case 3298, Todd-San Andres Field,

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Roosevelt County. The engineering data available at this time does not indicate an associated oil and gas field. Recommend that the Commission withhold any action until more information is available."

Also we have a telegram from J. S. Mackley, division manager for Texaco in Midland, reading as follows: "Case 3298, Texaco believes Todd-San Andres is two separate reservoirs, separated by impermeable anhydrous section for a gas reservoir above and oil reservoir below. Insufficient production and reservoir data preclude definite proof at this time. Classifying this as one large gas reservoir is not substantiated by available production history and would tend to limit the development in the field. However, Texaco does not concur with the Applicant that this is an oil reservoir with a gas cap. We recommend that the docket be left open until pertinent data becomes available." This is all the correspondence regarding this case.

MR. JENNINGS: I think it's quite clear that in our position, as Mr. Aston stated, they have a tremendous investment here and the proposed rules would certainly result in a substantial curtailment of their take. We do not feel that we have had an ample opportunity to evaluate the situation and we feel that all concerned will be better able to evaluate it better six months from now probably than we are

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now.

Sunray has proposed a very highly technical and theoretical formula and it's only been applied on one occasion in New Mexico. Since January, they have been working on this to substantiate their position and we have had very little time. We feel that it would be quite premature at this time to establish these rules. We feel that if we waited for another six months to see what develops in the area, it might better explain some of these areas where there may or may not be contact between the gas and the oil. Maybe there is some block there that we don't know about at this time which will be further explained, and we just feel if the Commission would withhold taking any action for at least six months that it would better serve all concerned.

MR. NUTTER: Thank you, Mr. Loar.

MR. LOAR: The only evidence in the record is that there has already been approximately 30,000 barrels of oil lost to the gas cap which cannot be recovered for anybody and that's sheer waste. There is also evidence, based upon Mr. Gray's testimony and Mr. Seidel's testimony, that the relative value of the gas and the oil are approximately the same or maybe even the oil is greater if you consider the changes in gas price.

Sunray does not seek to harm Franklin, Aston, and Fair

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or any of the other gas cap operators, but we do believe that the Commission is faced with a problem of preventing waste and this waste is a substantial amount. We are requesting a temporary rule. We are requesting permission to proceed to gather data and certainly if we are wrong, we will be the first to admit it; but every bit of reservoir engineering data that has been gathered would indicate that our position is sound in this matter. We would ask the Commission to adopt a rule such as we have suggested here today on a temporary basis and in the future reopen this matter to consider additional data that might be available. Thank you, sir.

MR. NUTTER: Thank you. Does anyone have anything they wish to offer in Case 3298? We will take the case under advisement and the hearing is adjourned.

(Whereupon, the taking of the hearing was concluded.)

* * * * *

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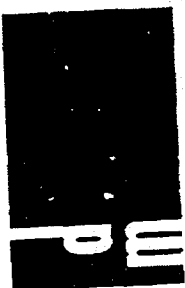
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WITNESS

PAGE

RODGERS ASTON

Direct Examination by Mr. Jennings
Cross Examination by Mr. Nutter

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EXHIBIT

MARKED

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, pages 1-47, is a true and correct record to the best of my knowledge, skill and ability.

I, DENNY WATTS, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, pages 48-101, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, I have affixed my hand and notarial seal this 13th day of September, 1965.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:
June 19, 1967.

IN WITNESS WHEREOF, I have affixed my hand and notarial seal this 13th day of September, 1965.

Denny Watts
NOTARY PUBLIC

My Commission Expires:
April 9, 1969.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3298, heard by me on 8/26, 1965.

[Signature], Examiner
New Mexico Oil Conservation Commission

SUNRAY DRILL COMPANY
RESERVOIR FLUID DATA
OIL ZONE
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

RESERVOIR DATA	PRESSURE BUILDUP	LOG ANALYSIS (1)	CORE ANALYSIS (2)
Porosity	ϕ	6.5% (1)	3.3%
Net Pay	ft.	25	46.8
Water Saturation	S_w	30.0%	-
Pore Volume-feet (3)		1.63	1.55
Capacity, md-ft.	144.7		39
Average Permeability, md.	4.7		0.9

FLUID DATA

Formation Volume Factor (4) B_o	1.16
Gas-Liquid Ratio (4)	275 c.f./Bbl.
Viscosity (Saturated) (4) μ_o	6.8
Tank Oil Gravity	24°API

- (1) Average for six Sunray wells on N. M. State "AY" Lease. Footage with less than 4% porosity is excluded.
- (2) Sunray N. M. State "AY" No. 2
- (3) (Fraction ϕ) x (Feet of Net Pay)
- (4) Empirically determined for initial reservoir conditions.

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Sunray EXHIBIT NO. 7
CASE NO. 3298

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 12, 1966

//

EXAMINER HEARING

IN THE MATTER OF:

Case 3298 being re-opened pursuant to
the provisions of Order #R-1670-G to
permit all operators in the Todd-San
Andres Pool, Roosevelt County, New
Mexico, to appear and present all
available information concerning the
effectiveness of the Temporary Special
Rule promulgated by Order #R-1670-G
for said Pool.

Case No. 3298

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: I call Case 3298.

MR. HATCH: Case 3298.

In the matter of Case 3298 being re-opened pursuant to the provisions of Order Number R-1670-G to permit all operators in the Todd-San Andres Pool, Roosevelt County, New Mexico, to appear and present all available information concerning the effectiveness of the Temporary Special Rule promulgated by Order Number R-1670-G for said Pool, particularly as they relate to the effectiveness of the volumetric formula established for limiting withdrawals of gas from the gas-cap area of said Pool, and to the area which can be economically and efficiently drained by one well.

MR. KELLY: Booker Kelly or White, Gilbert, Koch and Kelly, appearing on behalf of Sunray DX, and I have Mr. Loar, an attorney from Oklahoma, associated with me, who will put on testimony for Sunray DX.

I am also appearing on behalf of Texaco. I think we will have some witnesses, probably at the end of the Hearing in this case.

MR. JENNINGS: James T. Jennings, appearing on behalf of Franklin, Aston and Fair, and it is possible that we will use Mr. Smith, Mr. Gray and Mr. Stephens.

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MR. NUTTER: Any other appearances?

MR. SELINGER: We will enter an appearance and make a statement at the close of the hearing.

MR. BAKER: Bob Baker, Atlantic Richfield, and we will have a statement at the end of the hearing.

MR. NUTTER: Anyone else? Proceed, Mr. Loar.

MR. LOAR: I hate to say this, Mr. Examiner, but this is another San Andres Pool. We have two witnesses.

MR. NUTTER: Let's have all the witnesses sworn.

(Whereupon, the witnesses were sworn.)

MR. LOAR: May we proceed, Mr. Examiner?

MR. NUTTER: Yes, sir.

EDWARD V. STINE

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Would you please state your name and occupation?

A Edward V. Stine, Division Exploitation Geologist with Sunray DX Oil Company, Midland, Texas.

Q Would you briefly state your professional background?

A Batchelor's Degree from the University of Wichita in Kansas. I did one year of graduate work at the University of Oklahoma, at Norman.

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Q How long have you been --

MR. JENNINGS: We will certainly admit to this witness's qualifications. He has testified in previous hearings concerning this.

MR. NUTTER: Mr. Stine's qualifications are a matter of record, are they not?

MR. LOAR: Yes, sir, they are.

MR. NUTTER: Are there any objections to the entrance of Mr. Stine as an expert witness in this case?

(No response.)

He's qualified.

(Whereupon, Sunray's exhibits were marked for identification.)

MR. LOAR: Mr. Nutter, we have put these together as a set.

Q (By Mr. Loar) Would you please refer to Exhibit Number One?

A Exhibit One is an Ownership Map of the Todd Field areas in South 35 and 36 East, and the scale of the map is one inch to four thousand feet. The various producing wells in the Todd Field are so located thereon. The yellow coloring designates Sunray DX-owned acreage.

Q Are there other San Andres pools in the vicinity of the Todd Pool?

A Yes. The northeast portion of the Milnesand Field

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is located in Section Five of 8 South and 35 East, and there's some scattered production in the Prairie Field. It is located in Sections 16 and 17 of 8 South, 36 East.

Q Would you please refer to Exhibit Number Two?

A Exhibit Number Two is a type log, being a Schlumberger formation density log on Sunray's Number Five AY State which is located 1,980 from the north, 660 from the west in Section 36, 7 South, 35 East. The vertical scale on this log is one inch to fifty feet, and, if you will turn to the bottom of the log, we have our formation designation plotted thereon, being the San Andres "H" Zone, the anhydrite bed, the San Andres "J" Zone and the San Andres "K" Zone.

Q First of all, what is the significance of the "H", "J" and "K" Zones?

A These are merely alphabetical designations that Sunray has applied to these various stratigraphic units within this portion, as well as other areas in New Mexico.

Q Could you give the top and base of the "H" Zone?

A The top of the "H" Zone is at 4134 on this particular well, and the base is 4248.

Q Now, you have shown an anhydrite bed. What is that?

A It is a twelve-foot section of impermeable anhydrite in this particular well, situated between the San Andres "H" and "J" interval.

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Q Could you give the top and base of that?

A The top of the anhydrite is at 4228, and the base is 4240.

Q Would you give the top and the base of the "J" Zone?

A The "J" Zone top, the porosity top is at 4244. The base is at 4329.

Q What about the "K"?

A The "K" Zone top is 4329 and the well was TD in that particular instance or that dimension.

Q As a basic situation, what does the "H" Zone produce in the Todd-San Andres Pool?

A Basically, it produces gas.

Q And what about the anhydrite?

A It is an impermeable barrier.

Q What about the "J" Zone?

A The "J" Zone is predominantly oil.

Q Does it have a gas cap associated with it?

A Yes, sir.

Q What about the "K" Zone?

A The "K" Zone was the water zone in this particular area.

Q In this Pool, does it produce any oil?

A No, none.

Q Are these various zones that you pointed out here correlative throughout the Todd-San Andres area?

A Yes, they are.

Q Will you refer to Sunray's Exhibit Number Three?

A Exhibit Number Three is a structural map of the top of the San Andres "H" Zone. The scale of the map is one inch to two thousand feet, and the contour interval is twenty-five feet. All of the leading values of the "H" Zone top have been applied below each well, along with the "H" and "J", whichever might apply, as to the producing interval.

All activity since the Hearing in August of '65 has been designated by the triangle around the actual well locations.

The red coloring around the various wells designates that that particular well did penetrate the San Andres pay zone, and the green designates those wells that penetrate only the San Andres "J" Zone.

Q Mr. Stine, in Section Thirty-Four of Seven South, Thirty-Five East, I note a well with designation "G" and "H" on it. What is this designation, "G" and "H"?

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A In this particular case, the well being the Atlantic Number One, BA State, this well is perforated in the "H" Zone as well as above the "H" Zone which is our section that we call the "G" Zone.

MR. LOAR: If the Examiner please, we will comment on that later in our cross section. I think we can point it out better.

Q (By Mr. Loar) Again, what is the production in the "H" Zone?

A Predominantly gas.

Q Is there any oil production from the "H" Zone?

A Only a small amount that was indicated in the Atlantic Number One BA State.

Q Would you please refer to Sunray's Exhibit Number Four?

A Exhibit Four is a structural map on top of the San Andres "J" Zone. As in the previous exhibit, the scale is one inch to two thousand feet, and the contour interval is twenty-five feet. Here again, the "J" Zone's values appear below each well location along with the alphabetical designation as to what each well is producing from. Also, the triangles around the various wells designate the activity since the Hearing in August of 1965.

Q What is the production from the "J" Zone at this time?

A Basically gas -- excuse me, oil.

Q Do we have a gas cap associated with this?

A Yes, sir.

Q Are there several wells producing from the gas cap of this "J" Zone?

A Yes, sir.

Q And, are there several oil wells producing from the oil column of this "J" Zone?

A Yes, sir.

Q All right, sir, would you please refer to Sunray's Exhibit Number Five?

MR. LOAR: Mr. Examiner, this exhibit is kind of spread out. Could we do something with it here to help you?

MR. NUTTER: Why don't you just put it up there on the wall. Here is some scotch tape.

Q (By Mr. Loar) Would you please proceed to discuss Exhibit Number Five?

A Exhibit Number Five is Cross Section "A" to "B" and starts at Franklin, Aston and Fair's Number One Skelly Well. If you will notice, the index progresses across various

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gas wells, across the oil interval, and ends up on the southeast with Franklin, Aston and Fair's Number One American Trading.

In all cases, we have used porosity logs -- Schlumberger porosity logs. The vertical scale is one inch to forty feet and we have applied no horizontal scale whatsoever. The actual cross section is hung from a sea level datum plus one hundred feet. The various markers, the "X" markers, previously mentioned "H", and the anhydrite bed and the "J" Zone are designated at these points.

Now, the datum values for these particular formations have been designated on the left side of each log, along with the top and base of the perforated interval. Also, the coring or testing along with the perforation and the completion, and the completion date has been applied to the bottom of each log.

Q Will you show the "H" interval in here, please?

A The "H" interval is this zone.

Q All right, and will you show the anhydrite stringer?

A The anhydrite is the stippled area at this point.

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Q All right, and now the "J" Zone?

A The "J" Zone is your lower portion.

Q Now, is the "H" Zone continuous and connected throughout this cross section?

A Yes, it is.

Q Is there any faulting or any break-up interior barriers in here which might break this into different varieties?

A None to our knowledge.

Q What about the anhydrite bed?

A It is continuous throughout the productive area of the field and, from our knowledge, is impermeable.

Q What about the "J" Zone?

A The "J" Zone is continuous throughout the entire field there.

Q Is there anything from a geological standpoint which would prevent one well from draining in excess of three hundred and twenty acres in the gas cap and in excess of eighty acres in the oil column in the two main zones there?

A In my opinion, they will drain.--

MR. NUTTER: Now, Mr. Loar, when you said the "gas cap", did you mean the "H" Zone?

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MR. LOAR: I intended the "H" Zone and the gas cap of the -- I should have stated the -- may we start again, Mr. Examiner to clear the record?

MR. NUTTER: Yes, sir.

Q (By Mr. Loar) Start with the "H" Zone, Mr. Stine. Again, what is the production from the "H" Zone?

A Basically, gas.

Q What, from a geological standpoint, would one well drain?

A In excess of three hundred and twenty acres.

Q Now, referring to the "J" Zone, what is the production from the "J" Zone?

A Basically oil.

Q Do you have a gas cap associated with it?

A Yes, sir, we do.

Q What would one well drain in the gas cap of the "J" Zone?

A In excess of three hundred and twenty acres.

Q What would one well drain in the oil column of the "J" Zone?

A At least eighty acres.

Q Refer to Well Number Three on this cross section, if you will, please, and point out the "G" Zone that we

referred to a few minutes ago.

A The actual "H" is on top at this point. The "G" Zone that we are referring to in this particular well is at approximately 4,099 feet.

Q What are the perforations in this well?

A The perforations that are open now are at this point in the "H" Zone, as well as these two points at what we are calling the "G" Zone.

Q What is the well producing?

A It is basically a gas well with some oil being made.

Q All right, in your opinion, is any of the "H" Zone contributing to the production of this well?

A In our opinion, it is not.

Q Why?

A It appears to be tight at the zone where the well is perforated.

Q Are these sections correlative throughout the field?

A What are you referring to?

Q I am talking about the "H" and the "J" and the anhydrite. Let me rephrase that. Are the "H" and the anhydrite and the "J" Zone correlative throughout the field?

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A Yes.

Q All right, sir, would you refer to our Exhibit Number Six? Exhibit Six is short enough that we can put it on the table, or, if you like, we can --

A Exhibit Number Six is another cross section, "C" to "D", and is from north to south, starting on the north with Franklin, Aston and Fair's Number Four, Mark "Federal, and moves to Franklin, Aston and Fair's Mark "Federal Number Two", and ends up on the south with Sunray's DX Number AY Five.

As in the previous exhibit, porosity logs have been used. The section is hung on a sea level datum plus one hundred feet. The previously mentioned "H" Zone and the anhydrite bed and the "J" Zone are so designated with their corresponding datum values plotted to the left of each log. Also, the top and base of the perforations have been plotted on the left side of the log also.

The bottom of the log shows the coring and the perforated intervals, along with the potential and completion date.

Q Again, is the "H" Zone continuously connected in a north-south direction across the field?

A Yes, sir.

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Q What about the anhydrite bed?

A You can carry it in a north-south direction, as well as east-west.

Q What about the "J" Zone?

A It is continuous in the north-south direction also.

Q I would like to refer you back to Exhibit Number Five. Is there an anhydrite section between the "G" and "H" across the field?

A Not between the "G" and the "H". There is a dense carbonate section but no anhydrite.

Q Is this an impervious section?

A In our opinion, it is.

Q It is continuous throughout?

A We correlated it throughout most of the area.

MR. NUTTER: Mr. Stine, is the "G" Zone perforated in that Atlantic well? I mean, is that the only well that it is perforated in?

A Yes, sir, it is.

Q (By Mr. Loar) From a geological standpoint, in your opinion, are the "H" and "J" separate zones?

A Yes, they are.

Q Does that anhydrite stringer extend throughout the field and effectively separate them?

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A In my opinion, it does.

MR. LOAR: That's all we have, Mr. Nutter, of this witness.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Stine, the anhydrite is a separation between the two zones, the "H" and the "J", but is there a communication between the two zones in various wells?

A The only way it could be, in my opinion, would be through mechanical or man-made.

Q Are any of the wells perforated in both of those sections?

A Yes.

Q So, you do have man-made communication although nature separated the two zones with this bed of anhydrite?

A Yes.

MR. NUTTER: Any further questions of Mr. Stine? Mr. Jennings?

CROSS EXAMINATION

BY MR. JENNINGS:

Q Mr. Stine, as I understand your testimony, there are two basic pools, one a gas pool, being the "H" Zone, and one an oil and gas pool, being the "J" Zone, is that correct?

A Yes.

Q You are just a geologist?

A Yes.

MR. NUTTER: Mr. Stine, I am just an Examiner.

Are any of the wells that are perforated in the "H" Zone, perforated in the "H" Zone only?

A Yes, we have, I believe, there's three wells, either three or four, I think you can refer to.

MR. NUTTER: So, we do have some completions in the "H" Zone only?

A Yes.

MR. NUTTER: What is the nature of the liquid of those wells perforated in the "H" Zone only?

A I have --

MR. LOAR: I believe Mr. Seidel, who is our Reservoir Engineer, can testify to that better.

MR. NUTTER: He is going to testify to the actual production from the various wells?

MR. LOAR: We will submit a tabulation showing production.

MR. NUTTER: Mr. Stine is just a geologist.

Are there any questions of Mr. Stine, any geological questions?

MR. UTZ: Your engineering witness will give pressure information for these various zones, I presume?

A Yes.

MR. NUTTER: If there are no questions, the witness may be excused.

(Witness excused.)

* * * * *

HERBERT A. SEIDEL

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A Herbert A. Seidel, Junior. I am Reservoir Engineer in Sunray's Southwest Division Office at Midland, Texas.

Q Now, have you testified previously before this Commission?

A Yes, I have.

Q As a Reservoir Engineer?

A Yes.

Q Have you made a study of it?

A Yes.

MR. LOAR: Are his qualifications acceptable?

MR. NUTTER: Yes.

Q (By Mr. Loar) Will you please refer to Sunray's Exhibit Number Seven?

A Yes, sir. This is a summary --

Q Mr. Seidel, before you do, excuse me, did you hear the testimony of Mr. Stine?

A Yes, sir, I did.

Q Did you hear the discussion concerning the "H" and "J" Zones?

A Yes, I did.

Q And the data that you will present now, have you combined the "H" and "J" Zone data?

A It was necessary to combine the "H" and "J" Zone data because some of the wells and some of the production in the field are actually from the "H" and "J" Zones combined.

Q In specific areas of interest, can you break some of that data out and separate the "H" and "J" Zones data?

A Yes, sir. We can.

Q Would you please refer to Exhibit Number Seven?

A This is a summary of reservoir data obtained from a sample from Sunray's New Mexico State AY Number Four. This information is presented as a means for calculating the volumetric equivalent gas allowable for gas cap wells.

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Q What is the top pressure that you have shown here?

A Fifteen hundred and thirty-three P.S.I.A.

Q What is that?

A This is our interpretation of the original reservoir pressure in the Todd-San Andres Field.

Q Has that been developed as the result of data that you have obtained since the last Hearing?

A Yes, sir, it has.

Q All right, sir, would you refer to Exhibit Number Eight?

A This is a summary of the rock and fluid data from log analysis of nineteen oil zone completions effective to September 21, 1966.

Q Mr. Seidel, when you say "nineteen oil zone completions", are these **all** in the "J" Zone?

A Yes, they are **all** in the "J" Zone.

Footage with less than four percent porosity is excluded from the average, and we have a six point three percent porosity for twenty-four feet net pay, a thirty percent water saturation, and our pore volume footage was one point five one.

Our fluid data has already been listed on the previous exhibit, Exhibit Seven.

Q Would you please refer to Exhibit Number Nine? Excuse me, was there something else that you wanted to point out?

A Yes, sir. I neglected to point out the information we have from the three build-up pressures in this area from the oil zone wells. We had an average of 220 millidarcy feet capacity on each one of the wells, and an average permeability of 8.9 millidarcys.

Q Will you please refer to Exhibit Number Nine?

A This is comparable to Exhibit Eight, only it is for the gas cap fluids and reservoir rock.

Q At this point, what have you done? Have you lumped together the "H" -- the gas reservoir of the "H" Zone and the gas cap of the "J" Zone?

A Yes, sir. This also includes the "J" Zone footage since it is actually gas production. We have combined the "H" and "J" Zones in some of these.

For the thirteen gas cap completions to September 21, 1966, and for footage with less than four percent porosity, we have an average in porosity of five point five percent for twenty-nine feet of net pay. Water saturation of thirty percent is also indicated with a pore volume footage of one point five nine.

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The fluid data for the gas cap is an analysis of a surface sample taken from Franklin, Aston and Fair's Mark Federal Number Two; an initial gas gravity of 0.795 was measured, and this does include fluids both from the "J" and the "H" Zones. A deviation from Boyles' Law or Z Factor is 0.789, and the formation volume factor is 1.46 reservoir barrels per M.C.F.

Q Would you please refer to Exhibit Number Ten?

MR. NUTTER: Back on Nine, Mr. Seidel, there, I note that you say the gas-liquid ratio is dry. Are there no liquids produced with that gas at all?

A That is correct. I think that Atlantic State BA Number One in the "G" Zone is producing some oil.

MR. NUTTER: But, all these other gas wells are dry gas?

A Yes, sir.

Q Number Ten.

A Exhibit Ten is a tabulation of all subsurface pressure data at a minus seventy datum for the gas cap completions, or completions prorated in the gas portions of this field.

MR. LOAR: At this point, Mr. Examiner, I would like to point out that some of these may or may not have a minus in front of the seventy on the heading at the top of

the page. There should be a "minus" put in there.

MR. NUTTER: P.S.I.G. minus seventy?

MR. LOAR: Yes. We got part of them but not all of them.

MR. NUTTER: All right, proceed.

A All right, sir. This exhibit lists the results of the last two general surveys ordered by the Commission and shows, for March, 1966, an average pressure of 920 pounds and a decrease of 77 pounds through September, 1966, to a pressure of 843 pounds.

Q All right, sir, will you please refer to Exhibit Number Eleven?

A This is a summary of the subsurface pressure data at a minus seventy datum for the oil zone completions which are all in the "J" Zone, and here we have the last two general surveys tabulated for the March, 1966 and the September, 1966 surveys.

Q Are these taken as a result of the Commission's order?

A That is correct, in conjunction with the Commission's order, and the average pressure for March of '66 was 834 pounds, a fifty-two pound drop to September of 1966 to 782 pounds.

Q Would you please refer to Exhibit Number Twelve?

A This is an isobaric map of the March, 1966 survey, presented on the previous two exhibits.

Q Before you start, Mr. Seidel, I would like to comment that, on this exhibit and the following exhibit, the contour interval is a hundred P.S.I. and not a thousand P.S.I. We got part of them changed but not all of them.

Proceed.

A The horizontal scale is one inch to two thousand feet.

I might point out four areas of low pressure that I believe result in a low pressure because of low quality or lower permeability pay. This is over in the western part of the field. The McClellan Federal Twenty-Two Number One in Section Twenty-Two. The Franklin, Aston and Fair Number One, Nix Yates, in Section Twenty-Eight, the south half, and then, on the eastern portion of the field, in the oil zone, we have Franklin, Aston and Fair's Number Four, Mark Federal, Sunray's New Mexico State AY Number Two and Skelly's Hobbs "R" Number Two.

Another interesting feature shown by this map is the pressure gradient from the south to the north in the

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southern edge of the field where you have pressures ranging from 1,400 pounds on the southern edge in the oil zone on down to 900 pounds in the gas cap, and this is pretty strong evidence that the fluids would flow in the direction of the oil zone to gas cap.

Q All right, sir, would you please refer to Exhibit Number Thirteen?

MR. NUTTER: Now, again, these pressures up here in this gas cap area, these would be composite pressures of the "H" and "J" Zones?

A That is correct, for the wells that actually have the "H" and "J" opening. Of course, there you have the communication problem.

Q (By Mr. Loar) Will you refer to Exhibit Number Thirteen?

A This is an isobaric map for the September, 1966 survey, presented on two pressure tabulation exhibits, and we still have the four low pressure areas mentioned earlier in the March survey. Also indicated is the pressure **gradient** from the southern edge of the field to the gas cap area of the field across Sunray's State New Mexico AY lease to Texaco's New Mexico State CT lease.

Q Would you refer to Exhibit Number Fourteen?

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A This is a tabulation of the production history from the oil zone including the oil-solution gas and water production from January of '65 which is the first month of production, through July, 1966.

Q Would you refer to Exhibit Number Fifteen?

A Exhibit Fifteen, you have a comparable production data for the gas cap of the Todd-San Andres Field. Production begins in April of 1964 and is included through July of 1966, and also included are production data from Atlantic's New Mexico State BA, oil and water.

Q So, included in this tabulation you have the "H" Zone gas reservoir, the "J" Zone gas cap, and the "G" Zone production?

A That is correct.

Q As a result of the Commission's order approximately a year ago in the Todd-San Andres Field, did you run an interference test?

A Yes, sir, we did.

Q And, have you tabulated the results of that on Exhibit Number Sixteen?

A Yes, sir, I have.

Q Would you -- and, may I suggest that you refer back to Number Twelve, and would you point out on Number

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Twelve the wells which were used in this interference test?

A Yes, sir. On Exhibit Sixteen, we do have a schematic of the test area, and I want to point out these four wells on Exhibit Twelve. They are all in Section Thirty-Six. The observation well is Sunray's New Mexico State AY Number Three. This is the well that was shut in during the entire test and is located in the southeast quarter of the northwest quarter. The other three wells were producing wells during most of the test, and these are Sunray's New Mexico State AY Number One, located in the northwest quarter of the northeast quarter. The Number Four, located in the northwest of the southeast. The Number Five in the southwest of the northwest.

Q Exhibit Twelve -- what relation does the data in Exhibit Twelve have to Exhibit Sixteen?

A The pressures contoured in Exhibit Twelve are those pressures which were measured at the end of this interference test or shortly thereafter during March, 1966.

Q Now then, referring to Exhibit Number Sixteen, would you discuss that?

A Yes, sir. The dotted curve, which is the upper part of the curve; however, it is the lower upper curve;

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however, it is the lower curve over towards the left-hand part of the curve. Accumulative hours after initiation of the test are zero. We had an initial pressure plotted for the Number Three well of 545 pounds.

Q That is that dot over on the very left-hand side of this graph?

A Yes, sir. This is the flowing pressure for this well prior to shut in, and it was shut in at this time as were all other wells on Sunray's New Mexico State AY lease, and the reason we shut the wells in was to try to stabilize pressure in the area of the test.

After a hundred hours of shut in, in New Mexico State AY Number Three, it reached a pressure of 1,035 pounds.

Q That is the dotted line?

A That is the dotted line. The shut in pressures with the triangles for the Number Four well reached 957 pounds after a hundred hours of shut in, or 98 hours as we haven't --

Q What was the triangle prior to that?

A Seventy-four hours shut in pressure of 940 pounds, and it was at this point that we began producing all the wells except the Number Three well on this lease. Total production from the area was about 260 barrels per day over the twenty-three

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days of flow for these three wells. The initial flowing pressure for the Number Four well was 875 pounds. Towards the end of the test, it had declined to 832 pounds. Now, if we had gotten a good textbook example of an interference test, we would have expected these pressures on the New Mexico State AY Number Three well to begin declining gradually, certainly towards the end of this flow test.

After twenty-three days, it appeared that we were not going to achieve interference in this manner within any reasonable length of time, so we shut the well in -- shut all the wells in on the lease at a cumulative producing time of 650 hours, and you can see the pressure build-up continuing on New Mexico State AY Number Three, which is the dotted curve. Again, we have the shut in pressures for the Number Four well building up to maximum at the end of the observation period of 1,010 pounds.

Also included here are the build-up pressure points for the Number One well which, on it, we pulled the pumps and rods to see what the build-up curve character would be on this well. The maximum pressure reached here was 925 pounds.

Q Mr. Seidel, why, in your opinion, didn't you get the typical textbook example of a pressure interference test?

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A If I could refer you back to Exhibit Twelve, I would like to give you my reasons as to why this test didn't work. Referring again to the shut in well or the observation well, it is noted that we have a pretty severe gradient going from the southwest to the northeast across the Number Three well, and that is my opinion that we have a dynamic condition across this area in the northeast direction, and we would expect the pressure to change if the influx to this area was equal to the eflux.

This is apparently what has happened here.

Q What, on this March survey, was the pressure in Well Number Five on the Sunray AY lease?

A Fourteen hundred and sixty pounds.

Q Then, the pressure in Number Three?

A Eleven sixty-one.

Q And, the pressure in the AY Number One?

A Nine hundred and twenty-seven.

Q And, the pressure in the Franklin, Aston and Fair Number Five in Section Twenty-Five?

A Seven hundred and forty-seven pounds.

Q Are you saying then that the pressure gradient from Sunray's Number Five in the direction of the Franklin, Aston and Fair Number Five prevented the break-off of

pressure in Number Three that you would normally expect?

A Yes, sir. It is my opinion that this is what caused no break-off in pressure.

Q Have you calculated how far you actually got pressure interference?

A Yes, sir. From the character of the build-up curve in Number Three, we have an indicated distance to a more or less symmetrical boundary condition of about eight hundred and twenty feet. This is also the distance, or the average distance, of halfway between the producing and observation well.

Q What conclusions do you draw from that?

A This is exactly what we would have expected because this no-flow boundary gives the appearance of an actual discontinuity of permeability or boundary conditions.

Q Mr. Seidel, you have heard the testimony of Mr. Stine, and you have done considerable reservoir engineering work in this field. In your opinion, what will one well drain in the oil column of the "J" Zone?

A Primarily, based on the permeability that we have evidence of from our build-up curve of nine millidarcys, I think that one well in the oil column of the "J" Zone will

drain in excess of eighty acres.

Q In your opinion, what will one well in the gas cap of the "J" Zone drain?

A In excess of three hundred and twenty acres.

Q Now, referring to the "H" Zone, in your opinion, what will one well drain in the gas pool of the "H" Zone?

A It's my opinion that one well in the "H" Zone will drain in excess of three hundred and twenty acres.

Q In your opinion, except for the man-made communications, how will the "H" Zone and the "J" Zone perform?

A With the information we have to date, I see no reason why they wouldn't perform as two separate reservoirs.

Q Are you recommending to the Commission that the "J" Zone be continued under the present rule with eighty acre units for the oil column, three hundred and twenty acre units for the gas cap, and a volumetric withdrawal formula for the gas cap-oil zone control?

A Yes, sir, I am.

Q Are you recommending that the "H" Zone be established as a separate gas pool subject to market demand withdrawal?

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A Yes, sir.

Q Are you recommending that it be continued on three hundred and twenty-acre spacing?

A That's correct. I am.

Q Now then, Mr. Seidel, approximately one year ago, the Commission established a volumetric withdrawal rule covering the withdrawal from the gas cap and the oil column, is that correct?

A That's correct.

Q Based on the information available to you, are you able to tell the Examiner today what the results have been from this rule?

A Sufficient information is not available to date as far as to evaluate the effectiveness of this rule.

Q Why not?

A Because additional time with reduced withdrawals from the gas cap would be required. The base period, or the initial base period, from December 1, 1965 to July 1, 1966 has just gone past, and we have been able to calculate the gas allowable, and they are indicated to be over-produced, so we really don't know what this thing will do with reduced gas cap withdrawal.

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Q Referring back to Exhibit Twelve and Exhibit Thirteen, do they demonstrate a need for a volumetric withdrawal limit on the gas cap?

A Yes, sir. In my opinion, they do. I think that, from a conservation standpoint, what we would prefer is that the gas cap pressures would be approximately equal to the pressures we measured in the oil zone. This would prevent migration of fluids from either the oil zone to the gas cap or vice versa.

Q In the length of time that this rule has been in operation, have you seen such a condition -- the trend towards such a condition becoming apparent?

A No, sir, I haven't.

MR. LOAR: I believe that's all we have at this time.

MR. NUTTER: Are there any questions of Mr. Seidel? Mr. Jennings?

CROSS EXAMINATION

BY MR. JENNINGS:

Q Mr. Seidel, in your original hearing, wasn't it your testimony that a six-month trial period would enable you to evaluate the effectiveness of the formula?

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A Yes, sir, it was. However, I erred in assuming that the gas withdrawal would be five hundred M.C.F.'s on this order. As it turned out, the new completions that have been added to the oil zone are ranging, in initial production rates of ten barrels per day where I assumed eight barrels per day, and much lower initial gas-oil ratios have severely reduced the average rate of withdrawal from the oil zone wells, and, as a result of this, the gas cap wells have voided ratios. It's been a lot less than what I predicted.

Q As I understand, the bad oil wells have severely punished the gas operators in the area?

A It has resulted in less withdrawal from the oil zone, the poor oil wells have.

Q Have you had occasion to apply the formula based upon the present conditions for the last month or the month before that?

A Mr. Jennings, I have for the initial base period. I have not calculated any rates past that time because it's over a period of less than six months, or the balance of that period.

Q When was the basic period? What month was it to cover?

A The initial balancing period, or base period, and the balancing period would follow, the following six months -- would be the first seven months, actually, December 1, 1965 to July 1, 1966.

Q Then, it is my understanding that the formula has not worked as you estimated that it would in your prior testimony?

A That's correct.

Q Is there any explanation other than some of the oil wells have not been -- or that they have been poor wells?

A Well, as I mentioned earlier, some of the new completions that have been added to the reservoir -- as a matter of fact, the majority of them have been on the order of ten barrels a day producers, particularly on Texaco's New Mexico State CT lease where the gas-oil ratio is less than one hundred unit feet per barrel. And, in addition to this, the wells on Sunray's New Mexico State AY lease have not held up as anticipated.

Q If the formula is carried on after this, Mr. Seidel, can you estimate what the gas allowable for each gas well in the gas cap will be?

A I haven't tried to predict the gas-oil ratio for the oil zone, primarily because of the dynamic condition in the reservoir. The gas-oil ratios are lower now than I initially estimated. We actually couldn't measure it prior to the last year. Here, we had thirteen hundred cubic feet per barrel, now, we have nine hundred and fifty.

Q How would this affect the gas allowable under the formula?

A As long as the gas-oil ratio remains constant, which would not be the case, I wouldn't think, unless we had a water drive, the oil wells would be expected to decline and the withdrawal from the gas cap wells would also decline under this formula.

Q What can the gas operators expect one year from now under the formula?

A I haven't calculated this. Let me withdraw that statement. I do have a prediction for the gas cap wells.

MR. LOAR: Mr. Jennings, so that I can understand your question, would you mind repeating it again?

MR. JENNINGS: My question is basically this -- what can the operators in the gas cap area expect as an allowable under the formula one year from now?

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MR. LOAR: May I inquire of what assumptions you are making? Are you assuming that the "H" and "J" are separated by the Commission, as requested, or are you assuming --

MR. JENNINGS: I am just referring to the oil-gas cap zone, the "J" Zone. I am not concerned with the "H" Zone.

THE WITNESS: Then, my answer to your question is still, I have not calculated that number.

Q (By Mr. Jennings) What calculations did you make?

A I assumed that the "H" and "J" Zones would be treated as a common source of hydrocarbons and I predicted these gas rates for the average gas cap well, which would of course include some wells which are not capable of even producing eight barrels right now. It's got some of those ten barrels a day type wells included in the average.

Q It is my understanding that it was your testimony that here were dealing with two separate and distinct pools, is that correct?

A That's correct.

Q But you have not calculated -- your calculations were made on the pools combined?

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A That is correct. Yes, sir.

Q Is it possible to calculate this on the separate pools?

A I would think yes, sir, it should be possible.

Q But you have not attempted to do that?

A It would require considerable time to make a prediction.

Q Does Sunray have any wells that are completed as gas wells in the "J" Zone?

A No, sir.

Q How many wells do you actually have in that "J" Zone?

A We have six wells in the "J" Zone.

Q These are all gas wells?

A They are all oil wells.

Q All oil wells?

A Yes, sir.

Q Do these wells produce some gas?

A Yes, sir. The gas-oil ratios reported at the --
I think the last G.O.R. Survey to the Commission reflected gas-oil ratios ranging from 474 cubic feet per barrel, Sunray's New Mexico State AY Number One, on up to 6,750 cubic feet per barrel in the Number Two well.

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Q I might ask you this because I am not clear on it. What, under the formula, would be the allowable for the gas wells in the "J" Zone today?

A Mr. Jennings, I believe they would be the same as I had calculated for the combined "H" and "J" Zones, but it ~~would be~~ gas assigned over to the "J" Zone. This would be for the initial base period, approximately 170 M.C.F. per day per well. This is an average for all the gas wells.

Q All the gas wells, and that includes both zones?

A This is what I calculated for both zones but, since we are producing oil only out of the "J" Zone, this number should be the same for the "J" Zone gas cap.

Q Mr. Seidel, isn't it true that Sunray is producing more than this amount of gas from the four oil wells in the north half of Section Thirty-Six?

A You are talking about four oil wells?

Q The only four oil wells in the north half of Section Thirty-Six, Sunray's Number One, Two and I believe Three and Five?

A One, Two, Three and Five? Yes, sir, that's true. In July, 1966, these four wells produced three hundred and thirty-three M.C.F. a day.

Q It is my understanding from your testimony that the four oil wells in the north half of Section Thirty-Six would actually produce twice as much gas in July as the formula would allow per any one gas well during a like period?

A You mean, it produced more than the allowable?

Q Yes.

A Yes, sir. It didn't produce more than the wells produced.

Q Yes, but it produced more than the formula -- twice the amount of the formula allowable?

A Yes, sir.

Q Do you think that is a reasonable situation?

A I believe that anytime you formulate a rule that is to apply to an area such as this, that you are going to find anomalous inequities. I don't know whether this is going to be the condition. I think you could pick any other four wells and find that the gas-oil ratios are considerably less.

Q Now, Mr. Seidel, as at the past hearing, I still do not quite comprehend the formula, but isn't the whole formula based upon the reservoir pressures? Isn't that the basic element?

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A No, sir. The basic element is the withdrawal rate. We want to try to maintain a comparable withdrawal rate from the cap as to the oil zone. However, in the formula, the pressure factors do influence the calculated values.

Q Don't these pressures vary greatly?

A Yes, sir. This is pointed out pretty dramatically in our Exhibits Twelve and Thirteen. They vary from a low, for example in September, 1966, of 365 pounds up to a maximum of 1,426 pounds.

Q Don't they vary greatly between different wells?

A I don't believe I would call this a great variation in our gradient across the field. I think it is something that would be expected.

Q Isn't it true that some of the wells in this pool or some of the oil wells are producing some water?

A Yes, sir, this is true.

Q What significance is given to this in connection with the formula?

A The formula doesn't consider water production, nor does it consider water influx, and, on this premise, the formula assumes that the water production equals the water influx, not from the hydrocarbons.

Q Isn't it based upon the withdrawal? It seems to me that when you withdraw oil, it would be the same as when you withdraw water?

A No, we are only concerned with withdrawal of the hydrocarbon portions of the reservoir, as I see it.

Q Does this entire field have a water right?

A From the south, we have an increasing pressure, and this is, of course, a feed-in of external energy. Now, whether this is oil or water, I don't know right now.

Q The formula does not give any credit for any water withdrawal at all?

A No, it does not.

MR. JENNINGS: No further questions.

MR. NUTTER: Are there any other questions of Mr.

Seidel?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Seidel, on your Exhibit Three, I note all these various well symbols and you pointed out that the red indicated the well penetrated the "K" Zone, the green, which penetrated the "J" Zone only, but what does the olive color mean?

A It should have been green.

Q All shades of green are the same?

A Yes, sir.

Q Then, what is the difference in the symbols? Some of the wells use a Standard Gas well symbol and some of the oil wells use a dot with a circle around it, and some of them have a triangle around the circle that encloses the dots.

MR. LOAR: Let the record show that Mr. Stine is answering the question.

MR. STINE: The triangle is concerned with those wells completed since the hearing in August of last year.

MR. NUTTER: Those are new wells since the last hearing?

MR. STINE: Yes.

MR. NUTTER: I believe that covers it.

Mr. Seidel, in determining the average pressure here -- well, let's take Exhibit Number Eleven, the oil zone pressures in March and September of '66. You have an average there of 834 and an average of 782 for September of 1966. Is that the average of all of the wells? I mean, there is quite a variation in the pressures themselves. The low one at the top of the page has only 393 pounds and then you have

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got one there with 1,460 pounds.

A Yes, sir. This is an arithmetic average; I actually totaled up the pressure datum and divided by the number of pressure points.

MR. NUTTER: Now, that applies to both columns on both Exhibits Ten and Eleven?

A Yes, sir, it does. I didn't mention previously, but Exhibit Ten also includes the total field average of pressures, the gas cap wells plus the oil zone wells, and this average is merely a total of all of the pressures divided by the total pressure points.

MR. NUTTER: Is there any conclusion that you can draw as to these average pressures for the two sections of the pool from March of '66 to September of '66? Is there any conclusion relating to those pressures that you can draw as to the effectiveness of the formula that has been in effect? Has it been effective or has it not, or is it too early to tell?

A Mr. Nutter, I think it is too early to tell. The pressure gradient across Sunray's New Mexico State AY lease as well as Texaco's New Mexico's State CT lease is about the same pressure running across the area. The gas

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cap wells did restrict their production to a number that I had estimated at our previous hearing and, of course, this has amounted to over-production costs because of a wrong assumption I had made that we had top allowable oil wells.

MR. NUTTER: In answer to Mr. Jennings' question, you agreed that the four oil wells in the north half of Section Thirty-Six were producing more gas than your calculated allowable for a gas well on three hundred and twenty acres. Isn't it true, in the use of a volumetric formula such as you have here, that the more gas that an oil well produces during this six-month period will be reflected in a higher allowable for the gas wells in the next six-month period?

A Yes, sir, this is true. However, apparently, the averaging technique that is involved in the formula tends to eliminate the gas-oil ratio increase that we noted on Sunray's lease. Apparently, Sunray's production is the only production that has gas-oil ratios that I had expected them to be.

MR. NUTTER: What did you say was the high ratio, your Number Two well?

A Yes, sir.

MR. NUTTER: What was it again?

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A This is a high water-producing well. I don't know how reliable our gas-oil ratios are, but it was 6,750. The test produced nine barrels of oil and 61 barrels of water -- I'm sorry, nine barrels of oil, three barrels of water -- that is not correct. I am pretty sure it is producing more water than that. It is producing about fifty barrels a day. This test is erroneously reported.

MR. NUTTER: How much gas did it make on the test?

A 61 M.C.F.

MR. NUTTER: That's where the 6,750 comes from?

A Yes, sir. Most of our other ratios are where the bulk of the production comes from. The Number Two is one of these ten barrels per day producers. However, the ratios are in excess of thirteen hundred cubic feet per barrel.

MR. NUTTER: Now, on your Exhibit Number Sixteen, the analysis of your interference test data, you show the complete production pressures for the Number Four well?

A Yes, sir.

MR. NUTTER: Over to the left, there are the two triangles which is the build-up. Then, you opened it up and produced it and shut it in at 650 hours, and then the triangles show the build-up?

A Yes, sir.

MR. NUTTER: And it finally built up to slightly over a thousand pounds?

A Yes, sir. That's correct.

MR. NUTTER: Which well is this other little dotted line where you show a build-up starting at 650? What well would that be?

A This is the Number One well. The symbol for the Number Four, flowing, and the Number One, static, is difficult to differentiate.

MR. NUTTER: They are both circles, but one is bigger than the other?

A Yes, sir.

MR. NUTTER: And, you did not show any pressure data at all for the Number Five well?

A No, sir, we didn't. It was on pump during the entire test. We thought Number Four would probably run the average for the entire test area.

MR. NUTTER: Now, the Number One well was flowing, I presume, during this period when the Number Three was shut in?

A No, sir. The Number One is also a pumping well. The Number Four is the only flowing well of the producing

wells. The Number Three was flowing but it was shut in during the entire test.

MR. NUTTER: There is nothing on this pressure interference analysis to indicate that one well will drain eighty acres, but you attributed that to the influx of pressure or fluid from the southwest?

A Well, to the fact that we had a full flowing capacity, in the Number Three well, so that the net production or influx into the area that we are observing pressure for here is zero.

MR. NUTTER: To your knowledge, have any of the wells up in that so-called gas cap area indicated the beginning of any oil production or any signs that any oil has migrated up into that area?

A No, sir, not to my knowledge.

MR. NUTTER: Have any of the gas wells started making any liquids of any sort?

A Atlantic State New Mexico BA Number One is the only well that reports liquid production in the Production Report. Now, for the G.O.R. Test, one other well reports oil production. It's Featherstone's H-27 Number One, located in the north half of Section Twenty-Seven. I am not sure

what interval is perforated. He produced on test January 21, 1966, 2.5 barrels of oil and 508.8 M.C.F. gas, but I don't know whether this condition materialized or whether this has been the condition since the oil began producing.

MR. NUTTER: Do they use separators on these gas wells?

A It is my understanding that they do; however, no liquids are separated out on most of the wells.

MR. NUTTER: They have separators but --

A It really doesn't serve any useful purpose that I can see.

MR. NUTTER: Do they have tanks on the gas wells?

A I don't believe they have. No, sir.

MR. LOAR: I think our representative of Franklin, Aston and Fair can answer that better than Mr. Seidel can.

MR. NUTTER: Sunray has no gas wells in the pool at all, does it?

A No, sir, not at this time.

MR. NUTTER: You indicated that, in your opinion, the pressure lows or the sink-outs on the west end were due to permeability pinch outs and possibly inferior reservoir

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conditions around those wells. Do you attribute those same conditions to the three pressure sinks that you have at the east end of the pool also?

A Yes, sir. This is low permeability. Yes, sir.

MR. NUTTER: Does anyone have any further questions of Mr. Seidel? Mr. Utz?

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Seidel, you are recommending actually two pools, one gas cap pool and one gas producer, is that correct?

A Yes, sir, that's correct.

Q And, I presume, on the wells that are now completed in both the "H" and "J" Zones, that would entail dual completion, is that your assumption?

A That would be my assumption and recommendation.
Yes, sir.

Q Can you tell me how many gas wells are completed in the "J" Zone?

A How many gas wells are completed in the "J" Zone?

Q Yes, sir.

MR. LOAR: Would you let Mr. Stine answer that question for you?

MR. STINE: There is one well completed in the "J" Zone alone.

MR. LOAR: That is a gas well?

MR. STINE: It is McClellan's Number One marked "Federal" in the southwest corner of Section Twenty-Six.

MR. UTZ: There is one well in the "J" only?

MR. STINE: Yes, sir.

MR. UTZ: And, how many are completed in both the "H" and "J" Zones?

MR. STINE: We have eight wells, combination "H" and "J".

MR. UTZ: So, actually, we have nine gas wells that are completed in the "J" zone of the gas cap?

MR. STINE: In combination.

MR. UTZ: So, that on the basis of the volumetric formula and the volume that was calculated this last period, as of July 1st, the volume of allowable at that time in accordance with your recommendation would be divided up among the nine wells instead of thirteen wells?

A (By Mr. Seidel) No, sir, that is not exactly the way the formula works. It is more on an average well basis. In the formula, you actually introduce a number of wells or a number of acres dedicated to the gas wells, and since this reduces the volume in the cap, it would reduce

in proportion.

MR. LOAR: Mr. Utz, for the record I might state that this is a direct crib from the Devil's Fork Rule, if that will help you?

MR. UTZ: Yes, I calculated this. However, your oil acreage will not change? Your oil acreage and your oil volume would not change?

A That's correct.

MR. UTZ: And, your gas allowable is tied to the oil acreage and your oil allowable, so the volume should be the same?

A Well, I would have to refer back to the formula. I think it also introduces the acreage into the gas cap as well as the acreage in the oil zone.

MR. UTZ: Yes, there's a relationship between the oil and gas acreage, and it certainly changes that. Yes, I will agree it would reduce it somewhat. It would be lesser gas acreage?

A Yes, sir.

MR. UTZ: But, the production would not be in the portion of thirteen to nine, do you think, since that relationship is the multiple of the oil production. In other words, what I am getting at here --

A No, sir. I see what you mean. It wouldn't.

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MR. UTZ: Wouldn't the gas allowable on the per well basis of the nine wells be larger than the ones we just got through assigning?

A I honestly would expect them to be the same on a per well basis. I may be missing something here, and would have to go back and crank it out.

MR. UTZ: I believe it would be larger, but I am not testifying.

The premise is that there would be nine gas wells in the gas zone and sixteen oil wells or the same number of oil wells under your recommendation -- well, maybe now, as of the 1st of July --

A I had twelve oil wells, I think, as of that time, if I haven't made an error. I am looking at the first base period. This would be as of July the 1st so the number of wells we had in June.

MR. UTZ: I count fifteen. This is probably not significant as far as this case is concerned anyway, but I just wanted to be sure what your recommendation was, and if the Commission should accept it what the results would be as far as the relationship between the gas and oil area?

A Yes, sir.

MR. UTZ: Now, Mr. Seidel, referring to your Exhibits Number Ten and Eleven, let's see if I interpret

these correctly. On your Exhibit Number Ten, that is for just the thirteen gas wells?

A Yes, sir.

MR. UTZ: That are completed in both zones?

A Yes, sir.

MR. UTZ: Now, the March pool average, your gas zone average was 881?

A This is for the total pool, Mr. Utz. For the gas cap wells, of course the 881 is the pressure that would go into the volumetric equation.

MR. UTZ: I want to get the gas and the oil zones' pressures separated here, so it would be 920 for the gas zones?

A Yes, sir.

MR. UTZ: And in September, it would be 843?

A That is correct.

MR. UTZ: Now, for the oil zone, would it be 834 and 782, respectively?

A Yes, sir.

MR. UTZ: Now, if my subtraction is not in error, then the difference between the average oil zone and gas zone in March was 96 pounds?

MR. NUTTER: 86.

MR. UTZ: Right, 86.

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A Right.

MR. UTZ: And the difference in the September average pressure was 61 pounds?

A Yes, sir.

MR. UTZ: Does that mean anything to you as to whether the formula is working or not?

A No, sir, it doesn't, and I would have to go back to our isobaric exhibits. I think you might erroneously conclude that it is working because the gas cap pressures are higher than the oil zone pressures. There again, I think we have some pressures averaged in from this lower quality pay portion of the oil zone as well as the gas cap. I don't know what affect this would have in the comparison of the two numbers.

MR. UTZ: Now, is it your recommendation and your opinion that that would solve the economic problem of the gas producers in their low volumes of gas that they were able to sell?

A I don't know, sir.

MR. UTZ: They would not be restricted as far as the "H" Zone except by the ability of the wells to produce?

A Yes, sir, that is true.

MR. UTZ: Do you have any opinion as to what the ability of the "H" Zone is to produce gas?

A We have one well that is completed only in the "H" Zone, and this is Franklin, Aston and Fair's Nix Federal Number One, located in the south half of Section Twenty-Eight. This well, on test -- I don't have the pressures yet that it was delivering at, but I assume around three hundred pounds which I understand is the gathering system pressure for the gas well. In January, 1966, 560 M.C.F. a day; April 23rd, 517; and July 19th, 459 M.C.F. a day.

MR. UTZ: You would not know whether that is an average potential?

A I certainly wouldn't, no, sir. We have no way, I don't believe, at this time of establishing what the average is.

MR. UTZ: Do you have any opinion as to whether, by separating these pools, that they would be allowed to produce more gas or they could produce more gas than they would under the current allowable set by the oil zone?

A It's my opinion that they would be permitted to produce more gas with these two zones separated.

MR. UTZ: Of course, at the same time, they would have to go to more expense yet?

A Yes, sir.

MR. UTZ: Now, are you familiar with the figures that were published for this pool ending July 1st, '66,

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published in the October schedule?

A No, sir, I didn't avail myself of those factors.

MR. UTZ: That's all the questions I have.

MR. NUTTER: Are there any other questions of Mr. Seidel?

MR. JENNINGS: Since the matter of the economic prices has been brought up, I would like to ask him a couple of questions.

RECROSS EXAMINATION

BY MR. JENNINGS:

Q Mr. Seidel, do you have any idea as to what income a gas well operator in this "J" Zone could expect to receive from his gas well under the proposed formula, and I think you estimated it would be allowed a hundred and seventy thousand cubic feet per day?

A It amounts to about four hundred and ten -- excuse me, I am assuming an eighth royalty, \$360.00 a month. This is based on a hundred and seventy M.C.F. a day.

Q That is the gross revenue?

A This would be the gross income to the operator.

Q Do you have any idea what it costs to drill one of those wells?

A Approximately forty-two thousand dollars.

Q How long would it take to pay one out?

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A I would guess that it would be during the blow down period, and I don't know when this will occur, when we will be able to blow the reservoir down without significant damage or loss of oil.

Q Are you talking about during our lifetime?

A Yes, sir, I certainly am. I would say within the next three to five years.

Q After the oil is all completed?

A No, sir, this is generally not the optimum time for blow downs from a conservation and economic standpoint. This would occur sometime prior to the economical depletion of the oil well.

Q You would be getting roughly four thousand dollars a year, and you think that would pay out in that period?

A I said that the pay out would occur during the blow down period.

Q Over how long a period would that expand?

A Well, if the well were initially capable of producing, say, a million per day during the blow down period, the pressure shouldn't be substantially lower. I don't see why the well probably couldn't produce as much as a half a million per day on this basis in less than five years, so I would guess we are looking at not over a ten-year pay out

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period.

Q During the past six months, has there been any indication that the over-production from the gas wells has affected the oil pool?

A From the isobaric maps, I would conclude that it has continued some to aggravate the situation that was created by withdrawing the gas prior to the oil zone discovery, and, certainly, it doesn't appear to have eliminated this condition.

Q To what extent has it aggravated it?

A Well, it's continued to exhibit the pressure ingredient across Sunray's New Mexico State AY and Texaco CT lease.

Q You do not know to what extent, though?

A In terms of barrels?

Q Barrels or percentages.

A No, sir, I do not.

MR. NUTTER: Any other questions of Mr. Seidel?

MR. LOAR: If everyone else is through, I would like to ask him some more.

REDIRECT EXAMINATION

BY MR. LOAR:

Q Mr. Seidel, in response to a question by Mr. Jennings, I was not clear what he was asking or what your

answer was, but, as my notes read, he asked, "Is the formula working or are the rates different from what you testified to?" Now, is there any indication at the present time that this formula is not working?

A No, sir. There is not.

Q However, are the rates different from what you anticipated a year ago?

A They are considerably less from what I anticipated a year ago.

Q Could the pressure ingredient that he questioned you about, moving from south across the Texaco and Sunray leases to the north, could that be caused by either a water drive or a pressure influx from an undeveloped area of the reservoir?

A Yes, it could.

Q Has anybody drilled a well along the immediate south edge of this reservoir to determine the productive limits of it?

A There have been two wells drilled here, the Skelly, Hobbs S Number One in the southwest quarter of Section Thirty-Six and Texaco's New Mexico's State CT Number Five, located in the northeast quarter of the northeast quarter of the southwest quarter of Section Thirty-Five. Each of these wells attempted completion in the "J" Zone and

they were unsuccessful.

Q Did they encounter "J" Zone reservoir?

A Yes, sir. From log analysis, as far as we know, we would expect the completions to have been successful commercial completions.

Q Is it possible that there are reservoirs to the south contributing pressures?

A Hydrocarbons?

Q Energy. It could be either water or hydrocarbons?

A Yes, sir.

Q What does the pressure gradient across the Texaco CT lease and the Sunray AY lease mean?

A To me, it is a clear indication that fluid migration has occurred from this southern portion of these leases to the northern portion of the leases to the gas cap.

Q In response to one of Mr. Nutter's questions, he phrased it, "Is there a permeability pinch out or low permeability in the area of some of these low pressures?" Have we seen any indication of permeability pinch out?

A No, sir, we haven't. This is just in the vicinity of this well. We have indications, I think, from these lower pressures of a lower quality formation or a lower permeability or a lower capacity. We have no indication of discontinuity of the permeability in this area.

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Q Mr. Seidel, at last year's Hearing, what did you testify to concerning the volume of oil migrating from the oil column into the gas cap of the "J" Zone?

A I testified that approximately thirty thousand barrels of stock tank oil had migrated into the gas cap, that would be irrecoverably lost. This represents a five percent residual loss saturation of the oil that actually migrated into the gas cap area. In other words, it is assumed that the oil would subsequently be either produced in the gas cap well or expanded back down into the oil and produced by the oil zone.

Q What is the purpose of a volumetric withdrawal rule?

A Among other things, it is to protect correlative rights, to prevent migration of either gas fluids from a gas cap to an oil zone or, conversely, an oil liquid from the oil zone to the gas cap.

Q Will waste occur if oil migrates into the gas cap?

A It is my opinion that it will. Yes, sir.

Q One of the purposes of a rule such as is in effect in the Todd-San Andres Pool is to prevent this?

A That is correct.

MR. LOAR: I believe that's all, Mr. Seidel.
Thank you, sir.

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MR. NUTTER: Are there any other questions?

MR. LOAR: For the record, I would like to introduce my exhibits.

Q Were Exhibits Seven through Sixteen prepared by you or under your supervision?

A Yes, sir, they were.

MR. LOAR: And, Mr. Stine, were Exhibits One through Six prepared by you or under your supervision?

MR. STINE: Yes, sir.

MR. LOAR: If there is no objection, I would like to move the introduction of these exhibits.

MR. NUTTER: S.D.X. Exhibits One through Sixteen will be admitted in evidence.

If there are no further questions of Mr. Seidel, he may be excused.

Did you have another witness, Mr. Loar?

MR. LOAR: No, sir.

MR. NUTTER: Before we resume with another witness, I think we will take a ten-minute recess.

(Whereupon, a short recess was taken.)

MR. NUTTER: The hearing will come to order.

Mr. Jennings, do you have a witness?

MR. JENNINGS: Yes, sir. We have one witness and, before we proceed, I would like to state that on behalf of

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Franklin, Aston and Fair, one of the other operators, we concur in the testimony presented to the effect that as to the spacing, and further, that there are two separate and distinct pools. We could offer further testimony, but it would only be cumulative of the testimony heretofore given by Mr. Stine and Mr. Seidel. Our only controversy is in connection with the formula.

MR. NUTTER: For this "J" Zone?

MR. JENNINGS: For the "J" Zone, yes, sir.

MR. LOAR: Mr. Nutter, I might state for Sunray that Mr. Jennings and I have discussed this and that there may be some question as to the sufficiency of notice to establish a new and separate "H" Zone Pool. If the Commission sees fit to grant the request of what I believe will be all operators in the pool, that to separate these and designate a new "H" Zone Pool, we would like to see that "H" Zone portion advertised, set down for a convenient hearing and perhaps introduce the record in this case to save all parties from having to come back.

MR. NUTTER: I think that if this is the decision of the Commission, that the two are separate and should be separated, that can certainly be arranged. I don't know. It would depend on the feeling of our Staff and the Commission whether we would want to do it on our own motion. However,

one of the companies certainly could be the Applicant in the case, and the record in this one could be incorporated if it was of a conclusive nature.

MR. LOAR: Sunray would be willing to be the Applicant and we would suggest doing it in that manner.

MR. NUTTER: I seriously doubt if the call of this Hearing is sufficient to create a new pool.

MR. LOAR: The three of us have some doubt about it. That is the reason we are raising it at this time.

MR. SCOTT: Robert J. Scott, Texaco, Incorporated. Since the majority of the testimony I have to offer is in support of establishing two separate pools here, the bulk of my testimony will be repetitious to what Sunray has presented. I do have one point which I feel might help the Commission further decide on the establishment of two pools, and time is running short if you would like to hear that?

MR. KELLY: I think we would just as soon keep it in the order that has been established.

MR. SCOTT: That's fine. I just wanted to clarify.

MR. NUTTER: In case we cannot get all of it today, we may be able to carry some of it over to the next hearing, too, pertinent to the establishment of a separate pool. Some of it could certainly be saved until the next

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hearing in the matter.

Proceed, Mr. Jennings.

RALPH L. GRAY

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

DIRECT EXAMINATION

BY MR. JENNINGS:

Q Would you state your name and occupation, please, sir?

A Ralph L. Gray, Consultant Engineer.

Q Mr. Gray, have you heretofore testified in this particular cause which is Case Number 3298?

A Yes, sir.

MR. LOAR: Sunray has no objection to his qualifications.

MR. KELLY: No objections.

Q (By Mr. Jennings) Mr. Gray, have you made a study of the operation and production from the Todd-San Andres Pool including both the "H" and "J" Zones since the time of the last Hearing?

A Yes, sir.

Q And, I believe you have heard the testimony of Mr. Seidel concerning the present formula which is a part of, I believe, Rule Thirteen-A, established under Order

Number R-1670-G?

A Yes, sir.

Q Mr. Gray, in your opinion, is the present Order under which the production is being prorated, the gas production from the "J" Zone is being prorated, working out as it was represented it would work out in the last Hearing?

A No, sir, I don't think the proration formula is working satisfactorily. For example, the September, 1966 allowable for the gas well amounts to approximately two hundred and thirty-six M.C.F. per day, which we consider as being unreasonably low, and it certainly works a terrific burden upon the gas operators.

Q Do you think that the formula will ever work in this particular field?

A No, sir, I do not. There are various factors that are used in the formula, and there are numerous factors which are dependent upon a correct and accurate knowledge of the reservoir pressures. These factors include R-Sub-2 which is a solution gas-oil ratio for certain reservoir pressures. The average reservoir pressure itself, the Z factor, which is the deviation factor for gas at certain pressures, and the leasable factor which is the oil reservoir factor. All of these factors are dependent upon a correct and true knowledge of the reservoir pressures. I would like

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to just refer back to Sunray's Exhibit Number Sixteen which shows a bottom hole pressure build-up on their State AY Number Three well, breaking the performance of this curve down into some numbers that really mean something to us. After being shut in for a twenty-four hour period, the bottom hole pressure was approximately seventy-five percent of the maximum build-up. After a forty-eight hour shut in, the pressure reached approximately eighty-two percent of the maximum build-up. After a seventy-two hour shut in, which ordinarily is the limit to the reasonable time that we shut these wells in for survey, the pressure had reached an eighty-six percent of the maximum build-up. So, it took possibly in the neighborhood of twenty days or more of shut in time to essentially reach a maximum build-up pressure. Of course, all of these pressures that are not essentially built up, introduce inaccuracies into the formula.

Another fallacy that we would like to point out is the use of the sonic measurements, or bottom hole pressures. As you know, the sonic method depends upon interpretation of these sound waves going down the casing and reflecting tubing collars. I have been working with sonic measurements for more than twenty years, and, as far as I am concerned, it is my opinion that they are not reliable, that they are inaccurate and they are certainly not useful for purposes of

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a proration formula. Some of the things that make the sonic measurements unreliable are the existence of frothy conditions, a gas and liquid froth in the annulus or salt rings or paraffin depositions and all of these things have their affects upon the results in recording the sonic waves.

In this particular pool, it has recently been found that the Franklin, Aston and Fair Mark Federal Number Five well is getting a salt deposition problem. Deposition of salt in the annulus certainly would affect these sound waves. The proof of this is the fact that the operator introduced a quantity of fresh water down the casing which dissolved the salt and the production from this well was substantially increased as a result of removing the salt.

We also have another indication of an inaccurate interpretation of the sonic measurements. Would you like to have this introduced?

(Whereupon, Franklin, Aston and Fair's Exhibit Number One was marked for identification.)

A I'm sorry we only have one copy of this exhibit marked "Franklin, Aston and Fair's Number One."

This Exhibit Number One is the report that has been prepared by the Coleman Petroleum Engineering Company who is a service company who took a sonic measurement on the

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Franklin, Aston and Fair's Mark Federal Number Five well on September 29, 1966. The results of interpreting the measurements as shown on this form shows depth of fluids as forty-three hundred and forty-four feet. The actual total depth that the well was drilled to was only forty-three hundred and fifteen feet, so, obviously, there is something wrong there. There is something inaccurate about their interpretation, and this is just an example that we would like to quote as to the unreliability of this type of measurement.

MR. NUTTER: Did you pay for that one?

A I expect they will. Yes, sir.

An additional factor that we think the formula falls apart on is the fact that the formula does not provide for water production data. As you all know, water flood types of mechanisms -- water flood maintains bottom hole pressures, and, very obviously, from a check of the pressure performance up to this time, it can be shown that the bottom hole pressures are decreasing rather fast, and certainly this is not an effective water drive type of mechanism. Now, there may be some degree of influx but not to the extent of being able to maintain bottom hole pressure, and the use of the proration formula that excludes water production is certainly not giving the correct reservoir data.

So, in conclusion, it's our opinion that the present formula is not workable; it is unacceptable; it is erroneous, and we would recommend that the formula be withdrawn from the pool rules.

MR. NUTTER: Do you have a substitute formula you would offer, Mr. Gray?

A Yes, sir. In the past, it has been rather customary in cases of this kind to assign a gas allowable that would be comparable to the amount of gas that the oil wells can be permitted to produce using the state-wide two thousand cubic feet per barrel limitation and multiplying the two thousand times the unit allowable for the state in the case of forty acre allowable, times, in the case of a three hundred and twenty acre unit, it would be times eight, to arrive at the amount of gas that, for example, any amount of oil wells on a comparable unit in this pool would be allowed to produce.

MR. NUTTER: Now, do you have any inherent accuracies in the use of that? I mean, if you take two thousand to one as the limiting ratio for the pool, but if you have a solution ratio in the neighborhood of three or four hundred to one, is this indicative of any more inequities than you have with the formula that is not working?

A Well, it is a formula that has been used

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extensively in the past and in proration matters, very often, it's my opinion that a simpler type of formula is more workable than some fancy formula that it is impossible to arrive at the conditions to meet the formula, and it is nothing new. It is a situation that has been used substantially in the past, and I think it works out reasonably well. Yes, sir.

Q (By Mr. Jennings) Mr. Gray, from your study of the wells in the "J" Zone, is there any indication that any of the oil column has moved into the gas-producing zone?

A No, sir, I don't think so. Franklin, Aston and Fair, their nearest gas well to the oil portion of the reservoir is their marked "Federal Number Two" well which is in the southwest quarter of Section Twenty-Five, and it is approximately one half mile west of the oil well marked "Federal Number Five", so it is not too far away. And, to my knowledge, there has been no indication as yet of any oil influx into this well.

MR. JENNINGS: That's all we have. No further questions.

MR. NUTTER: Do you have any questions?

CROSS EXAMINATION

BY MR. LOAR:

Q Mr. Gray, I believe you started off with the

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predicate that this formula is not working satisfactorily.

Why isn't it working satisfactorily?

A Well, I think any formula that results in the setting of allowables that are unreasonable and impossible for the operator to live with, well, you can say that the formula is not satisfactory.

Q Do you disagree with the theory that oil which migrates into a gas cap will be lost forever?

A In general terms, yes, sir.

Q You disagree?

A Oh, no. I agree with it. Yes, sir.

Q All right, sir, if we have higher pressures at the edge of the oil column with lower pressures in the gas cap, is oil going to migrate into the gas cap?

A If you actually have a condition of higher pressures; now this proposition of higher pressures existing down on the south end may be a reflection of inaccurate pressures, I don't know, but, in the case of the Franklin, Aston and Fair wells, at least, the average pressure for their three oil wells in the October survey was five hundred and ninety-six pounds. The average pressure of six gas wells was seven hundred and fifty pounds.

Q Now, let's go back and answer my question if you will, Mr. Gray. My question was, if the pressure gradient

is from the oil into the gas, will oil migrate into the gas cap?

A I would say you would have to put some kind of degree of difference there. If you have a high degree of difference over a very, very long period of time, there would probably be some movement in the case of this particular reservoir. It has been shown that the movement of fluids proceed on a rather slow basis which was indicated on the bottom hole pressure build-up curve, and in the conditions that exist in this particular reservoir, I think it would require a great length of time and a high -- a very high pressure differential condition to -- for the fluid to actively migrate a very far distance.

Q By a "great difference" -- what kind of difference of pressure does it take, ten percent or ninety percent difference between the oil column and the gas cap?

I will repeat my question. You use the term "a great difference in pressure". Does it take a ten percent difference or a ninety percent difference in pressures between the oil column and the gas cap to accomplish a great difference?

A Well, we have to tie it down better than that. How far we are going to move and in what length of time are we going to move.

Q You have heard the testimony of Mr. Seidel,

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stating that he made calculations that over a year ago that thirty thousand barrels had migrated into the gas cap. Do you disagree with that?

A Yes, sir. I don't agree with Mr. Seidel's calculations because I think some of the data that he was using was probably inaccurate.

Q What specifically?

A Due to the character of the reservoir, this type of permeability condition that we have, I don't -- an engineer, of course, likes to use formulas but my experience as being practical about the thing, frankly, I don't think that I would be able to get information that I would consider accurate enough to make a calculation of that type.

Q Are you saying that we cannot run accurate bottom hole pressures in this reservoir?

A Yes, sir. You haven't up to this time except for the one well.

Q You do not subscribe to the theory that you can calculate from a pressure build-up the reservoir conditions?

A You can make an attempt at it. I do subscribe to the theory that the sonic measurements are inaccurate and they are not dependable for calculations of this type.

Q We have several bomb measurements here. Are you saying that they are so inaccurate that they cannot be used?

A They could be used up to a point, but you also require the pressures from the oil wells. See, there is a basic difference in Mr. Seidel's approach than mine. He accepts the bottom hole pressure information on face value, and, from my standpoint, I think that quite a bit of this difference in pressure that we see is due to inaccuracies rather than actual reservoir conditions. For example, if you will notice the list of the bottom hole pressures in the gas part of the reservoir, you will see that the variation the difference in the pressure is rather narrow compared with the difference of the pressure taken in the oil part where the sonic measurements are made, and I think that this great variation in the oil reservoir part is due strictly to the method that is used to take the pressures, that the method is inaccurate.

Q I believe you pointed out in your Exhibit Number One that there was a mistake of approximately twenty-nine feet to the depth of the fluid?

A Yes, sir.

Q How much difference in pressure would that mistake make?

A Well --

Q You've labeled it now as twenty-nine feet --

A If they show a fluid level lower than where the

well was drilled to, well, obviously, there is an error there somewhere.

Q Assuming that this twenty-nine foot mistake was made, how much difference in pounds is that?

A Well, if we are going to assume that there is a difference of fluid head, I would say that there is about three-tenths of a pound per foot, roughly, so approximately ten pounds.

MR. LOAR: I believe that's all.

MR. NUTTER: All right, Mr. Kelly.

CROSS EXAMINATION

BY MR. KELLY:

Q Mr. Gray, you do subscribe to the testimony that has been presented here, that there is a separation between the two zones, is that correct?

A Yes, sir.

Q As far as the Commission sees fit to create a new gas zone called the "H" Zone, as far as the wells that you have that penetrate both the "H" and "J", this will give you a new allowable for the "H" Zone gas, is that right?

A Yes, sir.

Q So, there will be some offset as far as that is concerned, if you were to lose any allowable from this?

A Yes, sir.

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Q Now, do you prescribe to the theory that withdrawals of the gas cap should be protected, if possible, or limited, if possible, as far as protecting the oil?

A Yes, sir, I think so in the case of the reservoir that is combination oil and gas.

Q And, your objection here is you feel that this formula that we are presently working under could not reflect enough of the true characteristics of the pool?

A That's right. Maybe, theoretically, we have a good formula, but when you enter inaccurate information in there, you are not getting anywhere.

Q Now, your substitute formula assumes a two thousand to one G.O.R. This is not accurate information to put into a formula, is it?

A Well, there is a certain amount of balancing there. In other words, an oil well is allowed to produce an amount of gas up to that formula.

Q My question was, two thousand to one G.O.R., is not reflected in the information we had in this group, you do not encounter that G.O.R. in this pool, do you?

A Well, I don't know. You may have some wells close to it. Yes, sir.

Q You may have some wells, but I mean overall this is not the G.O.R. that we are dealing with here?

A It's not a G.O.R.

Q And, your unit allowable in this case would be about forty-seven?

A At the present top allowable.

Q What is the actual production of the average, or the average production of the wells in this pool?

A From which wells?

Q The oil wells.

A I haven't figured it out. I don't know what the average production is.

Q Do you know whether all of the wells are top allowable or not?

A I don't know of any top allowable wells.

Q So, again, under your formula, we are not dealing with a true figure as reflected in the production, are we?

A I don't know what you mean by "true figure".

Q Well, the point I am getting at is that your formula which you are proposing here over another formula, has no true figures in it. There is nothing reflected in the actual characteristics of this pool?

A No, it is just a formula that has been tried before many times, and it has been found workable.

Q I mean, as far as the economics?

A As far as the economics and performance.

MR. KELLY: That's all I have.

MR. NUTTER: Are there any other questions of
Mr. Gray?

RE CROSS EXAMINATION

BY MR. LOAR:

Q Going back earlier, I believe we did agree
that one of the purposes of the volumetric withdrawal rule
is to prevent the migration of oil into the gas cap, did
we not?

A Yes, sir.

Q What information do you have to indicate that
this seven hundred and fifty-two thousand cubic feet per
day per gas well would stabilize the gas-oil contact?

A Well, it would take some performance history
to see if any inequities were developing, but there is no
doubt at all but what the present formula is not doing the
job, so it is a matter of changing to something that is
reasonable.

Q I believe we have testimony as to whether it is
doing the job or not, but what are you offering to substitute?
Does it have any basis at all for --

A Yes, sir. I think anything that has been used
often in the past and in other areas which it has been found
to be a workable plan has some basis for use. Yes, sir.

Q Doesn't it need to have some relationship to producing conditions and reservoir conditions?

A Well, if the characteristics of the reservoir were such that we could determine these factors accurately, I would agree with you. Yes, sir. It would be a fine formula, but I think that it has been demonstrated pretty clearly that the type of permeability that exists in the reservoir is such that we cannot get accurate information to use this formula.

MR. LOAR: That's all, Mr. Nutter.

MR. NUTTER: Are there any questions of Mr. Gray?

MR. UTZ: Mr. Gray, how much gas would a two thousand to one G.O.R. forty-seven barrel allowable give a three hundred and twenty acre unit?

A It would give it seven hundred -- no --

MR. JENNINGS: Seven fifty-two, I believe.

A That sounds right. We worked it out and I believe that is correct.

MR. UTZ: That's close?

A Yes, seven fifty-two M.C.F. per day.

MR. UTZ: All right, how much gas do you have to produce out of these wells a day in order to make your economics satisfactory?

A Well, I think --

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MR. UTZ: The minimum?

A I think the very minimum would be somewhere in the range of five to six hundred M.C.F. per day, and they would like to have more than that.

MR. UTZ: They'd like to pay them out in thirty days.

A Well, let me put it this way. Even on the basis of five hundred M.C.F. per day, I think these operators are going to look at it pretty closely before they're going to drill any new wells.

MR. UTZ: This five or six hundred M.C.F. per day, would that include the cost of duly completing if the Commission should decide to separate these two zones? You agree with that, don't you?

A Yes, sir. I didn't quite understand your question.

MR. UTZ: Would your five to six hundred M.C.F. per day include the cost of duly completing these wells? Would that make a satisfactory pay out?

A I'd say it would give you a very modest pay out.

MR. UTZ: And, in your opinion, will these wells, when they are duly completed, be able to produce this volume of gas?

A Yes, sir, I think most of them would. There are perhaps one or two wells, Franklin, Aston and Fair's, that

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wouldn't be able to produce this. I am not even sure now if we went in duly completed, it's possible that this benefited some.

The McClellan Federal Number One well has been a rather poor gas producer according to my information. It's completed in the "A" Zone only, so it is possible, by duly completing that well, that the productivity could be increased. I think it is the only well that perhaps couldn't produce that top right at the present time.

MR. UTZ: Now, you recommended two thousand to one G.O.R. Where did you get that, just because it is a rule --

A Well, that applies to the oil wells at the present time. You see, your formula, at the present time, your rule -- rule Nine-B for example. I will just read that. It says, "Each oil well on eighty acre oil proration units shall be permitted to produce the amount of gas determined by multiplying the top unit allowable for the pool by the lending gas-oil ratio for the pool.", which is two thousand, so you are guaranteeing your oil wells that they can produce that amount of gas. The gas wells have no such guarantee.

MR. UTZ: But, a gas well can produce this seven hundred and fifty-two M.C.F. plus any liquids it might create, right?

A Well, they don't produce any liquids.

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MR. UTZ: Not in this case?

A No, sir.

MR. UTZ: That would be the gas allowable for a top allowable well, and an oil well could be a marginal well and only produce half the top allowable, and it still would not curtail the relationship? In other words, between the oil and gas producing, so that actually the two thousand to one isn't a real good index for volumetric control, is it?

A Well, it is something that we are using now and, as far as I know, it is working pretty good, generally speaking.

MR. UTZ: The average producing G.O.R. of the oil at the present time is in the neighborhood of thirteen hundred, isn't it?

A I don't think we really know what it is. Part of the casing head gas is actually being measured from some of the wells, and, in other cases, the casing head gas has not been measured. It is reported by the operators, but I sort of doubt whether the operators really know themselves what the actual gas-oil ratio is on these wells.

MR. NUTTER: Doesn't that rule require that all casing head gas be measured?

A I don't know. It's my understanding that the gasoline plants have not hooked up to all of the wells.

Well, I couldn't give you a clear picture on it, but it is my understanding that some of them are selling casing head and some are not.

MR. UTZ: That's all the questions I have.

MR. NUTTER: Mr. Gray, do you have any idea as to how the "H" Zone and "J" Zone compare in productivity in all of these wells where the two zones are perforated? How much gas is coming from each one?

A Well, there are -- all I can really comment on are Franklin, Aston and Fair's wells. I haven't really studies the other operator's wells well enough to testify on those, but the Texaco Federal Number One is completed in the "A" Zone and the --

MR. NUTTER: The "A" Zone? Is that the same as the "H" Zone?

A That is the same as the "H" Zone, and that is a real good well. It produces, you might say, top allowable for the gas well. The Mark Number One well is completed in the "B" Zone only.

MR. NUTTER: That is the same as their "J"?

A Right, and it also is a prolific producer, so that I don't think that you can -- I don't think that we really have enough information to say that one zone is generally better than the other. I think that in some areas

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that possibly one zone would be better than the other, but maybe you might move over a mile and conditions could be reversed, but we don't -- other than just that general statement, I think that's the only thing I can say.

MR. NUTTER: Do you have any idea whether the original pressure in each of these zones was similar or dissimilar or what they were?

A As far as we can tell, they were comparable.

MR. NUTTER: And, how about the net thickness of the sand and the porosity of the two sands. How did it compare?

A Well, the characteristics I think are similar, very low permeability, low porosity.

MR. NUTTER: In the event the Commission should separate this pool into two pools, we have a number of these gas wells that have an over-produced status. I just wonder how much of the over-production came from the "H" zone and how much came from the "J" zone?

MR. PORTER: Mr. Nutter, do you think you will ever be able to --

A Mr. Nutter, I'm sorry but I don't have a crystal ball.

MR. NUTTER: You say, all that over-production came from the unprorated "H" zone?

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But, actually, the two zones have not been tested separately in most of these wells in which they are open?

A

Not sufficiently to come to any conclusions.

MR. NUTTER: I presume that the operator which you represent and the other operators that are present here at the Hearing today realize that if the Commission should separate the two, that these man-made communications between these two proposed pools would have to cease?

A

Yes, sir.

MR. LOAR: We are aware of that.

MR. NUTTER: Everybody is aware of that?

Are there any more questions of Mr. Gray?

MR. PORTER: Mr. Gray, I was absent from the room during your direct testimony. What was your recommendation in lieu of the volumetric formula? Did you make one?

A

Yes, sir. We recommended in the case of the combination oil and gas reservoirs that the gas allowables be set by allowing them two thousand cubic feet per barrel times the state-wide top unit allowable for forty acres times eight units in the case of the three hundred and twenty acre tracts.

MR. PORTER: In other words, you would control gas production on both oil and gas by the gas-oil ratio?

A

Right.

MR. NUTTER: I believe you mean four.

A I am using forty times eight. If you use the eighty acreage allowable, well, it would be four times.

MR. NUTTER: Well, the oil wells are on eighty acres at the present, and the application is the continuance of eighty acres.

A That's right.

MR. NUTTER: Are there any further questions?

The witness may be excused.

MR. JENNINGS: We have nothing further.

MR. NUTTER: You have no further witnesses to call?

MR. JENNINGS: No, sir.

MR. NUTTER: Does anyone have any further testimony they wish to offer in this case?

MR. KELLY: We have some additional testimony, and we will make it as short as possible.

MR. NUTTER: And, that is Texaco?

MR. KELLY: Yes.

MR. NUTTER: Okay. Call your witness.

MR. KELLY: Booker Kelly, on behalf of Texaco, and the witness has already been sworn.

DIRECT EXAMINATION

BY MR. KELLY:

Q Would you state your name, position and employer,

please?

A My name is Carl Whigham and I am employed by Texaco, Incorporated as the Midland Division Proration Engineer.

Q Have you previously testified before this Commission as an expert witness?

A Yes, I have.

Q Referring to what has been marked "Texaco's Exhibit Two", would you explain to the Examiner what Texaco's interest in this field is?

A Yes, sir. Texaco Corporation has a lease in Section Thirty-Five. Texaco is the working interest owner of this four hundred and eighty acre, State of New Mexico CT lease. On this lease, at the present time, we have five oil wells completed. Texaco also has a partial interest in three wells operated by Franklin, Aston and Fair. These three wells are those that are located in the southwest quarter of Section Twenty-Six, Twenty-Seven and Twenty-Eight.

Q Now, Texaco did not actually personally appear in the last Hearing, but I believe you did send a telegram stating Texaco's position. What was that position at that time?

A I can answer that question most readily by simply reading the telegram. "Texaco, Incorporated believes

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Todd-San Andres is two separate reservoirs separated by an impervious anhydrite section, and there is a gas reservoir above and an oil reservoir below. Insufficient production and reservoir data precludes definite proof at this time. Classifying this as one large gas reservoir is not substantiated by available production history and would tend to limit the development in the field. However, Texaco does not concur with the Applicant's position that this is an oil reservoir with a gas cap. Recommend that docket be left open for hearing when pertinent data becomes available." That was Texaco's position a year ago.

Q Based on the additional data that has become available in your study of this field, what are your recommendations now?

A Very briefly, in summary, we would recommend that the zone which has been previously identified as the "H" Zone or the "A" Zone, this is the zone that overlies the anhydrite stringer, we recommend that it be classified as a separate gas pool.

Then, our second recommendation would be that for this pool, a rule be adopted providing for three hundred and twenty acre spacing and the footage specifications that already exist under the current rules. These would be the rules that Texaco would recommend for the new gas field.

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Thirdly, we would recommend to the Commission that the provision in the current rules that sets out the spacing for the oil wells be retained for the remaining oil zone; in other words, the "J" Zone or the "B" Zone would retain its classification as an oil reservoir, and we would like to make the recommendation that the spacing and footage rules remain the same.

Then, fourthly, it would be Texaco's recommendation that the finding, Finding Number Eleven, that is listed in the existing rules, be continued. I would like to read that, and this constitutes Texaco's position, and our fourth recommendation. I am reading from Finding Number Eleven in Order Number R-667, " -- that the temporary special rules and regulations should provide for limited withdrawals from gas cap wells in order to prevent the migration of oil in the gas cap and result in waste."

Q Now, based on your independent study and the testimony you have heard here today, is it your opinion that what has been designated the "H" Zone is a separate zone?

A Yes, sir. I think everyone's data is in agreement on that point, that this is a separate reservoir and that the production from this reservoir has no bearing or no affect on the underlying oil reservoirs.

Q Do you feel that a well can adequately be

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drained in excess of three hundred and twenty acres?

A Yes, sir, judging from the reservoir characteristics and data that has been given today at this Hearing. I would think that a gas well should be able to drain three hundred and twenty acres in Zone "H".

Q How about for the "J" Zone? What do you think the drainage capacity would be there for both oil and gas?

A I would be in agreement with the testimony that has already been presented by the other parties; that is, that any gas well completed in the gas cap of the "J" Zone or "B" Zone would be capable of draining three hundred and twenty acres, and that the oil wells are capable of draining in excess of eighty acres. I think that the permeability data that has been presented and the other reservoir characteristics would indicate this extent of drainage.

Q Do you recommend to the Commission that the "J" Zone, if it is created as a separate zone from the "H" Zone, that the rules applicable to that zone be made permanent at this time?

A Those were not my specific recommendations.

Q I mean, with the comment that you made there, that the spacing rules not be continued on a temporary basis but --

A That's correct. Texaco is primarily interested

in the spacing provision for both of the reservoirs.

Q Do you feel any additional data is necessary as far as the spacing on the upper "H" Zone?

A No, I don't think that would be necessary.

MR. KELLY: That's all I have of this witness.

MR. NUTTER: Any questions of Mr. Whigham?

Mr. Whigham, you said that you thought we should continue Finding Number Eleven. Now, as you read that, I think it said " -- withdrawals of gas should be limited --"?

A Yes, sir.

MR. NUTTER: Do you have a recommendation as to which type of limitation should be applied?

A No, I don't. It appears to me that a lot of data has been presented here at the Hearing, and none of it has been conclusive as far as I am concerned to determine whether or not oil is, at the present time, migrating into the gas cap, and that is what is provided in Finding Number Eleven. I am in no better position to recommend a specific rule that would meet this condition than anyone else is, but I am sure that the ultimate objective is to prevent the movement of oil that is now in the oil column up into the gas areas.

MR. NUTTER: And so, Texaco has no position as far as any conclusive recommendation?

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A Not really, Mr. Nutter. We firmly believe that the Commission will examine the testimony and data that has been presented at this Hearing and will come up with the required formula or the required method of prorating these gas wells, and Texaco would be most willing to abide by whatever decision is made by the Oil Conservation Commission.

MR. NUTTER: We thank you for the confidence.

MR. UTZ: In other words, you are willing to pass the buck.

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

Do you have anything further, Mr. Kelly?

MR. KELLY: I have one additional witness, just to put in additional testimony on the separation of the two zones.

ROBERT J. SCOTT

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

DIRECT EXAMINATION

BY MR. KELLY:

Q Would you state your name and your occupation, please?

A Robert J. Scott. I am employed by Texaco, Incorporated, as the District Development Geologist, in their

Roswell, New Mexico District.

Q Now, referring to what has been marked "Exhibit Number One" of Texaco, would you describe the nature of the pay in this Todd field?

A The pay in the Todd field is a portion of the San Andres formation which is primarily dolomite. The pay section has been divided into two zones which we designate Zone "A" and Zone "B". These are equivalent, in this difference in nomenclature, as has been explained here previously. The separation is based on a ten to fifteen foot anhydrite bed.

Within these two dolomite units, porosity occurs in stringers and to effect complete and productive wells, these porosity stringers are selectively perforated and treated.

Q And now, your studies indicate that the production from Zone "A" is exclusively gas, and Zone "B" is gas and oil, is that right?

A Yes, the information gained by production and drilling and testing within the field would show that Zone "A" carries gas exclusively, and that Zone "B" will carry gas, oil or water, dependent upon the structural position of the penetration.

Q Now, referring to your Exhibits Two and Three,

would you support your testimony on the separation of the anhydrite pit?

A Exhibit Two is a structural contour map. The scale of the map is one inch equals two thousand feet. The contour interval is fifty feet. The line section on Exhibit Three is designated on a little location plat on the exhibit, and it can be readily transposed to the structural contour map. By the way, the contour horizon of the structural contour map is on top of the anhydrite stringer.

The points made by the cross section is that we have a section here running essentially north-south with the structurally highest well, the Franklin, Aston and Fair Number Five marked "Federal" being located on the north end, and the structurally low well of the section is the Skelly Number One Hobbs "S" being located on the south end. Now, denoted that the production in the structurally high well, the Number Five marked "Federal" is oil. The production in the structurally low well, the Skelly Number One Hobbs "S" is gas. Now, this is a structural cross section hung on a sea level datum of plus five hundred feet. The red dash lines project the perforated interval of the oil pay into the perforated interval of the gas pay, and it will be noted that the two perforated intervals are structurally equivalent. In other words, the structural position of the

oil perforations is within the structural interval of the gas perforations.

Now, this situation, to my way of thinking, could not occur should this whole section be considered one reservoir. This is not the nature of the accumulation of oil and gas. Gas is found structurally high, so that this situation of having the gas wells down dip to the oil well could not exist except that the two productive intervals were separated by an impermeable barrier.

Q Do you have an exhibit that shows the anhydrite stringer as it goes throughout the whole zone, separating "A" and "B"?

A Yes, we do. Exhibit Four was prepared and it spans the productive portion of the field from the northwest down across the southeast limits to a dry hole, the Franklin, Aston and Fair Number One, "American Trading". The anhydrite stringer which separates Zone "A" and "B" is shaded blue on this section, and, as the section illustrates, this dividing anhydrite bed is present over the entire length of this section. I have also examined and correlated each well within the productive limits of the Todd field and found the anhydrite stringer to be present in all instances.

Q Were Exhibits One through Four prepared by you or under your supervision?

A Yes, they were.

MR. KELLY: I move the introduction of Texaco's Exhibits One through Four.

MR. NUTTER: Texaco's Exhibits One through Four will be admitted into evidence.

MR. KELLY: That's all I have.

MR. NUTTER: Does anyone have any questions of Mr. Scott? Mr. Scott, you may be excused.

Do you have anything further, Mr. Kelly?

MR. KELLY: That's all.

MR. NUTTER: Does anyone have anything they wish to offer in Case 3298, Re-opened?

MR. JENNINGS: Mr. Examiner, I don't think that I offered Franklin, Aston and Fair's Exhibit Number One. It got away from me, and I would like to offer it at this time.

MR. NUTTER: Franklin, Aston and Fair's Exhibit Number One will be admitted into evidence.

Does anyone have anything further they wish to offer in this case?

MR. SELINGER: My name is George W. Selinger. You have heard from everybody but Skelly. For the record, Skelly has two gas wells and two oil wells. The two gas wells are in what has been designated as the "H" Zone. Apparently, everyone is in agreement that the "H" Zone

should be segregated from the existing Todd-San Andres and separated as an undesignated gas pool. It is to be noted that, of the thirteen gas wells, there is only one in the "J" Zone alone. Eight of the gas wells are in the "H" and "J", and it is also to be noted that everyone is in agreement for a dual completion of the "H" and "J" for the separation of the man-made connections. That leaves four gas wells only in the "H" Zone. There are nineteen oil wells at the present time. According to the October schedule, they have an allowable of nine hundred and fifty-seven barrels.

The Commission will recall when we were faced with the Devil's Fork-Gallup Combination Pool, we advocated the same thing that Mr. Gray was advocating. We felt like Mr. Porter's question that you cannot tie a combination field to a nomination for a gas field where you have a number of oil wells. It is almost impossible to do that, so the next best thing, and this is true and tried, and not only in this state but in all other states, of tying your combination gas takes to your oil allowable and, when you do that, you have to use the actual production. You have to use not a fictitious two-thousand ratio, but you have to use the actual producing ratio, and, admittedly, the main purpose, as indicated by your Finding Number Eleven, is to stabilize your gas-oil

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contact. The only thing I have heard at this Hearing in objection to the proposal is that we don't have sufficient information, we don't know where we are at. We don't know where we're going. That's all the more reason why you should leave a status quo. You shouldn't make any changes. If we do not know that there's oil being taken into the gas cap, and that should be a flag of caution for this Commission, not to change the existing rules because we do not know that there is any invasion of the oil into the gas cap. That should be a suitable objective of the Commission. That should be all the more reason why you should maintain your status quo of your present existing rules. For that reason, we think that the only thing that is brought up now is the matter of economics. If the Protestant thinks they are in bad shape, there is always someone else that is in worse shape than you are. We are sitting there with two gas wells that we are offsetting by oil wells. We drilled for oil and we got gas, and we are sitting there with a half a well allowable on each of our two gas wells, and the matter of economics, we only have one zone, the "H" Zone. At least, they have -- the Protestants have three hundred and twenty acre, full-sized gas units. They are in a fortunate position of being able to dually complete in the two zones. They are going to get the benefit of an unrestricted gas take. They

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are going to get the benefit of whatever the allowable is for the "J" Zone, so, economically, they may be better off than they are at what they are advocating at this time. So, I would say to the Commission that they should concur in the existing rules, extend the existing rules until someone brings up any evidence to the adverse affect that there is some waste being committed. We all admit right now that nobody knows whether there is or isn't. The Applicant has indicated that there is no waste being committed at this time. The Protestants indicate they don't know, and, as long as that situation prevails, I think the Commission ought to maintain a status quo.

MR. NUTTER: Thank you, Mr. Selinger.

MR. BAKER: Mr. Nutter?

MR. NUTTER: Yes, sir, Mr. Baker?

MR. BAKER: I am Bob Baker of Atlantic Richfield Company. Atlantic Richfield Company operates one gas well in the Todd-San Andres Pool. This is the State BA Number One. It is completed as testimony has shown primarily in the "H" or "A" Zone, the gas-producing zone of the Pool. With future declining oil production in the Todd-San Andres Pool, as presently designated, we believe that the gas well production soon will be penalized to an uneconomic rate. For this reason, economics alone, Atlantic Richfield Company

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supports any change in the special rules and regulations for the Todd-San Andres Pool, to provide economic relief. I thank you.

MR. NUTTER: Thank you. Any other statements?

MR. McCLELLAN: May I ask a question?

MR. NUTTER: Yes, sir.

MR. McCLELLAN: I am Jack McClellan. If correspondence was received on this, will it be introduced at this time?

MR. NUTTER: Yes, sir. I think we do have some. Mr. Hatch?

MR. HATCH: I have a telegram from Olin F. Featherstone addressed to the Oil Conservation Commission dated October 10, 1966. "I concur with Franklin, Aston and Fair and Texaco's opinion as to the separation of the gas field in Township Seven South, Range Thirty-Five East. I concur that the gas field should be divided into an "A" and "B" Zone, and that "B" Zone should be prorated on a two thousand to one basis with a one hundred and sixty acre spacing, Olin F. Featherstone."

I have a letter from Cities Service Oil Company dated October 5, 1966, addressed to the New Mexico Oil Conservation Commission, "RE: Case 3298. It is our understanding that the subject case involves a reduction of

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gas allowable from Todd-San Andres Field, Roosevelt County, New Mexico. Although Cities Service Oil Company is not a producer in the Todd-San Andres Field, we have a vital interest as a gas processor. Effective September 1, 1966, Cities Service Oil Company acquired ownership of the Bluit Plant in Milnesand, New Mexico. The economics of this acquisition were based on processing slightly over three billion cubic feet of gas annually from the Todd-San Andres Field. We have been advised that the proposed allowable in the Todd-San Andres Field is eight M.M.C.F. per month, per well. Such an allowable would reduce the annual volume to about one and one tenth premium cubic feet, or approximately one-third of our projected volume. The seriousness is further compounded since producers state that such a volume is below the economic limit of operation, and they will be compelled to discontinue operating the Todd-San Andres Field wells. The Todd-San Andres Field gas presently represents about twenty-five percent of the Bluit Plant throughout. We want to emphasize that we have plant capacity dedicated to the Todd-San Andres gas and there is a market demand for the gas. Any substantial reduction in the Todd-San Andres Field allowable will severely affect our economic position. We solicit your consideration of these facts." Signed, "Fred H. Ramsier, General Manager, Natural Gas Liquids Department".

MR. NUTTER: Thank you, Mr. Hatch. Any statements?

MR. JENNINGS: Mr. Examiner, I would just like to make one comment due to the lateness of the hour here, but, a year ago, the Commission was told to accept this formula upon the basis that with six months of experience, we would know where we were going on it, and, further, on the basis that the gas allowable would be approximately five hundred and twenty-five thousand cubic feet per well per day. Well, neither situation has come to pass. The testimony has been today, we don't know any more about this than we did six months ago, and further, that the allowable as now calculated by this formula, would be roughly one-third of this. This certainly works a hardship on the people who went out in the early days and developed these gas pools which were there first. Franklin, Aston and Fair has just as much at stake as Sunray. They have just as many oil wells. They happen to have a few gas wells, too. Well, I realize that the formula is doing the job for Sunray which is quite well and good, but there are others to be considered. When you get down to the situation where a gas well will be producing three hundred and sixty dollars a month or less to the working interest, it is pretty sad. It applies not only to Cities Service but to the operators in the field. And, it seems further that there is quite an unfair situation

when we have the situation where, at one section where Sunray will be allowed a proportionate higher allowable -- gas allowable on their oil wells than we get on the gas wells. This certainly doesn't seem -- frankly, I don't know the answer, but I certainly don't think that the formula that we have been operating under which they propose to operate on in the future is the answer.

MR. NUTTER: Thank you. Any other statements?

MR. LOAR: As Applicant, I would like to make a statement, Mr. Nutter.

All I can say is, I think the record will stand on its own. Certainly, Sunray presented testimony and data to support the formula. Mr. Gray's recommendations were based on no reservoir data for the San Andres. He applied a rule that has been used in some other fields, which were not even specified here and he gave an indication that he had no -- I believe, he gave an indication that he had no knowledge of whether it would work and accomplish the job in the Todd Field or not.

Sunray pointed out that a year ago, that thirty thousand barrels had migrated into the gas cap. We indicated that this migration was continuing. Certainly, that indicates waste. We recommend the separation of the "H" and

"J" reservoirs. We recommend that the rules be made permanent. I assume that the Cities Service letter will be treated for what it's worth, in that there are certainly allegations made there that are not supported by testimony in the record.

As to Mr. Jennings' comment that the north half of our lease is getting a higher allowable than one of his three hundred and twenty acres, we have four wells on that lease producing pursuant to the rules and regulations. We urge the Commission to separate these, to establish the "H" and "J" as separate reservoirs and make these rules permanent.

Thank you for your time.

MR. NUTTER: Thank you. Does anyone have any further statement? Mr. McClellan, did you have anything that you wanted to add?

MR. MCCLELLAN: I would just like to concur testimony of Franklin, Aston and Fair, particularly with the division in some manner of this gas proration on the "J" Zone, realizing that we all want to conserve the oil. We are not intending to take an undue amount out, but I don't think the present formula is applicable here and if we can get one that is, that would certainly be my recommendation.

MR. NUTTER: Thank you. If there are no further statements, we will take Case 3298 Re-opened under advisement,

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and the Hearing is adjourned.

STATE OF NEW MEXICO)
) ss.
 COUNTY OF BERNALILLO)

I, W. DON MCINTYRE, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission Examiner at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, I have affixed my hand this 1st day of November, 1966.

W. Don McIntyre
 Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3298 (reagan) heard by me on 10/11, 1966.
[Signature] Examiner.
 New Mexico Oil Conservation Commission

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I N D E X (Continued)

E X H I B I T S

EXHIBIT NUMBER

MARKED FOR IDENTIFICATION

Sunray's Exhibits

4

Franklin, Aston and Fair's Exhibit Number One

70

SUNRAY DX OIL COMPANY
RESERVOIR and FLUID DATA
GAS CAP
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

RESERVOIR DATA

Porosity ϕ
Net Pay ft.
Water Saturation S_w
Pore Volume-Feet (2)

LOG ANALYSIS (1)

5.8%
33
30.0%
1.92

FLUID DATA

Gas Gravity (Air=1.0) (3)
Deviation from Boyles' Law, Z (3)
Formation Volume Factor (3), Res.Bbls./Mcf = B_g
Gas-Liquid Ratio

0.799
0.81
1.47
Dry

- (1) Average for five gas cap wells. Footage with less than 4% porosity excluded. Gas productive footage overlying oil column is not included in averages.
- (2) (Fraction ϕ) x (Feet of Net Pay)
- (3) Vapor-liquid equilibrium calculations from separator gas sample of oil zone production.

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
SDX EXHIBIT NO. 8
CASE NO. 3298

SUNRAY DX OIL COMPANY
RESERVE CALCULATION
OIL ZONE
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Recoverable Reserves Per Acre-Foot

$$= \frac{7758 (\phi)(1-S_w)(\text{Fractional Recovery})}{B_o}$$

$$= \frac{7758 (0.065)(0.70)(0.16)}{1.16}$$

$$= 49 \text{ Barrels per Acre-Foot}$$

Recoverable Reserves Per Well

$$= (\text{Barrels/A-F}) \times (\text{Net Pay}) \times (\text{Acres})$$

80-Acre Spacing

$$= (49) \times (25) \times (80)$$

$$= 98,000 \text{ Barrels}$$

40-Acre Spacing

$$= (49) \times (25) \times (40)$$

$$= 49,000 \text{ Barrels}$$

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
SDX EXHIBIT NO. 9
CASE NO. 3298

SUNRAY DX OIL COMPANY
RESERVE CALCULATION
GAS CAP
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Recoverable Reserves Per Acre-Foot

$$= \frac{7758 (\phi)(1-S_w)(\text{Fractional Recovery})}{B_g}$$

$$= \frac{7758 (0.058)(0.70)(0.85)}{1.47}$$

$$= 182 \text{ Mcf per Acre-Foot}$$

Recoverable Reserves Per Well

$$= (\text{Mcf/A-F}) \times (\text{Net Pay}) \times (\text{Acres})$$

$$= (182) \times (33) \times (320)$$

$$= 1,920,000 \text{ Mcf}$$

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
SDX EXHIBIT NO. 10
CASE NO. 3278

SUNRAY DX OIL COMPANY
DETAILED ESTIMATED COST ANALYSIS TO
DRILL AND COMPLETE IN SAN ANDRES
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

INTANGIBLE

Location Preparation	\$ 2,900
Contract Drilling - 4400'	14,400
Day Work	600
Casing Cementing	1,400
Geological Logging	1,600
Perforating	500
Acidizing	4,300
Special Rig Completing	1,800
Tool and Equipment Rental	500
Water and Fuel	500
Casing Supplies	900
Drilling Mud	000
Company Supervision	500
TOTAL INTANGIBLES	\$ 30,700

TANGIBLE

Surface Casing: 350' - 8-5/8" O.D.	\$ 1,000
Production Casing: 4400' - 4-1/2" O.D.	5,300
Tubing: 4300' - 2-3/8" O.D.	3,000
Wellhead Equipment	1,700
TOTAL TANGIBLES	\$ 11,000

TOTAL COST

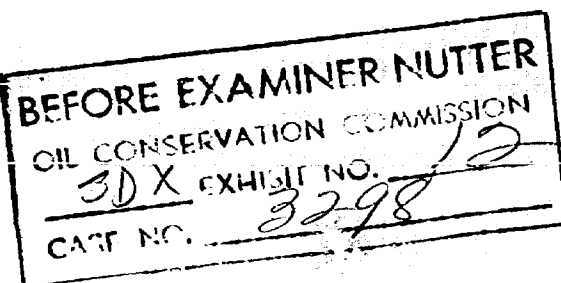
\$ 41,700

BEFORE EXAMINER NUTTER	
OIL CONSERVATION COMMISSION	
SDX	EXHIBIT NO. 11
CASE NO.	3298

SUNRAY DX OIL COMPANY
OIL ZONE
ECONOMIC ANALYSIS FOR DEVELOPMENT WELL
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

	80-Acre Spacing	40-Acre Spacing
Total Reserves, Gross Bbls.	98,000	49,000
Less 1/8 Royalty, Bbls.	12,200	6,100
Net to Producer, Bbls.	85,800	42,900
Gross Income @ \$2.47/Bbl.	\$212,000	\$106,000
Less Operating Costs:		
	80-Acre	40-Acre
Well Cost	\$41,700	\$41,700 (1)
Operating Expense	18,000	9,000 (2)
Production Taxes	9,800	4,900 (3)
Total	\$69,500	\$55,600
	\$ 69,500	\$ 55,600
Profit Before F.I.T.	\$142,500	\$ 50,400
Present Worth Discounted @ 7% (4)	\$122,700	\$ 42,400
Discounted Profit Before F.I.T. per Dollar Invested	\$2.94	\$1.02

- (1) Does not include investment for pipeline to market outlet or artificial lift equipment, the latter of which is estimated at \$6,500 per well.
- (2) Excludes trucking charge of 13¢ per bbl.
- (3) Production taxes: 4.64%
- (4) Present worth based on 13-year life for 80-acre spacing and 8-year life for 40-acre spacing.



SUNRAY OIL COMPANY
 GAS CAP
 ECONOMIC ANALYSIS FOR DEVELOPMENT WELL
 TODD (SAN ANDRES) FIELD
 ROOSEVELT COUNTY, NEW MEXICO

320-Acre Spacing

1,920,000
 240,000
 1,680,000
 \$ 201,600

Total Reserves, Gross Mcf
 Less 1/8 Royalty, Mcf
 Net to Producer, Mcf
 Gross Income @ 12¢/Mcf

Less Operating Costs:

Well Cost
 Operating Expense
 Production Taxes
 Total

\$41,700 (1)
 24,000
 9,400 (2)
 \$75,100

75,100
 \$ 126,500
 \$ 83,700
 \$2.00

Profit Before F.I.T.

Present Worth Discounted @5% (3)
 Discounted Profit Before F.I.T. per
 Dollar Invested

- (1) Does not include investment for pipeline to market outlet or compression equipment cost.
- (2) Production taxes: 4.64%
- (3) Present worth based on 20-year life for 320-acre spacing.

BEFORE EXAMINER NUTTER
 OIL CONSERVATION COMMISSION
 SDK EXHIBIT NO. 13
 CASE NO. 3298

SUNRAY DX OIL COMPANY
SUBSURFACE PRESSURE DATA
TODD (SAN ANDRES) FIELD
ROOSEVELT COUNTY, NEW MEXICO

Date	Well	Pressure, Psig @-70'	Average
9-64	(a) Mark Federal #2	1,392	1,392
2-12-65	(b) N. M. State "AY" #1	1,238	1,238
3-65	(a) Cunningham Fed. #3	1,255	1,255
7-9-65	(b) N. M. State "AY" #3	1,311 (31)	
	" " " #4	1,234 (30)	
	" " " #5	1,335 (29)	1,276
	" " " #6	1,223 (31)	1,442 *
		1,442 (72)	1,141
7-26-65	(c) Hobbs "S" #1	1,141 (71)	
7-31-65	(b) N. M. State "AY" #3		

Operator - (a) Franklin, Aston & Fair
(b) Sunray DX Oil Company
(c) Skelly Oil Company

* Not Representative
(Shut-in time, hours)

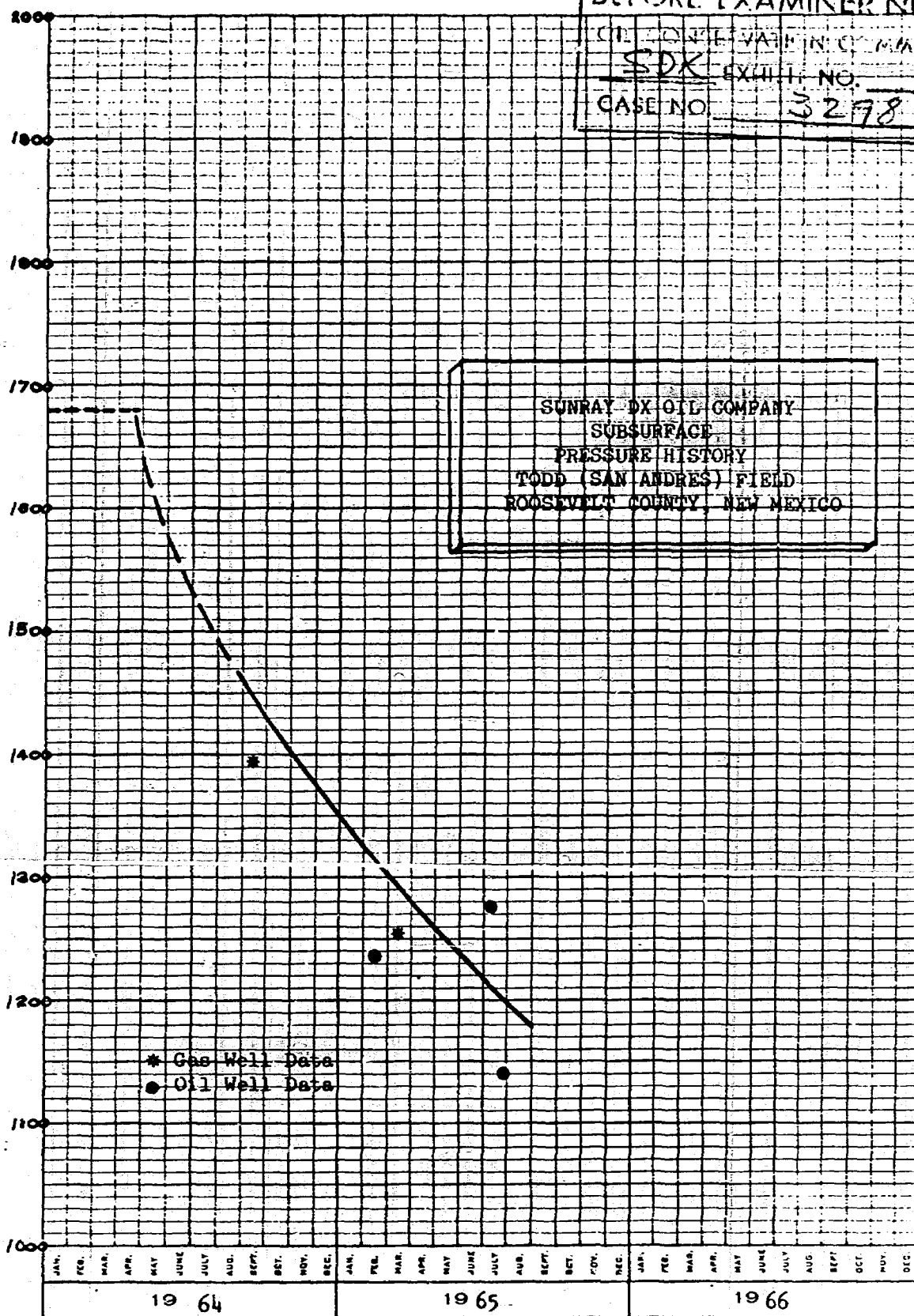
Reservoir Temperature -124°F

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
CDX EXHIBIT NO. 15
CASE NO. 3298

Case 3298

BEFORE EXAMINER NUTTER
OIL FIELD ELEVATION COMMISSION
SDK EXHIBIT NO. 16
CASE NO. 3298

Pressure, Psig @ -70'



BEFORE EXAMINER NUTTER
 OIL CONSERVATION COMMISSION
 507 EXHIBIT NO. 17
 CASE NO. 2298

SUNRAY DX OIL COMPANY
 PRODUCTION HISTORY
 OIL ZONE
 TODD (SAN ANDRES) FIELD
 ROOSEVELT COUNTY, NEW MEXICO

OPERATOR	SUNRAY "AY"					SKELLY Hobbs "R" No. 1	Total
	No. 1	No. 2	No. 3	No. 4	No. 5		
WELL	New Mexico State						
	OIL, BARRELS						

January, 1965	493	561	574	228	792	1,013	493
February	788						788
March	1,200	1,250	1,302	1,161	792	1,013	2,355
April	1,303	1,161	1,161	1,389			4,083
May	1,162	2,992	3,037				6,450
	4,946						14,169

GAS, MCF							
January, 1965	986	552	1,030	171	1,263	898	986
February	1,576						1,576
March	2,400	1,187	2,457	871			3,982
April	2,606	1,103	2,191	1,042	1,263		6,421
May	2,322	2,842	5,678				8,648
	9,890						21,613

WATER, BARRELS							
January, 1965	150					41	150
February	100						100
March	75						116
April							
May	325						366

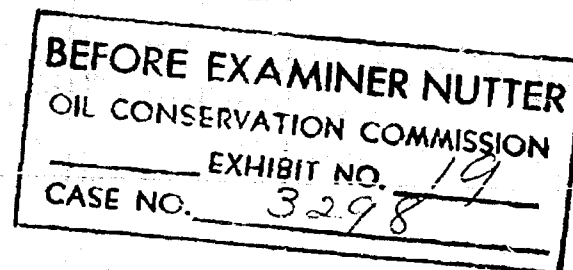
SPECIAL RULES AND REGULATIONS FOR THE
TODD SAN ANDRES POOL
ROOSEVELT COUNTY, NEW MEXICO

ORDER

1. (Same as existing Todd San Andres Gas Pool Rule 1).

2. (a) Each gas well completed or recompleted in the Todd San Andres Pool shall be located on a standard unit consisting of approximately 320 acres which shall comprise any two contiguous quarter sections of a single governmental section, being a legal subdivision (half section) of the United States Public Lands Survey. For purposes of these rules, a unit consisting of between 316 and 324 contiguous surface acres shall be considered a standard unit.

(b) Each oil well completed or recompleted in the Todd San Andres Pool shall be located on a standard unit containing 80 acres more or less consisting of the North Half, South Half, East Half or West Half of a single governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quarter-quarter sections in the unit. For purposes of these rules, a unit consisting of between 79 and 81 contiguous surface acres shall be considered a standard unit.



3. (Same as existing Todd San Andres Gas Pool Rule 3).

4. Each gas well completed or recompleted in the Todd San Andres Pool shall be located in the northeast quarter ^{OR} of the southwest quarter of the section and shall be located no nearer than 990 feet to the outer boundary of the quarter section and no nearer than 330 feet to any governmental quarter-quarter section line.

5. All oil wells shall be located within 200 feet of the center of a governmental quarter-quarter section.

6. (Same as existing Todd San Andres Gas Pool Rule 5).

7. The total tentative gas allowable to be allocated to the pool shall be equal to the sum of the preliminary or supplemental nominations together with necessary adjustments. The pool gas allowable remaining each month after deducting the total allowable assigned to marginal wells shall be allocated among the non-marginal wells entitled to an allowable in the proportion that each well's acreage factor bears to the total of the acreage factors for all non-marginal wells in the pool.

Preliminary nominations for the first full six-months gas proration period shall be filed with the Commission at least five days prior to the 9.15.68 hearing.

- (a) No well shall be assigned an allowable until Form C-104, Form C-110 and Form C-116 have been filed, together with a plat (Form C-128) showing the acreage dedicated to the well and the location of all wells on the unit. Form C-116 shall show, in addition to the information required thereon, the gravity of the liquid hydrocarbons produced on the test.

The District Supervisor of the Commission's Hobbs District Office is hereby authorized to assign a temporary gas allowable to wells connected to a gas transportation facility during the recovery of lead oil, which allowable shall not exceed the number of cubic feet of gas obtained by multiplying the daily top unit allowable for the pool by 2000.

- (b) A standard oil proration unit in the Todd San Andres Pool shall be assigned an 80-acre proportional factor of 2.00 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any

proportion. The allowable assigned to a non-standard proportion unit shall bear the same ratio to a standard allowable in the Todd San Andres Pool as the acreage in such non-standard unit bears to 80 acres.

8. (a) A gas well's "Acreage Factor" shall be determined to the nearest hundredth of a unit by dividing the acreage assigned to the well by 320 acres. An oil well's "Acreage Factor" shall be determined to the nearest hundredth of a unit by dividing the acreage assigned to the well by 80 acres.

(b) The allowable to be assigned to each marginal gas well shall be equal to the maximum production of such well during any month of the preceding gas proration period.

(c) Each oil well on an 80-acre oil proration unit shall be permitted to produce an amount of gas determined by multiplying the top unit oil allowable for the pool by the limiting gas-oil ratio for the pool (2000). In the event there is more than one oil well on an 80-acre oil proration unit, the operator may produce the allowable assigned to the unit from said wells in any proportion.

(d) Allowables to wells whose classification has changed from oil to gas or from gas to oil as the result of a

gas-liquid ratio test shall commence on the first day of the month following the month in which such test was reported, provided that a plat (Form C-128) showing the acreage dedicated to the well and the location of all wells on the dedicated acreage has been filed.

9. The full production of gas from each well including drilling gas, shall be charged against the well's allowable regardless of the disposition of the gas; provided, however, that gas used in maintaining the producing ability of the well shall not be charged against the allowable.

10. The initial gas proration period shall be from 7:00 o'clock a.m. on _____, to 7:00 o'clock a.m. on _____. Subsequently, the dates 7:00 o'clock a.m. _____ 1st and 7:00 o'clock a.m. _____ 1st shall be known as balancing dates, and the periods of time bounded by these dates shall be known as the gas proration periods for the Todd San Andres Pool.

(a) (1) The top 80-acre unit allowable for oil wells in the Todd San Andres Pool shall be determined each month by multiplying the Southeast New Mexico Normal Unit Allowable by the 80-acre proportional (depth) factor for said pool (2.00). The final allowable for the gas area of said pool shall be determined for the preceding six-months period on _____ 1st and on _____ 1st of each year in accordance with the following formula:

(1) (a)

$$V = \left[Q \times \left(\frac{A + \Delta A}{a + \Delta a} \right) \right] \left[(r_1 - r_2) + \left(\frac{T_{sc}}{T_{res}} \times \frac{P_{res}}{P_{sc}} \times \frac{1}{Z} \times B_o \times 5.61 \frac{ft^3}{bbl} \right) \right]$$

where:

- V = the gas allowable for the gas area for the preceding six-months period and is equal to the volumetric gas equivalent of all production from the oil area during the preceding six-months period expressed in cubic feet rounded off to the nearest MCF.
- Q = total oil production from the oil area during the preceding six-months period, barrels.
- (A + ΔA) = total acres dedicated to gas wells during preceding six-months period.
- (a + Δa) = total acres dedicated to oil wells during preceding six-months period.

(Note: "A" and "a" represent acreage dedicated to gas wells and to oil wells respectively for the entire six-months period. ΔA and Δa represent acreage so dedicated for only a portion of the six-months period. In the event a well is completed or reclassified during a six-months period ΔA and/or Δa shall be computed as follows:

$$\Delta A = A \left(\frac{d}{D} \right)$$

$$\Delta a = a \left(\frac{d}{D} \right)$$

where:

- ΔA or Δa = acreage to be added to gas or oil area, respectively.
- A or a = acreage dedicated to the well.
- d = number of days during proration period during which well was completed as gas well or as oil well and was so classified.
- D = total number of days in proration period.)
- r_1 = average producing GOR for oil area during preceding six-months period. (Determined by dividing total cubic feet of casinghead gas produced by total barrels of oil produced.)
- r_2 = Solution GOR for the oil area at Pres. (r_2 determined from Solution GOR Tabulation in Special Rule 10 (b).)
- T_{sc} = Temperature at standard conditions = 60° F or 520° R.
- T_{res} = Initial bottom-hole temperature 107° F or 567° R.
- Pres = Average reservoir pressure based on most recent bottom-hole pressure survey as provided in Special Rule 18.
- P_{sc} = Pressure at standard conditions.
- Z = Deviation factor for gas at Pres and at 107° F. (Z factor determined from gas Deviation Factor Tabulation in Special Rule 10 (b).)
- B_o = Oil reservoir factor at Pres. (B_o determined from Oil Reservoir Volume Factor Tabulation in Special Rule 10 (b).)

(a) (2) The volumetric equivalent of gas for the gas area determined in (1) above shall be compared with the actual production from the gas area.

(2) (a) If the actual production from the gas area exceeds such volumetric equivalent plus any permitted production remaining as determined in (b) below, then the nominations and purchases by gas purchasers during the succeeding six month period shall be adjusted by the Commission so that the volumetric withdrawals from the gas area shall be restricted for the purpose of balancing the cumulative equivalent volumetric withdrawals from each area.

(2) (b) If the actual production from the gas area is less than the volumetric equivalent for the gas area then no adjustments will be made but the difference between the volumes will be carried forward as permitted production of gas from the gas area in subsequent balancing periods.

(2) (b) The following values of r_2 , Solution Gas-Oil Ratio, Z , Gas Deviation Factor, and B_o , Oil Reservoir Volume Factor, for the various values of P_{res} , Average Reservoir Pressure, shall be used in computing the volumetric equivalent of gas per Special Rule 10 (a):

<u>Press. Average Reservoir Pressure, Psia</u>	<u>r₂ Solution GOR Ft³/Bbl.</u>	<u>% Gas Deviation Factor</u>	<u>β_o Oil Reservoir Volume Factor</u>
1680	275	0.841	1.160
1600	265	0.844	1.155
1500	253	0.850	1.149
1400	241	0.856	1.142
1300	229	0.863	1.136
1200	217	0.871	1.129
1100	205	0.880	1.122
1000	193	0.889	1.116
900	181	0.899	1.109
800	169	0.909	1.103
700	157	0.919	1.097
600	145	0.930	1.089
500	133	0.942	1.081
400	119	0.953	1.076
300	101	0.965	1.070
200	79	0.976	1.058
100	51	0.988	1.040

11. If, at any time, a well is overproduced an amount equalling three times its current monthly allowable, it shall be shut-in during that month and each succeeding month until the well is overproduced less than three times its current monthly allowable.

12. If, at the end of a proration period, a marginal gas well has produced more than the total allowable assigned a non-marginal unit of corresponding size for that period, the marginal well shall be reclassified as a non-marginal well and its allowable and net status shall be adjusted accordingly.

13. No gas, either dry gas or casinghead gas, produced from the Todd San Andres Pool shall be flared or vented except as otherwise provided in these Special Rules and Regulations. All gas produced, whether dry gas or casinghead gas and regardless of final disposition thereof, shall be constantly and accurately measured.

14. All transporters or users of gas shall file gas well connection notices with the Commission as soon as possible after the date of connection or reconnection.

15. A gas well in the Todd San Andres Pool shall be a well producing with a gas-liquid ratio of 50,000 cubic feet of gas per barrel of liquid hydrocarbons, or more, or any well which produces liquid hydrocarbons with a gravity of 60° API or greater.

An oil well in the Todd San Andres Pool shall be a well producing with a gas-liquid ratio of less than 30,000 cubic feet of gas per barrel of liquid hydrocarbons and which produces liquid hydrocarbons with a gravity of less than 60° API.

16. The operator of each newly completed well in the Todd San Andres Pool shall cause a gas-liquid ratio test to be taken on said well upon recovery of all load oil from the well, provided, however, that in no event shall the test be commenced later than 30 days from the date of first production unless the well is connected to a gas-gathering facility and is producing under a temporary gas allowable assigned in accordance with Rule 7 (a) above. Provided, however, that any well which is shut-in shall be exempted from the aforesaid gas-liquid ratio test requirement so long as it remains shut-in. The initial gas-liquid ratio test shall be taken in the manner prescribed by Special Rule 17 below. If the gas-liquid ratio is 30,000 cubic feet of gas per barrel of liquid hydrocarbons, or more, or the gravity of the liquid hydrocarbons is 60° API or greater, the operator shall not produce the well until beneficial use can be made of the gas.

No gas shall be flared or vented from any well classified as an oil well more than 60 days after the well begins to produce. Exceptions may be granted administratively by the Secretary-Director if the request sets forth facts and circumstances justifying such exception.

17. Gas-liquid ratio tests shall be taken on all wells in the Todd San Andres Pool and on all wells producing from the San Andres Formation within one mile of the boundaries of the Todd San Andres Pool which are not within another designated San Andres Pool during the months of January, April, July and October of each year. The initial gas-liquid ratio test shall suffice as the first quarterly test. Tests shall be 24-hour tests, being the final 24 hours of a 72-hour period during which the well shall be produced at a constant normal rate of production. Results of such tests shall be filed on Commission Form C-116 on or before the 10th day of the following month. At least 72 hours prior to commencement of any such gas-liquid ratio test, each operator shall file with the Hobbs District Office of the Commission a test schedule for its wells specifying the time each of its wells is to be tested. Copies of the test schedule shall also be furnished to all offset operators.

Special tests shall also be taken at the request of the Secretary-Director and may also be taken at the option of the operator. Such special tests shall be taken in accordance with the procedures outlined hereinabove, including notification to the Commission and offset operators.

18. The average reservoir pressure shall be determined during _____, and thereafter during the month of October each year after the well has been shut-in for a minimum of three

days. Pressures shall be calculated to a common datum, which shall be the approximate depth of the gas-oil contract (_____ feet above sea level). The pressure on individual wells shall be determined in the following manner:

(1) (As amended by Order No. R-1670-B-1, October 18, 1962.) Subsurface pressure tests shall be taken on all wells, gas and oil, in accordance with the procedure outlined in Statewide Rule 302, except with respect to shut-in time and datum as provided above. Pressures of pumping oil wells may be calculated from sonic fluid level determinations.

(2) Information obtained on these tests shall be reported on Form C-124 in accordance with the provisions of Statewide Rules 302 and 1123, and the Commission shall use the arithmetic average of the pressures so reported for the pressure, P_{res} , in the calculations as provided in Special Rule 10 (a).

19. The gas-oil ratio limitation for the Todd San Andres Pool shall be 2000 cubic feet of gas per barrel of liquid hydrocarbons produced.

20. No acreage shall be simultaneously dedicated to an oil well and to a gas well in the Todd San Andres Pool.

21. The vertical limits of the Todd San Andres Pool shall be the San Andres Formation.

IT IS FURTHER ORDERED:

(1) That any well presently drilled to or completed in the San Andres Formation within the Todd San Andres Pool or within one mile of said pool that would not comply with the well location requirements of Rules 5 or 6, is hereby granted an exception to said rule. The operator shall notify the HOBBS District Office of the Commission in writing of the name and location of the well on or before _____, 1965.

(2) That the Secretary-Director of the Commission is hereby authorized to approve interference tests and the transfer of allowables to wells on the same lease or, if in a unitized area, to wells in the same participating area, provided, however, that any such authorization shall be limited to a period of six months, but may be renewed. No transfer well shall be permitted to receive, in addition to its own allowable, more than 50 per cent of one top unit allowable for the pool.

To obtain administrative approval for interference tests and the transfer of allowable, the operator shall submit in triplicate a request for such authority describing in detail the

proposed method of conducting such tests and transferring the allowable. The application shall be accompanied by a plat showing thereon all wells within a radius of two miles of the proposed shut-in well (s) and the transfer well (s). The plat shall also identify each lease or participating area as to ownership or operating rights. The application shall include evidence that all offset operators to the shut-in well (s) and the transfer well (s) have been furnished a complete copy of the application. It shall also be accompanied by Form C-116 for each shut-in well, showing the results of a pre-shut-in test to determine the amount of allowable to be transferred. The transferred allowable shall not exceed the volume of oil produced during the last 24 hours of a 72-hour period during which the well shall be produced at a constant rate. The Commission and offset operators to both the shut-in well (s) and the transfer well (s) may witness such tests if they so desire and shall be notified of the tests at least 48 hours prior to the commencement thereof.

The Secretary-Director of the Commission may grant approval of the interference tests and transfer of allowable upon receipt of waivers from all offset operators or upon expiration of a 20-day waiting period, provided no offset operator has objected to the proposed test and transfer.

(3) That this case shall be reopened at an examiner hearing in _____, 1966, at which time the operators in the

subject pool shall appear and present all available reservoir information, including interference test results, to establish the area that can be efficiently and economically drained and developed by one well and show cause why the Todd San Andres Pool should not be developed on 40-acre spacing units.

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

SUREAV DX OIL COMPANY
 PRODUCTION HISTORY
 GAS CAP
 TODD (SAN ANDRES) FIELD
 ROOSEVELT COUNTY, NEW MEXICO

GAS, MCF

SDX Sx 18
 Co 3298

OPERATOR
 WELL

Cumulative 1-1-64

January, 1964
 February
 March
 April
 May
 June
 July
 August
 September
 October
 November
 December
 Total

January, 1965
 February
 March
 April
 May
 Total

Cumulative Totals
 Through May, 1965

Cunningham Fed. #3	Mark Fed. #1	Mark Fed. #2	McClellan Fed. #1	NA Fed.
		FRANKLIN, ALTON & PAIR		

350	27,805	21,392	6,994	
	39,516	26,926	18,625	
	43,431	42,826	16,845	
	58,349	43,421	17,500	
	48,274	134,565	16,687	
	20,602		9,924	
	71,149		14,255	
	62,199		12,833	
	371,675		113,663	

30,809	70,924	46,466	13,652
39,127	41,978	38,601	10,370
49,259	59,678	42,230	12,195
	41,178	18,961	13,069
	40,598	32,173	9,403
	254,356	178,451	58,689

119,195	626,031	313,016	191,040
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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 3298
Order No. R-1670-G
NOMENCLATURE

APPLICATION OF SUNRAY DX OIL COMPANY
FOR THE CREATION OF AN OIL AND GAS POOL
AND FOR SPECIAL POOL RULES, ROOSEVELT
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 25, 1965, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 29th day of October, 1965, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Sunray DX Oil Company, seeks creation of a new oil and gas pool in Sections 22 through 28 and Sections 34 through 36, Township 7 South, Range 35 East, and Sections 30 and 31, Township 7 South, Range 36 East, NMPM, Roosevelt County, New Mexico.

(3) That the applicant also seeks the promulgation of temporary special rules and regulations governing said pool, including a provision for 80-acre oil well spacing and proration units and 320-acre gas well spacing and proration units.

(4) That the applicant also seeks a provision for limiting withdrawals from gas cap wells to the volumetric equivalent of withdrawals from oil wells in the pool.

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CASE No. 3298

Order No. R-1670-G

(5) That the applicant also seeks the establishment of an administrative procedure to authorize the transfer of allowables among wells on the same lease while conducting pressure interference tests.

(6) That by Order No. R-2666, dated March 13, 1964, the Commission created the Todd-San Andres Gas Pool and promulgated special rules and regulations governing said pool.

(7) That the applicant has established that the common source of supply presently designated the Todd-San Andres Gas Pool is, in fact, an associated oil and gas reservoir.

(8) That said reservoir should be redesignated the Todd-San Andres Pool and the horizontal limits of said pool should be re-defined.

(9) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, temporary special rules and regulations providing for 80-acre oil well spacing and proration units and 320-acre gas well spacing and proration units should be promulgated for the Todd-San Andres Pool.

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

(11) That the temporary special rules and regulations should provide for limited withdrawals from gas cap wells in order to prevent the migration of oil into the gas cap and resulting waste.

(12) That in order to permit the operators in the subject pool to gather additional reservoir information, the temporary special rules and regulations should establish an administrative procedure to authorize the transfer of allowables among wells on the same lease while conducting interference tests.

(13) That this case should be reopened at an examiner hearing in October, 1966, to permit the operators in the subject pool to present all available information, including interference test results, concerning the effectiveness of the temporary special

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CASE No. 3298

Order No. R-1670-G

rules and regulations promulgated by this order and the area that can be efficiently and economically drained and developed by one well in the subject pool.

(14) That the special rules and regulations for the Todd-San Andres Gas Pool, promulgated by Order No. R-2666, should be superseded.

IT IS THEREFORE ORDERED:

(1) That the Todd-San Andres Gas Pool in Roosevelt County, New Mexico, is hereby redesignated the Todd-San Andres Pool, with vertical limits comprising the San Andres formation and horizontal limits comprising the following-described area:

TOWNSHIP 7 SOUTH, RANGE 35 EAST, NMPM

Sections 22 and 23: All

Section 24: W/2

Sections 25 through 28: All

Sections 34 through 36: All

TOWNSHIP 7 SOUTH, RANGE 36 EAST, NMPM

Section 31: W/2

(2) That the Todd-San Andres Pool shall be governed by the General Rules and Regulations Governing Prorated Gas Pools in South-eastern New Mexico promulgated by Order No. R-1670, as amended, insofar as said General Rules and Regulations are not inconsistent with the Special Rules and Regulations hereinafter set forth.

(3) That temporary Special Rules and Regulations for the Todd-San Andres Pool are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS

FOR THE

TODD-SAN ANDRES POOL

A. WELL LOCATION AND ACREAGE REQUIREMENTS

RULE 1. Each well completed or recompleted in the Todd-San Andres Pool or in the San Andres formation within one mile of the Todd-San Andres Pool, and not nearer to or within the limits of another designated San Andres pool, shall be spaced, drilled, operated, and

-4-

CASE No. 3298
Order No. R-1670-G

produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2(A). Each gas well shall be located in the northeast quarter or the southwest quarter of the section and shall be located no nearer than 660 feet to the outer boundary of the quarter section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 2(B). Each oil well shall be located within 200 feet of the center of a governmental quarter-quarter section.

RULE 2(C). In the event oil production is obtained in a well projected as a gas well and located in accordance with Rule 2(A) above but not in accordance with Rule 2(B) above, or in the event gas production is obtained in a well projected as an oil well and located in accordance with Rule 2(B) above but not in accordance with Rule 2(A) above, it shall be necessary for the operator to bring the matter to a hearing before approval for the production of hydrocarbons can be given. Such unorthodox location, if approved, may necessitate an allowable adjustment.

RULE 3. The Secretary-Director of the Commission may grant an exception to the footage requirements of Rule 2(A) or 2(B) without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application. Such unorthodox location, if approved, may necessitate an allowable adjustment.

RULE 4(A). Each gas well shall be located on a standard unit consisting of approximately 320 acres which shall comprise any two contiguous quarter sections of a single governmental section, being a legal subdivision (half section) of the United States Public Lands Survey. For purposes of these rules, a unit consisting of between 316 and 324 contiguous surface acres shall be considered a standard unit.

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RULE 4(B). For good cause shown, the Secretary-Director may grant an exception to the requirements of Rule 4(A) without notice and hearing where an application has been filed in due form and where the unorthodox size or shape of the tract is due to a variation in the legal subdivision of the United States Public Lands Survey, or where the following facts exist and the following provisions are complied with:

- (1) The non-standard unit consists of contiguous quarter-quarter sections or lots.
- (2) The non-standard unit consists of not more than 324 acres and lies wholly within a single governmental section.
- (3) The entire non-standard unit may reasonably be presumed to be productive of gas from said pool.
- (4) The applicant presents written consent in the form of waivers from all offset operators, and from all operators owning interests in the section in which any part of the non-standard unit is situated and which acreage is not included in the non-standard unit.
- (5) In lieu of Paragraph 4 of this Rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if, after a period of 30 days, no such operator has entered an objection to the formation of the non-standard unit.

RULE 5(A). Each oil well shall be located on a standard unit containing 80 acres, more or less, consisting of the N/2, S/2, E/2, or W/2 of a single governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quarter-quarter sections in the unit. For purposes of these rules, a unit consisting of between 79 and 81 contiguous surface acres shall be considered a standard unit.

RULE 5(B). For good cause shown, the Secretary-Director may grant an exception to the requirements of Rule 5(A) above without notice

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and hearing where an application has been filed in due form, and where the unorthodox size or shape of the tract is due to a variation in the legal subdivision of the United States Public Lands Survey, or where the following facts exist and the following provisions are complied with:

- (1) The non-standard unit is to consist of a single quarter-quarter section or lot.
- (2) The non-standard unit contains less than 81 acres.
- (3) The entire non-standard unit may reasonably be presumed to be productive of oil from said pool.
- (4) The applicant presents written consent in the form of waivers from all offset operators.
- (5) In lieu of Paragraph 4 of this Rule, the applicant may furnish proof of the fact that all of the offset operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if, after a period of 30 days, no operator has entered an objection to the formation of such non-standard unit.

B. NOMINATION AND PRORATION SCHEDULE

RULE 6(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 6(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 7(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 7(B). (SEE ORDER NO. R-1670, AS AMENDED.)

C. ALLOCATION AND GRANTING OF ALLOWABLES

RULE 8(A). The total tentative gas allowable to be allocated to the pool shall be equal to the sum of the preliminary or supplemental nominations together with necessary adjustments. The pool gas allowable remaining each month after deducting the total allowable assigned to marginal wells shall be allocated among the non-marginal wells entitled to an allowable in the proportion that

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each well's acreage factor bears to the total of the acreage factors for all non-marginal wells in the pool.

Preliminary nominations for the first gas proration period (seven months, from December 1, 1965, to July 1, 1966) shall be filed with the Commission at least five days prior to the November, 1965, hearing. These nominations shall indicate the market demand for gas for the ensuing period and shall be subject to any necessary adjustments.

RULE 8(B)(1). No well shall be assigned an allowable until Form C-104 and Form C-116 have been filed together with a plat (Form C-102) showing the acreage dedicated to the well and the location of all wells on the unit. Form C-116 shall show, in addition to the information required thereon, the gravity of the liquid hydrocarbons produced on the test.

The District Supervisor of the Commission's Hobbs District Office is hereby authorized to assign a temporary gas allowable to wells connected to a gas transportation facility during the recovery of load oil, which allowable shall not exceed the number of cubic feet of gas obtained by multiplying the daily top unit allowable for the pool by 2000.

RULE 8(B)(2). A standard oil proration unit shall be assigned an 80-acre proportional factor of 2.00 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any proportion. The allowable assigned to a non-standard proration unit shall bear the same ratio to a standard allowable as the acreage in such non-standard unit bears to 80 acres.

RULE 9(A). A gas well's "Acreage Factor" shall be determined to the nearest hundredth of a unit by dividing the acreage assigned to the well by 320 acres. An oil well's "Acreage Factor" shall be determined to the nearest hundredth of a unit by dividing the acreage assigned to the well by 80 acres.

RULE 9(B). Each oil well on an 80-acre oil proration unit shall be permitted to produce an amount of gas determined by multiplying the top unit oil allowable for the pool by the limiting gas-oil ratio for the pool (2000). In the event there is more than one oil well on an 80-acre oil proration unit, the operator may produce the allowable assigned to the unit from said wells in any proportion.

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RULE 9(C). Allowables to wells whose classification has changed from oil to gas or from gas to oil as the result of a gas-liquid ratio test shall commence on the first day of the month following the month in which such test was reported, provided a plat (Form C-102) showing the acreage dedicated to the well and the location of all wells on the dedicated acreage has been filed.

RULE 10(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 10(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 11: (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 12. The full production of gas from each well, including drilling gas, shall be charged against the well's allowable regardless of the disposition of the gas; provided, however, that gas used in maintaining the producing ability of the well shall not be charged against the allowable.

D. BALANCING OF PRODUCTION

RULE 13(A). The initial gas proration period shall be from 7:00 o'clock a.m. on December 1, 1965, to 7:00 o'clock a.m. on July 1, 1966. Subsequently, the dates of 7:00 o'clock a.m. January 1st and 7:00 o'clock a.m. July 1st shall be known as balancing dates, and the periods of time bounded by these dates shall be known as the gas proration periods for the pool.

RULE 13(B)(1). The top 80-acre unit allowable for oil wells shall be determined each month by multiplying the Southeast New Mexico Normal Unit Allowable by the 80-acre proportional (depth) factor for said pool (2.00). The final allowable for the gas area of said pool shall be determined each six months for the preceding six-month period in accordance with the following formula:

$$V = \left[Q \times \left(\frac{A + \Delta A}{a + \Delta a} \right) \right] \left[(r_1 - r_2) + \left(\frac{T_{sc}}{T_{res}} \times \frac{P_{res}}{P_{sc}} \times \frac{1}{Z} \times B_o \times 5.61 \frac{\text{ft}^3}{\text{bbl}} \right) \right]$$

where:

V = the gas allowable for the gas area for the preceding six-month period and is equal to the volumetric gas equivalent of all production from the oil area during the preceding six-month period expressed in cubic feet rounded off to the nearest MCF.

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Q = total oil production from the oil area during the preceding six-month period, barrels.

$(A + \Delta A)$ = total acres dedicated to gas wells during preceding six-month period.

$(a + \Delta a)$ = total acres dedicated to oil wells during preceding six-month period.

(Note: "A" and "a" represent acreage dedicated to gas wells and to oil wells respectively for the entire six-month period. ΔA and Δa represent acreage so dedicated for only a portion of the six-month period. In the event a well is completed or reclassified during a six-month period ΔA and/or Δa shall be computed as follows:

$$\Delta A = A \left(\frac{d}{D} \right)$$

$$\Delta a = a \left(\frac{d}{D} \right)$$

where:

ΔA or Δa = acreage to be added to gas or oil area, respectively.

A or a = acreage dedicated to the well.

d = number of days during proration period during which well was completed as gas well or as oil well and was so classified.

D = total number of days in proration period.)

r_1 = Average producing GOR for oil area during preceding six-month period. (Determined by dividing total cubic feet of casinghead gas produced by total barrels of oil produced.)

r_2 = Solution GOR for the oil area at P_{res} . (r_2 determined from Solution GOR Tabulation in Special Rule 13(C).)

T_{sc} = Temperature at standard conditions = 60° F or 520° R.

- T_{res} = Initial bottom-hole temperature 125° F or 585° R.
- P_{res} = Average reservoir pressure based on most recent bottom-hole pressure survey as provided in Special Rule 28.
- P_{sc} = Pressure at standard conditions. (15.025 psia.)
- Z = Deviation factor for gas at P_{res} and at 125° F. (Z factor determined from gas Deviation Factor Tabulation in Special Rule 13(C).)
- B_o = Oil reservoir factor at P_{res} . (B_o determined from Oil Reservoir Volume Factor Tabulation in Special Rule 13(C).)

RULE 13(B)(2). (a) The volumetric equivalent of gas for the gas area determined in (1) above shall be compared with the actual production from the gas area.

RULE 13(B)(2). (b) If the actual production from the gas area exceeds such volumetric equivalent plus any permitted production remaining as determined in (c) below, then the nominations and purchases by gas purchasers during the succeeding six-month period shall be adjusted by the Commission so that the volumetric withdrawals from the gas area shall be restricted for the purpose of balancing the cumulative equivalent volumetric withdrawals from each area.

RULE 13(B)(2). (c) If the actual production from the gas area is less than the volumetric equivalent for the gas area then no adjustments will be made but the difference between the volumes will be carried forward as permitted production of gas from the gas area in subsequent balancing periods.

RULE 13(C). The following values of r_2 , Solution Gas-Oil Ratio, Z , Gas Deviation Factor, and B_o , Oil Reservoir Volume Factor, for the various values of P_{sc} , Average Reservoir Pressure, shall be used in computing the volumetric equivalent of gas per Special Rule 13(B):

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P_{res} Average Reservoir Pressure, Psia	r_2 Solution GOR $Ft^3/Bbl.$	Z Gas Deviation Factor	B_o Oil Reservoir Volume Factor
1680	275	0.841	1.160
1600	265	0.844	1.155
1500	253	0.850	1.149
1400	241	0.856	1.142
1300	229	0.863	1.136
1200	217	0.871	1.129
1100	205	0.880	1.122
1000	193	0.889	1.116
900	181	0.899	1.109
800	169	0.909	1.103
700	157	0.919	1.097
600	145	0.930	1.089
500	133	0.942	1.081
400	119	0.953	1.076
300	101	0.965	1.070
200	79	0.976	1.058
100	51	0.988	1.040

RULE 14(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 14(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 15(A). Overproduction: Any well which has an overproduced status as of the end of a gas proration period shall carry such overproduction forward into the next gas proration period, provided that such overproduction shall be made up during such succeeding period. Any well which has not made up the overproduction carried into a gas proration period by the end of such proration period shall be shut in until such overproduction is made up. If, at any time, a well is overproduced an amount equalling three times its current monthly allowable, it shall be shut in during that month, and each succeeding month until the well is overproduced less than three times its current monthly allowable.

RULE 15(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 15(C). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 15(D). (SEE ORDER NO. R-1670, AS AMENDED.)

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E. CLASSIFICATION OF WELLS

RULE 16(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 16(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 17. (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 18. (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 19. (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 20. (SEE ORDER NO. R-1670, AS AMENDED.)

F. REPORTING OF PRODUCTION

RULE 21(A). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 21(B). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 21(C). (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 21(D). (SEE ORDER NO. R-1670, AS AMENDED.)

G. GENERAL

RULE 22. No gas, either dry gas or casinghead gas, produced from the pool shall be flared or vented except as otherwise provided in these Special Rules and Regulations. All gas produced, whether dry gas or casinghead gas and regardless of final disposition thereof, shall be constantly and accurately measured.

RULE 23. (SEE ORDER NO. R-1670, AS AMENDED.)

RULE 24. (SEE ORDER NO. R-1670, AS AMENDED.)

H. MISCELLANEOUS SPECIAL POOL RULES

RULE 25. A gas well in the pool shall be a well producing with a gas-liquid ratio of 30,000 cubic feet of gas per barrel of liquid hydrocarbons, or more, or any well which produces liquid hydrocarbons with a gravity of 60° API or greater.

An oil well in the pool shall be a well producing with a gas-liquid ratio of less than 30,000 cubic feet of gas per barrel

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of liquid hydrocarbons and which produces liquid hydrocarbons with a gravity of less than 60° API.

RULE 26. The operator of each newly completed well in the pool shall cause a gas-liquid ratio test to be taken on said well upon recovery of all load oil from the well; provided, however, that in no event shall the test be commenced later than 30 days from the date of first production unless the well is connected to a gas-gathering facility and is producing under a temporary gas allowable assigned in accordance with Rule 8(A) above. Provided, however, that any well which is shut in shall be exempted from the aforesaid gas-liquid ratio test requirement so long as it remains shut in. The initial gas-liquid ratio test shall be taken in the manner prescribed by Special Rule 27 below. If the gas-liquid ratio is 30,000 cubic feet of gas per barrel of liquid hydrocarbons, or more, or the gravity of the liquid hydrocarbons is 60° API, or greater, the operator shall not produce the well until beneficial use can be made of the gas.

No gas shall be flared or vented from any well classified as an oil well more than 60 days after the well begins to produce. Exceptions may be granted administratively by the Secretary-Director if the request sets forth facts and circumstances justifying such exception.

RULE 27. Gas-liquid ratio tests shall be taken on all wells in the pool and on all wells producing from the San Andres formation within one mile of the boundaries of the pool which are not within another designated San Andres pool during the months of January, April, July, and October of each year. The initial gas-liquid ratio test shall suffice as the first quarterly test. Tests shall be 24-hour tests, being the final 24 hours of a 72-hour period during which the well shall be produced at a constant normal rate of production. Results of such tests shall be filed on Commission Form C-116 on or before the 10th day of the following month. At least 72 hours prior to commencement of any such gas-liquid ratio test, each operator shall file with the Hobbs District Office of the Commission a test schedule for its wells specifying the time each of its wells is to be tested. Copies of the test schedule shall also be furnished to all offset operators.

Special tests shall also be taken at the request of the Secretary-Director and may also be taken at the option of the operator. Such special tests shall be taken in accordance with

the procedures outlined hereinabove, including notification to the Commission and offset operators.

RULE 28. The average reservoir pressure shall be determined during the months of March and September each year after the well has been shut in for a minimum of three days. Pressures shall be calculated to a common datum, which shall be the approximate depth of the gas-oil contact (-70 feet subsea). The pressure on individual wells shall be determined in the following manner:

- (1) Subsurface pressure tests shall be taken on all wells, gas and oil, in accordance with the procedure outlined in Statewide Rule 302, except with respect to shut-in time and datum as provided above. Pressures of pumping oil wells may be calculated from sonic fluid level determinations.
- (2) Information obtained on these tests shall be reported on Form C-124 in accordance with the provisions of Statewide Rules 302 and 1124, and the Commission shall use the arithmetic average of the pressures so reported for the pressure, Pres, in the calculations as provided in Special Rule 13(B).

RULE 29. The gas-oil ratio limitation for the pool shall be 2000 cubic feet of gas per barrel of liquid hydrocarbons produced.

RULE 30. No acreage shall be simultaneously dedicated to an oil well and to a gas well in the pool.

IT IS FURTHER ORDERED:

(1) That the Special Rules and Regulations for the Todd-San Andres Gas Pool, promulgated by Order No. R-2666, are hereby superseded.

(2) That any well presently drilling to or completed in the San Andres formation within the Todd-San Andres Pool or within one mile of said pool that would not comply with the well location requirements of Rules 2(A) and 2(B) is hereby granted an exception to said rules. The operator shall notify the Hobbs District Office of the Commission in writing of the name and location of the well on or before December 1, 1965.

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(3) That the Secretary-Director of the Commission is hereby authorized to approve interference tests and the transfer of allowables to wells in the same lease or, if in a unitized area, to wells on the same participating area; provided, however, that any such authorization shall be limited to a period of six months, but may be renewed. No transfer well shall be permitted to receive, in addition to its own allowable, more than 50 per cent of one top unit allowable for the pool.

To obtain administrative approval for interference tests and the transfer of allowable, the operator shall submit in triplicate a request for such authority describing in detail the proposed method of conducting such tests and transferring the allowable. The application shall be accompanied by a plat showing thereon all wells within a radius of two miles of the proposed shut-in well(s) and the transfer well(s). The plat shall also identify each lease or participating area as to ownership or operating rights. The application shall include evidence that all offset operators to the shut-in well(s) and the transfer well(s) have been furnished a complete copy of the application. It shall also be accompanied by Form C-116 for each shut-in well, showing the results of a pre-shut-in test to determine the amount of allowable to be transferred. The transferred allowable shall not exceed the volume of oil produced during the last 24 hours of a 72-hour period during which the well shall be produced at a constant rate. The Commission and offset operators to both the shut-in well(s) and the transfer well(s) may witness such tests if they so desire and shall be notified of the tests at least 48 hours prior to the commencement thereof.

The Secretary-Director of the Commission may grant approval of the interference tests and transfer of allowable upon receipt of waivers from all offset operators or upon expiration of a 20-day waiting period, provided no offset operator has objected to the proposed test and transfer.

(4) That this case shall be reopened at an examiner hearing in October, 1966, at which time the operators in the Todd-San Andres Pool should be prepared to appear and present all available information, including bottom hole fluid analyses, reservoir data, and interference test results, concerning the effectiveness of the temporary Special Rules and Regulations promulgated by this order and the area that can be efficiently and economically drained and developed by one well in the subject pool.

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

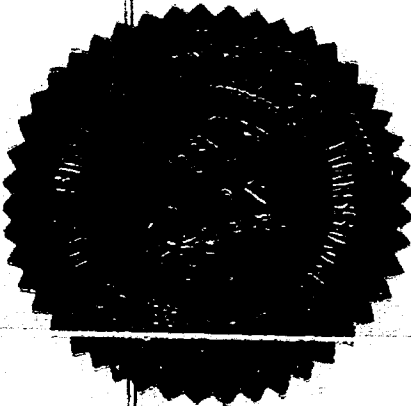
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

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



esr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 3298
Order No. R-1670-G-1

APPLICATION OF SUNRAY OX OIL COMPANY
FOR THE CREATION OF AN OIL AND GAS POOL
AND FOR SPECIAL POOL RULES, ROOSEVELT
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 11, 1966,
at Santa Fe, New Mexico, before Examiner Daniel S. Mutter.

NOW, on this 19th day of October, 1966, the Commission, a
quorum being present, having considered the testimony, the record,
and the recommendations of the Examiner, and being fully advised
in the premises,

FINDS:

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

(2) That by Order No. R-1670-G, dated October 29, 1965,
temporary Special Rules and Regulations were promulgated for the
Todd-San Andres Pool, Roosevelt County, New Mexico, superseding
the Special Rules and Regulations promulgated by Order No.
R-2666, dated March 13, 1964.

(3) That pursuant to the provisions of Order No. R-1670-G,
this case was reopened to allow the operators in the subject
pool to appear and present all available information, including
bottom hole fluid analyses, reservoir data, and interference test
results, concerning the effectiveness of the temporary Special
Rules and Regulations promulgated by Order No. R-1670-G for said
pool, particularly as they relate to the effectiveness of the

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volumetric formula established for limiting withdrawals of gas from the gas-cap area of said pool and the area which can be economically and effectively drained by one well in the subject pool.

(4) That the evidence presented indicates the formula as set forth in Order No. R-1670-G for said pool has efficiently prevented the migration and consequent loss of oil into the gas-cap area of said pool.

(5) That the evidence establishes that one gas well in the Todd-San Andres Pool can efficiently and economically drain and develop 320 acres.

(6) That the evidence establishes that one oil well in the Todd-San Andres Pool can efficiently and economically drain and develop 80 acres.

(7) That the Special Rules and Regulations promulgated by Order No. R-1670-G have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the oil and gas in the pool.

(8) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-1670-G should be continued in full force and effect.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Todd-San Andres Pool, promulgated by Order No. R-1670-G, are hereby continued in full force and effect until further order of the Commission.

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

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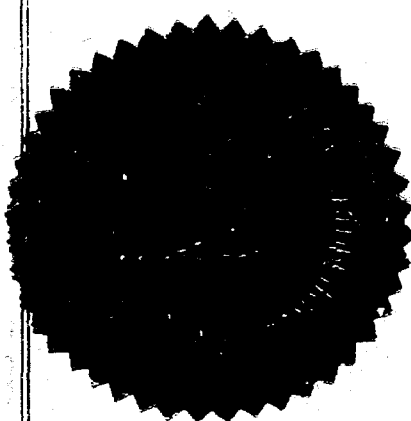
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

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



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