Q. State your name and position for the record please.

A. Stanley J. Stanley, Engineer, for the New Mexico Oil Conservation Commission.

Q. Have you testified before this Commission?

A. I have.

Q. (To Spurrier) Are his qualifications accepted?

A. They are.

Stanley - May I read into the record my position with respect to gas proration and an outline of my recommendations.

INTRODUCTION

If it will please the Commission - it is my desire to first of all clarify my position with respect to Gas Proration. I am absolutely neutral in this controversy. My testimony will undoubtedly hurt a few Operators which is to be expected in a contraversial matter but I do feel that it will benefit the majority of the Producers. I believe that over a long period of time more gas and oil will be recovered from certain pools in question. I believe that the State of New Mexico will benefit by my recommendations - the Operators will benefit and especially those Operators that believe in Conservation - the prevention of waste - and the insurance of ratable-take. Last but not least I firmly believe that in the final analysis the gas purchaser will realize a greater ultimate recovery of gas to be purchased and processed in the future.

My primary and fundemental study has been based on the Langlie Mattix and Cooper Jal Oil Pools, which underly two gas pools - namely the Jalco and Langmat, and by virtue of past completion practices the gas produced from oil and gas reservoirs affect the gas pools.

I feel that the Blinebry - Tubb - Justis - Byers Queen - and even the Eumont are unique in that the producing horizons are fairly well defined and do not present an associated casinghead gas problem at this time. Therefore I feel that the Langmat and Jalco are the problems of our gas proration system

and these problems should be resolved. I firmly believe that in order to prevent waste and protect correlative rights certain rules should be enacted pertaining to the oil pools underlying the Jalco and Langmat and essentially I recommend that this Commission enact:

1. A no flare order.
2. A Gas-Oil Ratio Limitation in those oil pools that have an unlimited ratio at the present time
3. That this Commission will proceed with caution in combining the horizontal limits of certain gas pools - namely the Eumont - Arrow with the Jalco and Langmat. That this Commission should have more time of experience in gas proration before naming one common source of supply for the four named pools.

Continuation of gas proration

Q. Would you explain to this Commission your interpretation of waste.

A. I believe that waste is aptly defined by the Statutes of the State of New New Mexico as appearing in Section 2 of the first page of the Act and labelled as Page 81 in the Rules and Regulations of the New Mexico Oil Conservation Commission.

Q. Mr. Stanley - waste as defined by the Statutes may be grouped as underground waste or surface waste. Is that correct?

A. That is correct.

Q. Can you prove that surface waste is occuring in the area of question?

A. I believe I can and will.

Q. Do you have an exhibit showing surface waste as herein defined?

A. I have what are marked as Exhibit one and Exhibit #2 showing surface waste.

Q. What is Exhibit #1?

A. Exhibit #1 is a cross-section showing the completion of four wells offsetting each other.

Q. In what pool are these wells located?

A. Well No. 5 and No. 6 are located in the Langlie-Mattix Oil Pool and Well No. 1 and No. 2 are located in the Jalco Gas Pool.

Q. What are the vertical limits of the Langlie-Mattix Oil Pool?

A. Yates - Seven Rivers and Queen.

Q. What are the vertical limits of the Jalco Gas Pool?

A. Yates - and a 100 foot above the base of the Seven Rivers.

Q. In other words Mr. Stanley by virtue of the present vertical definition of the Jalco Gas Pool and Langlie Mattix Oil Pool they do overlap?

A. Yes Sir - the Langlie-Mattix Pool actually includes all of the vertical limits of the Jalco Gas Pool plus the bottom 100 feet of the Seven Rivers and all of the Queen.

Q. Is this relationship true of any other oil and gas pool?

A. Yes Sir.

Q. Would you name these pools?

A. The Langmat Gas Pool has the same vertical limits as the Jalco Gas Pool, whereas the Cooper Jal Oil Pool includes the Yates and all of the Seven Rivers.

Q. Why isn't the Queen formation incorporated in the Cooper Jal Oil Pool?

A. Usually the Queen formation is absent from the Cooper Jal Oil Pool. It was only recently that Humble Oil and Refining Company had developed oil production in the Queen formation within the present horizontal limits of the Cooper Jal Pool.

Q. Do you have an exhibit showing the geographical position and boundaries of the two named oil pools and the two named gas pools?

A. Mr. Montgomery may I borrow your exhibit showing the various pool boundaries herein named?

Q. Mark that Exhibit #3 please.
Basically the Jalco Gas Pool overlies the Cooper Jal Oil Pool and the Langmat Gas Pool overlies the Langlie-Mattix Oil Pool?

A. That is generally true except that the Jalco Gas Pool extends over the Langlie-Mattix Oil Pool in the Southern boundaries of the areal limits of the two pools. This is exactly what Exhibit #1 reflects. Wells #5 and #6 penetrate and expose in the same well bore, the Yates Seven Rivers and Queen formations and are classified as Langlie-Mattix oil producers. Wells #1 and #2 are completed in the Yates formation and the wells are classified in the Jalco Gas Pools.

Q. Do you have an exhibit showing the relative position of the wells with respect to Section lines?

A. Yes sir - Exhibit #2 shows the position of the wells with respect to Section lines and the acreage contributed.

Q. In other words Mr. Stanley - wells Nos. 5 and 6 are oil wells located on 40 acre spacing and wells no. 1 and No. 2 are gas wells with a ~~contributed~~ attributed acreage of 160 acres.

A. Yes sir.

Q. Do the oil wells appear on the current oil proration schedule?

A. Yes sir.

Q. Do the gas wells appear on the current gas proration schedule with an attributed gas proration unit of 160 acres a piece.?

A. Yes sir - they do.

Q. Do you know how much oil #5 and #6 produced during the months of January, February and March 1954?

A. Since the two oil wells produce into a common tank battery I will give you the total oil production on a monthly basis.

In January of 1954 the oil produced was 1,567 bbls.

In February of 1954 the oil produced was 1,417 bbls.

In March of 1954 the oil produced was 1,338.

Q. What is the daily average oil production of these two oil wells combined?

A. January 1954 - 50.54 /avg./day.

February 1954 - 50.60

March 1954 - 43.16

Q. Do you know how much casinghead gas was sold during these three months based on a 15.025 pressure base?

A. During January, 1954 - 88,290 MCF casinghead

" " February 1954 - 25,863

" " March 1954 - 47,228

How to account for crude difference

Q. Is this all the gas that the wells produced during the months of January, February and March of 1954?

A. No Sir - part of the total gas produced was flared.

Q. Did you personally inspect these wells Mr. Stanley?

A. Yes sir I did - on February 25, 1954. At 12 noon MST I inspected the meter run observed oil flowing in a certain number tank. No. 5 well was flowing on a 1" choke with a flowing tubing pressure of 280 lbs. No. 6 well was set on a 39/64" choke flowing with a tubing pressure of 365 lbs.

Q. Are the well connected to a casing-head gas line and metered.

A. Yes sir - the 6" meter loop was equipped with a 3 1/2" orifice plate and metered.

Q. Was all the gas passing through the meter [redacted]

A. No sir - I understand that due to the excessive amounts of gas produced the gas purchaser was unable to process all the gas produced through a 16 lb. pressure casinghead line. Therefore the plug valve on the casing-head gas line was in approximately in a 60 degree closed position.

Q. How much gas was passing thfough the casing-head gas line at that time?

A. Approximately 263,000 cubic feet/day.

Q. How much was being flared?

A. I can answer that question only as an estimate by observation of tubing pressures and later comparing production by actual measurement, of the casinghead gas.

Q. Would you explain - please.

A. On March 31, 1954 at 12:45 P.M. MST, I actually had metered all the gas that the wells were capable of producing at a certain choke setting and a stabilized flowing tubing pressure.

Q. Would you explian the actual measurement of gas on that particular day?

A. On March 31, 1954 at 12:45 P.M. the No. 5 well was flowing on 38/64" choke. Flowing tubing pressure was 420 lbs. The No. 6 well was set on a 27/64" choke with a flowing tubing pressure of 500 lbs. At this particular time all of the gas was passed through the meter for a period of approximately 15 minutes. Readings were stable both on differential and static pen recorders and the calculation of the chart showed that 3,905,000 cu. ft. of gas/day was being produced. Of this amount

440,000 cu. ft. was sold and approximately 3 1/2 millions flared. Based on my experience of actual study of stabilized flowing conditions of gas wells in this area and of oil wells with high gas oil ratios I would certainly state that more gas was being produced during the month of February 25, 1954, inspection due to larger choke settings and lower flowing tubing pressures, and consequently more gas was being flared on that day.

Q. Now let me elaborate further. Did you say this was casing-head gas?

A. Yes sir - I do not wish to totally infer that the gas purchaser nor the producer were flaring high pressure gas. In reality the gas flared was produced from the Langlie-Mattix Oil Pool as defined by the Commission.

Q. However, isn't it possible that part of this gas was being produced from the Jalco Gas Pool?

A. A drill stem test as reflected by Commission records from 2880 to 2900 on well #5 showed that gas surfaced immediately, recovering dry gas during a 12 hr. flow period. The initial flowing pressure was 325 lbs. Final flowing pressure was 1075 lbs. The amount of gas was not recorded on Commission forms. Our geologists had correlated the drill stem test interval as being approximately in Yates - Seven Rivers interval or perhaps in the upper part of the Seven Rivers. When you refer to this diagrammatic cross - section marked Exhibit #1, you will note that the casing seat in both of the oil wells is actually landed and set in the Tansil formation above the Yates formation.

Q. In other words Mr. Stanley based on a dry gas allowable of 1,000,000 cu. ft/day for Well No. 1 or Well No. 2 and with each well located on a 160 acre tract would you say that the so called oil wells were producing considerable more gas than the gas wells?

A. Based on my observation of (1) the completion program of the oil wells versus the gas wells and (2) on actual field measurements I have calculated that the 2 oil wells were producing nearly 4 times as much gas as anyone of the gas wells with an allowable of 1,000,000 cu. ft./day. When you consider that the oil wells are each located on a 40 acre tract or a total of 80 acres then to transfer this acreage to a 160 acre pattern I would

say that the oil wells are producing 8 times as much gas based on a comparable 160 acre unit and a 1,000,000 cu. ft. of allowable/day.

Q. When the allowable is ~~produced~~ reduced to 500,000 cu. ft/day during summer months as experienced at this time how much more gas are the oil wells producing?

A. Approximately 16times on an equivalent 160 acre basis comparison.

Q. In that particular area which zone has the higher shut-in pressure, the Jalco gas pool or the Langlie-Mattix Oil Pool?

A. The Jalco Gas Pool - based on a comparison over a large area.

Q. In other words the operator must reduce the bottom-hole pressure in the gas zone by withdrawing large volumes of gas before reaching a critically low pressure to allow the oil to enter the well bore?

A. That is correct.

Q. Now if he produces excessively large amounts of gas and the operators volumetric withdrawals are greater in the gas zone than in the oil zone won't the bottom hole pressures of the two zones equalize?

A. It is logical to assume that in due time equalization of pressures will result.

Q. And if the practice continues over a longer period of time it would be possible to have a lower pressure in the gas zone than in the oil zone?

A. It is logical to assume that that would occur since gas will pass thru a zone of equal permeability at a faster rate than a liquid - oil or water.

Q. In that particular case the oil would flow in to the gas zone?

A. That is correct.

Q. And if this occured less oil would be recovered?

A. That is correct - at any time that you have expanded an oil into a dry gas zone you certainly have lessened your recovery of oil ahd have contributed to underground waste.

Q. Is this 4 million cu. ft. of gas that is flared put to beneficial use?

A. No sir - that is certainly surface waste.

Q. Are these the only two wells completed in this manner in the Langlie-Mattix anD Cooper Jal Oil Pools?

A. No sir - we have a number of wells completed in this manner and a number of wells flaring gas in a similiar fashion. To save time and shorten my testimony I would like to present this data in a generalized manner.

Q. Mr. Stanley - for the sake of the record I wish you would relate one more example of flare gas in the Yates formation.

A. I understand from idle conversation with some idle company pumpers in the Jal area that this well, that I will discuss, caused some confusion during the recent Continental Bell Lake Unit Fire. Certain strangers in the area who in the manner of curiosity to see a real oil well fire were occasionally guided to this flare by the town's practical jokers.
This well is classified as an oil well in the Cooper Jal Pool. The Commission records show that the top of the Yates is 2,910 feet. The oil and gas pay is from 3045 to 3079 feet. The oil string is set @ 3019 feet with a total depth of 3079 feet plug back. Our geological interpretation is that the well is producing from the Yates formation and this is confirmed by the operator as evidenced by his forms. It is also interesting to note that this well file shows that in 1950 on May 22, the operator had filed a 24 hour shut-in pressure of 906 lbs. On December 5, 1950 the operator reported a shut-in pressure of 963.3 lbs. (dead weight gauge). In other words at that time it appeared that the well was classified as a gas well.

A. Yes sir.

Q. When was the well completed ?

A. It was completed August 25, 1947.

Q. When was the plug-back operation conducted?

A. Our records indicate that the plug back operation and a 5,000 gal treatment of acid were conducted during the initial completion of the well.

Q. What was the oil potential of the well?

A. 1 bbl/day natural increasing to 110 bbls/day following a 5000 gal treatment.

Q. What was the gas potential of the well?

A. None was reported.

Q. Does the Form C-105 reflect that a gas pay was exposed to the well bore ?

A. The operator on Form C-105 shows a interval from 2865 which is behind the pipe. (The casing was set @ 3019. Below the casing shoe and in open hole the operator shows a gas zone from 3045 to 3050 and from 3072 to 3077. The operator also shows that an oil zone occurs from 3045 to 3079.

Q. In reality the operator shows that he has both a gas zone and an oil zone in practically the same interval.

A. That is correct.

Q. What day did you make this inspection?

A. March 3 @ 6: 10 P.M. MST.

Q. Was the well flowing?

A. Yes sir.

Q. What disposition was made of the gas?

A. It was flared at the well site.

Q. Did you observe the flowing tubing pressure?

A. Yes sir - I did. It was 330 lbs. on a full opening 1" choke.

Q. Was the well tied in to a casing-head gas ~~&~~ line or a high pressure gas line?

A. Yes sir it was. However the well was by-passed to the flare. The reason being that since the gas line in that area was a high pressure line the well was not capable of "bucking" the line pressure.

Q. What was the line pressure:

A. 560 lbs.

Q. And the flowing tubing pressure was 300 lbs. ?

A. That is correct.

Q. Did you observe the chart on the meter ?

A. I did - The chart was for an 8 day period and it showed that the production for the first three days of the chart was zero gas sold.

Q. Is the gas purchaser forced to take that gas?

A. No sir - since the gas produced is classified as casing-head as appearing on the oil proration schedules.

Q. Is the operator required to sell his gas?

A. Not under the present rules.

Q. How much gas is the operator flaring?

A. I did not measure the gas but would estimate that the wel was flaring 3 to 4 million cu. ft./day.

Q. This well is unique that it occurs on the western side of the reef front.

A. I may be able to better explain this from a cross-section prepared by our geologists. May I have a cross-section not specifically this well but portraying the general underground condition of the area.

Q. The names of operators appearing on this cross-section are not involved in this particular well but the underground position of the reservoirs are approximately the same as the underground conditions of the wells in question?

A. That is correct.

Q. The formations i. e., the Yates - Seven Rivers and Queen have an upward dip to the East?

A. They do.

Q. Explain the general characteristics of the reservoir problem in this area.

A. Originally and I believe that this is reflected in the records of this particular well, gas occurs updip - followed by an oil gas contact down structure. Whenever the gas is withdrawan the oil will move up structure followed generally by one oil water contact. In 1950 I would assume that the operator encountered considerable quantities of gas and produced this

gas as the records reflected. At a later time more oil production was encountered due to the movement of fluid - oil and water upstructure.

Q. In other words from your knowledge of reservoir mechanics wouldn't it be logical to assume that good pressure maintenance by the restriction of gas flow would result in a greater ∉ ultimate recovery of oil?

A. Whenever the oil appeared I certainly would recommend not flaring large quantities of gas in the gas-oil contact to prevent the premature encroachment of water and the insurance of greater recoveries of oil.

Q. Is the gas that is being flared put to beneficial use?

A. No sir - I would classify this as surface waste and underground waste.

Q. Do you have any other exhibits? #4

A. Yes sir - I do - I have what is marked as Exhibit #4.

Q. What does this exhibit reflect?

A. This exhibit shows that in the Langlie-Mattix oil pool for the year 1953, 25,251,867 cu. ft. of casing-head was sold to El Paso Natural Gas Co., and some gas was reported flared by the operator on Commission Form---.

Q. Where was this information obtained?

A. From Commission forms submitted by the operators and gas purchasers and from the files of the gas purchasers.

Q. What is the vertical scale?

A. The vertical scale is a percent ordinate showing the relative amount of casing-head gas produced for the various gas-oil ratio intervals based on the 25,251,867 cu. ft. of gas produced.

Q. What is the horizontal scale?

A. The gas-oil ratio's are classified into various groups. For instance 10% of the total amount of gas was produced from wells having a G.O.R. in the O to 6000 interval. 5.9% in the 6000-10,000 interval, 6.6% in the 10,000 to 15,000 interval 18.3% in the 15,000 to 25,000 interval, 20.5% in the 25,000 to 50,000 interval, 17.8% in the 50,000 to 100,000 interval, and 20.8% in the 100,000 and over category.

Q. In other words over 50% of the gas sold had a higher ratio than 25,000 to 1?

A. That is correct.

Q. This baregraph that you have prepared does not include all of the flare gas?

A. No sir.

Q. Don't you believe that if it were possible that flared casing-head gas was considered in this study that the percentage of the high gas oil ratio volume would increase.

A. I feel certain that it would.

Q. Would you explian to the Commission your Exhibit #5?

A. Exhibit #5 is presented in conjunction with Exhibit #4. The barographs reflect the same gas-oil ratio's as previously defined, however, instead of using casing-head gas as the basic reference I have used the total number of oil wells in the pool - namely 497.

Q. Would you explain your findings?

A. 29.4% of the wells are in G.O.R. interval of 0 to 6,000

9.1% " " " " " " 6,000 to 10,000

12.3% " " " " " 10,000 - 15,000

19.3% 15,000 - 25,000

12.3 25,000 -50,000

11.3 50,000 - 100,000

6.4 100,000 -& over.

Q. In other words when you compare Exhibit #4 and Exhibit #5 -32 oil wells constituting 6% of the total No. of wells in the pool produce in effect 21% of the casing-head gas of the pool and this 21% has a G.OR. ratio in excess of 100,000 to 1?

A. That is correct.

Q. And if it were possible to include all of the flare gas the % of very high gas oil ratio would increase?

A. I believe that is correct.

Q. Have you conducted a similiar study of the Cooper Jal Field?

A. Yes sir - I have.

Q. Would you please present these exhibits?

A. I have what is marked here as Exhibit #6 and Exhibit #7.

Q. What does Exhibit #6 show?

A. This exhibit shows that the Cooper Jal Pobl has produced 7,337,427 MCF based on plant take and some flare gas that was reported. I would like to read into the record the percentage of the casing-head gas for each gas-oil ratio interval.

From A G.O.R. interval of 0-6,000 -	20.04%
6,000 - 10,000-	4.84%
10,000 - 15,000-	20.36%
15,000- 25,000-	4.55%
25,000- 50,000-	28.89%
50,000-100,000-	18.87%

Q. What does Exhibit #7 reflect?

A. Exhibit #7 is a break down of the % the G.O.R. intervals based on the total number of oil wells.

Q. Please read into the record what Exhibit #7 shows:

A. Based on 156 oil wells in the Cooper Jal Pool the

0-6,000 G.O.R. interval is	60.26%
6,000-10,000 " " "	7.69
10,000-15,000 " " "	12.82
15,000 -25,000	3.21
25,000-50,000	10.90%
50,000-100,000	0.64
100,000 - plus	449

Q. Again with those wells, over 100,000: to 1 ratio produce 19% of the total casing gas and only constitute 4 1/2% of the total number of wells in the pool?

A. That is correct.

Q. Do you feel that if all the gas flared was reported this ratio would be higher in the 100,000 plus G.O.R. interval?

A. Yes sir - I believe it would.

Q. What is Exhibit #8 and #9.

A. A study of the gas-oil ratio interval based on combining the Langlie-Mattix and Cooper Jal Pool.

Q. Why are you combining the study?

A. At the present time I am not convinced that the Langmat and Jalco Gas Pool boundary is justified. Further from my study of the two pools I cannot find reasons for its existance. Unless evidence is presented to the contrary I feel that this Commission should combine the Jalco and Langmat Oil Pool.

Q. Proceed with your exhibits.

A. The total casing-head gas sold was 32,589,294 MCF.

Again for the information shown in Exhibit #8-

0-6,000 G.O.R. interval 12.32% of the gas was produced.

6,000 - 10,000	GOR interval	5.69%	of the gas was produced.
10,000 - 15,000	"	9.73	
15,000 - 25,000	"	15.20	
25,000 - 50,000	"	23.38	
50,000 - 100,000	"	14.32	
100,000 and over	"	20.38	

Q. Would you explain Exhibit #9?

A. Exhibit #9 is a summary percentage study of the various G.O.R. intervals based on the total No. of oil wells in the two named pools. It shows that 36.75% of the wells occur in the 0-6000 G.O.R. intervals.

8.73	" " " "	6,000 - 10,000 "
12.40		10,000 - 15,000
15.47		15,000 - 25,000
11.94		25,000 - 50,000
8.73		50,000 - 100,000
5.97		100,000 plus.

Q. In other words 5.97% of the total number of wells produce in excess of 20% of the gas?

A. That is correct.

Q. Would you please explain Exhibit #10 ?

A. Exhibit #10 shows a geographical distribution of various G.O.R. intervals in the Langlie-Mattix and Cooper Jal Pools. The color values commence with a light color value for low ratio leases and successively darker values for higher G.O.R. values. For instance the yellow-color represents the

G.O.R. - 0.2,000.
Orange - 6,000 - 10,000
Orange- 2,000 - 6,000
Red 6,000 -10,000
Blue 10, 000 -50,000
Purple 50,000 - and over

There is no sequence of regularity of geographical occurrence. High G.O.R. wells and excessive gas production from oil wells is only dependent on the way on which the well is completed.

Q. Would you explain Exhibit #11?

A. Exhibit#11 is a production summary of the Cooper Jal and Langlie-Mattix Oil Pools from 1938 to 1953.

Q. What does it show?

A. The various graphs are incorporated from 1938 through 1953.

1. The blue line indicates the increase in the number of wells of the two pools.
2. The red line indicates the total gas plant take which is the casinghead and the dry gas.
3. The green line indicates the total dry gas plus the casing-head gas as obtained from Commission forms.

Q. Shouldn't the green line i.e. total gas reported exceed the red line which is the total gas plant take?

A. Yes sir - it should. There is a certain percentage of gas that is being flared and if this were added to plant take the green line should be above the red line at all times.

Q. Isn't there something wrong?

A. There is - it may be that some of the forms are completed with a dry sense of humor.

Q. Continue with your testimony.

A. The orange and black curves reflect casing-head gas and dry gas production. Now with respect to Exhibit #11 I would like to present Exhibit #12. Exhibit 12 has three curves.

1. The number of wells in the pool similiar to Exhibit #11.

However Exhibit #12 shows the relationship of oil production versus reported gas production - economically it is evident from the upward trend of the gas curve that more gas will be produced in the future and perhaps a continuing decline of oil production.

Based on the production of 71,992,960 MCF of dry gas produced @ an average price of 9.5¢ per thousand plus 29,868,704 MCF casing-head @ 3.5¢/thousand the total value of gas equals $7,884,735.

Based on the total oil production of the Cooper Jal and Langlie-Mattix Oil Pool for 1953 of 2,722,760 bbls @ $2.60/bbl. the value of the oil is $7,079,176.

Therefore economically the gas is of more value in dollars and cents than the oil.

Q. Would you summarize the significance of this G.O.R. study and your other data?

A. Due to the absence of controlled production of casing-head gas as presently defined and due to the manner by which the wells have been completed in the past.

1. Casing-head gas is partly dry gas production.
2. Since the vertical limits of the Langlie-Mattix and Cooper Jal Oil Pools coincide with the vertical limits of the Jalco and Langmat gas pools the withdrawals of gas and fluid from each and every pool have a direct bearing on each other.

Supplement to top of Page 2.

In paragraph (b) of the Statutes.

Surface waste as those words are generally understood in the oil and gas business and in any event to embrace the unnecessary or excessive surface loss or destruction without beneficial use, however caused, of natural gas of any type or in any form or crude petroleum oil, etc. - unquote.

3. That there is now non-ratable take of gas between the oil pools as compared to the prorated gas of the dry gas pools.

4. (a) For the protection of correlative rights and (b) the insurance of a greatly ultimate recovery of oil and (c) the prevention of rapid decline in pressures in certain areas to ensure the recovery of gas at higher pressures and (d) utilizing the full extent of the present reservoir energy, I feel that a No Flare Order and a Gas-Oil Ratio Limitation are long overdue and are essentially needed for a successful program of gas proration. (e) that from my calculations the average G.O.R. for the Langlie-Mattix Oil Pool is 17600.1 and for the Cooper Jal the average G.O.R. is 7,400:1. (f) that a recommended operating G.O.R. for a trial period during our first step in gas proration I recommend a G.O.R. limit for oil pools that no limits exist be 10,000 to 1.

Q. Do you have evidence of a well producing from a dry gas pool and an oil pool together?

A. This particular well has an oil string set @ 2880 ft. and a total depth of 3260, producing from the Yates and Seven Rivers. It was completed in March of 1949 with an initial gas potential of 58,500 MCF. It was produced as a dry gas well to August of 1951 and recompleted in September of 1951 by deepening to a total depth of 3670. The well produced 55 bbls. oil for a 24 hour period and was given an oil well. In the meantime on September 22, 1951 the well was potentiated by a gas purchaser for 20,300 MCF/day.

During January of this year the dry gas sales were 40,651 MCF, February, 1951 the producer sold 13,670 MCF. It is presently carried on the oil proration schedule for 17 bbls day.

Q. Mr. Stanley - do you have an exhibit showing Bottom-hole pressure data?

A. Exhibit is a plotted map of bottom hole pressure data. I would like to present all of the evidence in the creations of the Falby-Yates Pool. Furthermore I wish to call the Commission's attention to the difference of pressure between the Falby-Yates pool and the underlying Langlie-Mattix, Cooper Jal oil pools. Two wells were completed on the same 40 acre unit. One well was completed in the Falby Yates pool with a pressure of 625 lbs. and 240 lbs in a well completed in the lower Queen oil formation or a differential of 385 lbs. This differential of pressure between the Yates formation and the Queen formation is characteristic between the Yates formation and the Lower oil producing Queen formation throughout the Langlie-Mattix - Cooper Jal boundaries and perhaps other pools to the South. Other Yates synclinal oil traps occur to the south with Yates pressures of a higher order than Queen pressures. I recite two oil wells drilled on the same 40 acre tract. In #1 well the oil string is set at 3112 - total depth of 3372. The well is classified as Yates - Seven Rivers producer of oil with a B.H.D. of 776 lbs. and showing an oil gradient for approximately 300 feet.

The other well situated on the same tract has a different completion. Oil string is set @ 2700 feet. TD is 3569, the well files showing that the Queen formation was penetrated. The pressure bottom was run to the same datum as the previous well (+- 214 S.S.) The bottom hole pressure was 443 lbs. or a differential of 333 lbs. What is important in this study is the fact the Queen well had a gas gradient in its entire length. I interpret this as actually a flow of gas from the higher pressure formation well to the lower pressure formation and this well will not have a stabilized pressure due to migration ~~when~~ when the well is shut-in. ~~I~~ interpret this as underground waste.

Q. Your name and position.

A.

Q. Have you made a study of this problem?

A. Yes sir I have. I have studied over 550 wells in this area. At the present time 2,668 wells appear on the oil and gas proration schedule for the shallow oil pools and shallow gas pools in southern Lea County. Percentagewise this study covered roughly 20% of the wells in this area.

Q. Did you arrive at any conclusion or have any recommendations to make?

A. Yes sir I have arrived a certain conclusion and have recommendation to make.

Q. What are these recommendations?

A. 1. That the Eumont, Jalco, Langmat, and Arrow gas pools be consolidated into one gas pool. (pointing out pools on base map)

2. That the Eunice-Monument, South Eunice, Cooper-Jal, Langlie-Mattix, Arrowhead, Rhodes, Eaves, Skaggs, Hardy, Penrose-Skelly, Leonard and South Leonard Oil Pools be consolidated into one oil pool. (pointing out pools on base map).

3. That the vertical limits of the gas pool be from the top of the Tansil formation to a point 75 feet below sea level.

4. That the vertical limits of the oil pool be from a minus 100 feet below sea level to a point 450 feet below sea level.

5. That the occurence of oil in areas such as the Falby-Yates be defined and named as separate oil pools and that the vertical limits be distinct from the above suggested oil pool.

6. That the occurence of oil along the western side which occurs, in the main, in a Seven Rivers reservoir be determined and made a separate and distinct pool.

Q. Do you have evidence to support these recommendations?

A. Yes sir I have in the form of cross-sections from east to west and north to south throughout the area as mentioned above and as indicated on the base map, and other information.

Q. Would you explain your exhibits to the Commission?

A. Yes sir, I will start on the north end of the area and work southward with my west to east cross sections and then start from the north and work southward with my south to north cross sections.

Q. Were these cross-sections prepared by you?

A. The cross sections are those which the committee used to set up the presently defined gas pools, but the interpretation is mine as are the penciled and inked notes which are additions to their work, due to work-overs and additional information which was available to me.

Q. Did you check the work that is shown on these cross-sections?

A. Yes sir I did, and I would like to compliment that committee on the amazing accuracy and almost complete lack of error, also on the great amount of work. (start showing the cross-sections and explain in detail the information that is shown on the X-sections).

Cross-section T-19

The red color indicates oil, and the green indicates gas. I have only illustrated gas and oil where production has or is being produced from.

Please note that the gas is from the Queen in this area, and that the oil lies below sea level at a rather constant interval from 150 to 240' below sea level, and occurs in the Grayburg. / T-20 This cross-section also shows oil lying below sea level at a rather constant interval 230 to 250' below sea lewel and note that the accumulation of oil is in no way affected by structure. The oil occurs in the San Andres, Grayburg and Queen, as the structure becomes lower.

Note that the gas is produced from the Seven Rivers, Queen and Grayburg but never is below 100' below sea level. This violates the vertical limits of the presently defined Eumont Gas Pool, it is defined as Yates, Seven Rivers Queen.

Cross-Section T-21
(Be sure and eheck Grayburg top)

Note again that the occurance of oil lies below sea level at 170 to 300', and structure has no affect upon the accumulation of oil, and occurs in the Grayburg Queen and Seven Rivers.

Note the Shell State #4 has perforated the Tansil for gas which is in violation of the presently defined vertical limits of the Eumont Gas Pool.

Note the horizontal limits of the Jalco Gas Pool and the Eumont Gas pool. The Eunice Monument and Penrose Skelly Oil Pools. The same accumulation of oil occurs in both.

Cross Section T-22

This cross-section crosses the South Eunice, Eunice-Monument, Arrowhead and Penrose Skelly Oil Pools, and the Jalco, Langmat and Arrow gas pools.

Again please note the occurance of oil which occurs from a 150 to 210' below sea level with complete disregard to structure and the pay zone being in the Grayburg, Queen, Seven Rivers and Yates within a distance of one mile.

Note that the Seven Rivers is productive on the west side of the area.

The Arrowhead oil pool and the Penrose Skelly oil pool have a commbn boundary and the occurance of oil is the same.

The South Eunice Pool is defined vertically as Seven Rivers but note on the cross-section, Queen, Seven Rivers and Yates production.

Of some 37 wells checked in the South Eunice oil pool 9 produced from the Seven Rivers, 7 from Yates and 21 from Queen.

Q.....Is.

Cross-Section T-22A

Q. I notice that on this cross-section that you have oil indicated as lying higher in relation to sea level than your previous cross-sections.

A. Yes sir, this cross-section shows 1st on the west limb an accumulation of oil which is controlled partly by structure, whereas structure had no affect upon the accumulation in the previous exhibit.

Q. Do you have an explanation for this separate accumulation?

A. Yes sir I do. If you will note these wells lie on the western edge of the productive area. This is the locale of the Seven Rivers dolomite, and sandy section, which runs south to north along the "high" from 225 to 255. Eastward the Seven Rivers becomes more anhydritic and porosity is poorly developed. There is a very active water drive from the west and a porosity pinch out to the east. Hence this accumulation is a separate and distinct reservoir from that which lies below sea level that I have discussed previously to this.

Q. You stated that a water drive was active from the west, what type of water?

A. The water has a relatively high H_2S content.

Q. Does this cause the oil to have a higher H_2S content?

A. Yes sir, that in part is responsible for the higher H_2S content along with the type of lithology in which the oil occurs.

Q. Does this also cause the gas to have a higher H_2S content than that gas which lies in the same horizon farther to the east?

A. Yes sir, in part the higher H_2S content is due to the contamination of the water and also due to the type of lithology of the reservoir, and also the proximity of sour crude.

Q. I also note that generally the pressures are lower and the H_2S content higher along roughly the boundaries of the Jalco Gas Pool.

A. Yes sir, as stated the higher H_2S content is due to the contamination and lithology, the lower pressures is due to the water invasion.

Q. Then it is your belief that the Jalco and Langmat gas pools are one and the same?

A. Yes sir, in part they are one and the same.

Q. What do you mean by in part?

A. Well sir, part of the gas zone which lies in the Langmat Gas Pool becomes productive of oil to the west in roughly the area presently designated as the Jalco Gas Pool, and the dry gas zone is more restricted vertically than it is to the east.

Q. Then as I understand you want to designate a separate oil pool for that occurance which you have described?

A. Yes sir.

Q. And you want to call the Jalco and Langmat gas pools one and the same?

A. Yes sir.

Q. Then what are your recommendations as to how to keep the oil zone from being opened if the vertical limits of the gas includes the oil reservoir which it would for this occurance to the west.

A. I recommend that the entire area be designated as one oil pool and defined the vertical limits, also that it be one gas pool and defined the vertical limits, but on this western limb we have a separate reservoir of oil which occurs sporatically up and down the high, therefore in some areas three reservoirs are present. One gas, and two oil along the high, but also along this area there are places where this second oil reservoir does not occur, therefore only the two reservoirs present that I previously described. Therefore to keep this second oil reservoir separate from the lower oil reservoir and the upper gas reservoir where it does occur I recommend that the vertical limits of the gas pool be limited to insure that the gas and oil reservoirs are kept separate where this second oil reservoir is present.

Q. Do you have any definite recommendations as to the vertical limits that the gas pool should be limited to over these areas where two oil reservoirs are present.

Q. I see that the Continental Meyer B-33 #2 well, you have oil indicated in the upper portion of the Yates.

A. Yes sir.

Q. Is this the same reservoir we have just discussed?

A. No sir it is not. It is a syncinal occurance of oil in the Yates and should be named horizonatly and vertically as a separate reservoir from the reservoir to the west and from the underlying reservoir which occurs thruout most of the area.

Q. Have you any recommendations as to the limits horizontally and vertically?

A. Yes sir I have, and they are: Vertically the Yates formation. Horizontally all but the SE/4 of Section 22, W/2 Section 27, E/2 Section 33, and NW/4 Section 34.

Q. I notice that no oil is produced below sea level in a portion of the cross-section. Do you have an explanation?

A. Yes sir the lithology of the Seven Rivers formation in this area was not condusive to the formation of porosity and permeability and it is this type of lithology that occurs in this immediate area at the horizon of the sub-sea oil accumulation which occurs elsewhere, but if you will notice as the structure climbs to the east and the Queen formation, which has favorable lithology for the formation of porosity and permeability, climbs into this sub-sea horizon oil is produced.

Q. I see that also on this cross-section you have an oil accumulation above sea leval. Is this the same occurance that was on the last exhibit?

A. Yes it is, and the gas zone thickens eastward as before and the oil is not produced, but as the section climbs eastward with the structure and favorable lithology is present in the sub sea oil zone oil production is obtained.

Q. I notice that the well on the west side is producing gas and oil, is that correct?

A. Yes it is a dual completion in the dry gas zone and the Seven Rivers oil zone.

Q. Will your recommendations affect this dual?

A. Yes sir it will affect this well, but the affect will be to protect it. At the present time the vertical limits of the Jalco Gas Pool is Yates and all but the lower 100' of the Seven Rivers, the Cooper-Jal oil pool is Yates and

Seven Rivers. Therefore the Commission cannot prevent an off-set operator from opening both zones and due to the differential pressures would be determined to the oil reservoir, these dual completions are expensive not taking in the fact of waste of energy.

Cross Section T-24

A. The oil zone as before below sea level and gas abofe until we reach the Falby-Yates oil pool and obtain Yates synclinal oil. Then gas is present again, as before when the section climbs and favorable lithology is present in this zone oil is found.

Q. Do you wishto alter the Falby Yates oil pool?

A. Yes sir I would like to add the NW/4 NW/4 19-24-37.

Q. What affect would this have?

A. This will validate the Yates well which is presently on this 40.

Q. What of the other well on this same 40.

A. This well is completed in the zone below sea level and would fall into the pool that I suggested earlier, which lies at a 100' below sea level.

Q. Would this also validate the other wells which are producing from both zonez?

A. Yes sir, the Falby-Yates would over lie the 100 reservoir.

Cross Section T-25

A. Yes there is an exception to the Western Gas Wimberly #1 SE NW 23-25-37, it is a dry gas well below 100' (ch for oil), but this well is outside the horizontal limits of a gas pool.

Q. I also notice that you have another accumulation of oil above sea level.

A. Yes sir, this is another occurance of oil similar to the Falby-Yates occurance and should be named as a separate pool.

Q. Do you have recommendations to make as to the horizontal and vertical limits? Also the accumulation in the Cont. Sholes A-24 #3 is above sea level.

A. Yes sir this is the Seven Rivers occurance along the dolomitic ridge I spoke of earlier and would be included in that reservoir when described more completely

Cross-Section M-1

A. The oil zone lies on the average of 200' below sea level and crosses stratigraphic boundaries. The commercial gas occurs in the Seven River and Queen.

Cross Section M-2

A. The oil occurs in the Grayburg and Queen, note the boundaries of the Langmat and Eumont. The lack of any apparant change, as with the Eunice-Monument and Arrowhead.

Note this well, it has open hole from the dry gas zone into the oil zone. It produced in the month of January 23 BOPD and sold 56,000 MCF and cannot be prorated because it produces oil. The offset operator's gas allowable was 29,382 MCF, almost 1/2/

Cross-Section M-3

A. Note the dry gas which is an exception - Stanolind C Meyer 9-B. Note the syniclinal occurance of Yates oil, this was dismissed on T-25. Note the exception where the gas is below 100' but these wells are now SI anyway and would not be exceptions to my recommendations.

Cross-Section E-3

Note the exception of vertical limits of gas but, I don't believe any are producing. I am not sure, anyway they are outside of the gas pools as presently defined.

Cross-section E-1

Same occurance note Gulf Shipp #1 is an exception.

Q. Do you have any more statements?

A. I would like to read very hastily remarks from New Mexico Bureau of Mines Bulletin 18.

Arrowhead Pool - Revel L. Boss
" Page 198

Cooper-Jal P. W. Miller and R. L. Bates Page 202

Eunice Pool Edgar Kraus Page 211
Langlie Mattix Page 233
Monument Page 252
South Eunice Page 266

As pointed out the vertical limits as they now exist do not cover all producing.