CASE NO. 35

BEFORE THE OIL CONSERVATION COMMISSION OF
THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF LOCO HILLS PRESSURE MAINTENANCE ASSOCIATION, INC., IN THIS: "THAT A MAXIMUM RATE OF WITHDRAWAL OF 30 BARRELS PER DAY PER WELL BE ESTABLISHED FOR THE LOCO HILLS AREA, INCLUDING BACK ALLOWABLES, UNTIL CONDITIONS JUSTIFY A FURTHER INCREASE AS SHOWN BY ENGINEERING STUDIES."

Pursuant to notice by the Commission, duly made and published, setting August 28, 1942, at two o'clock P. M., for hearing in the above entitled matter, said hearing was convened on said day, at said hour, in the office of the Governor of New Mexico, at Santa Fe, New Mexico, the Commission sitting as follows:

HON. JOHN E. MILES, Governor of New Mexico, Chairman
HON. JOHN M. KELLY, State Geologist, Secretary
HON. H. R. RODGERS, Commissioner of Public Lands, Member
HON. CARL B. LIVINGSTON, Chief Clerk and Legal Advisor.

APPEARANCES:

Name	Company
C. J. Dexter	Premier Petroleum Corp.
Chuck Aston	Franklin Pet. Corp.
Fred Brainard	Brainard & Guy
P. B. English	P. B. English
Leo R. Manning	State Land Office
Bert Aston	Franklin Pet. Corp.
Fred L. Jacobs	Loco Hills Pressure Maintenance, Inc.
George W. Selinger	Skelly Oil Co., Tulsa, Okla.
J. N. Dunlavey	Skelly Oil Co., Hobbs
J. O. Seth	Spectator
Neil H. Wills	Carlsbad, N. M.
Ellis A. Hall	E. A. Hall
B. A. Bowers	Rep. Helen M. Bowers and Katherine Bowers
W. L. Cooper	Plains Production Co.
Glenn Staley	Lea County Operators
J. M. Rush	Trinity Drg. Co.
H. B. Hurley	Continental Oil Co.
E. P. Keeler	Continental Oil Co.
Walter P. Luck	N. M. Asphalt & Rfg. Co.

The meeting was called to order by the Chairman, who requested the Chief Clerk to read the Call of the meeting, which was read by Mr. Livingston, as follows:

"NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The Oil Conservation Commission, by law invested with jurisdiction as the oil and gas regulatory body of the State of New Mexico, hereby gives notice of the following hearing to be held at the Capitol, Santa Fe, New Mexico:

Case No. 35

In the matter of the application of Loco Hills Pressure Maintenance Association, Inc., in this: 'That a maximum rate of withdrawal of 30 barrels per day per well be established for the Loco Hills area, including back allowables, until conditions justify a further increase as shown by engineering studies." This case is set for 2 o'clock P.M., August 28, 1942.

Any person having any interest in the subject of said hearing shall be entitled to be heard.

The foregoing Notice of Publication was made pursuant to the direction of the Commission at its Executive Meeting August 3, 1942.

Given under the seal of said Commission at Santa Fe, New Mexico, on August 3, 1942.

OIL CONSERVATION COMMISSION

BY (SGD) JOHN M. KELLY
SECRETARY."

SEAL

Whereupon Mr. Livingston announced that the Commission is ready to proceed upon Case No. 35.

FRED BRAINARD,

being called as a witness, and being first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. BRAINARD: My name is Fred Brainard. I am Secretary-Treasurer of the Loco Hills Pressure Maintenance Association, Inc., of Artesia, New Mexico. We are chartered -- were chartered last year, under the laws of New Mexico

as a corporation to do business within the State of New Mexico, for the purpose of producing oil, among other places in the Loco Hills oil field in Eddy County, New Mexico, and for the purpose of installing a pressure maintenance plant and injecting gas back into the formation which was produced by reason of the production of oil.

This measure was approved by the Oil Conservation Commission at the time, and also approved by the United States Geological Survey, and I believe this is one of the first, but highly respected maintenance approval and regulatory bodies.

Since the time we have come into operation we have installed forty to fifty high pressure lines -- gathering lines, and we have continued our studies, both before and after installation. The plant has fulfilled our expectations to date, and we are getting some real results.

As Secretary-Treasurer of the Loco Hills Pressure Maintenance Association, I am also one of the Directors, and at the meeting of the Board of Directors of July 28th thefollowing resolution was adopted: I will quote parts and leave it as part of the record: The Board of Directors authorized the Secretary to request a hearing on the following proposal: "That a maximum rate of withdrawal of 30 barrels per day per well be established for the Loco Hills area, including back allowables, until conditions justify a further increase as shown by engineering studies."

In other words, if we produce more oil than we have done in the past we have found out that is a very wasteful condition, when 45 barrels a day are produced. We have found that by producing 18, 20 and 30 barrels a day, and re-injecting the gas into the field, this has stablized our field. By some work, work on oil-gas rates among

individual operators, we have very nearly equalized our pool gas, which is ideal in an oil field. I propose to show that here.

Here is a copy of the minutes authorizing this request for this hearing.

(Marked Exhibit No. 1)

I would like to call as the first witness Mr. Jacobs, the Superintendent of our pressure plant.

FRED L. JACOBS,

being first duly sworn to tell the truth, the whole truth and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q Please state your name.

A Fred L. Jacobs.

Q In what capacity are you now employed?

A Superintendent of the Association.

Q The Loco Hills Pressure Maintenance Association?

A The Loco Hills Pressure Maintenance Association.

Q What is your past experience in matters connected with oil field production?

A I have had about 26 years' experience in the production of oil and natural gasoline, and the different phases of re-cycling, and now repressuring. I first began work for the Milliken Company, of Arkansas City, Kansas, in 1916. This company was both refiners and producers, with wells in the Deer Worth. They installed, you might say, one of the first vacuum plants in that field. That was probably one of the earliest methods of assisting production of oil other than just opening wells and closing them.

After I severed my connections with the Milliken Company, which is now the Continental, I put in nine years with the Natural Gasoline Department. While in the Natural Gasoline Department we made a complete survey, I would say of 200 wells north of Arkansas City, Kansas, with the idea of

measuring the gas and oil and balancing out the rate of withdrawals. At that time very little information was available in that direction, and nothing was done about it.

I then worked for the Forest-Ring-Gilmore Company, of Tulsa, Oklahoma, in the gas lift plants. There were a number of gas lift plants in the Seminole Field in Oklahoma. These plants used gas to lift the oil. I worked three years in this type of work.

In 1938 I worked in an engineering consulting firm in Tulsa, on the design, and later I had charge of the construction of the original three repressure plants in the K & A field near Wichita Falls, Texas. When these plants were completed in October, I went to Illinois and built the first repressure plant in Illinois for the Carter Oil Company near St. Elmo, Illinois, and assisted in putting this plant in operation, and worked on this project about six months.

I have been with the Loco Hills Pressure Maintenance Association since March of last year, and have been in charge of their work at Artesia.

BY MR. KELLY: Your statement shows engineering work in several places. Are you a registered engineer in the State of New Mexico?

A No, sir, I am not. I am not operating as an engineer, but as superintendent of the Association.

BY MR. BRAINARD:

Q Your present work includes, not only superintendent of the plant, but also superintendent of the production of the field, and you take oil and gas measurements, bottom hole presaures, and regulatory protection of the field?

A That is right.

Q You are in a position to know the benefits to be derived by decreasing the gas-oil ratios?

A I have the records of five surveys taken.

BY MR. KELLY: What type?

A Bottom hole and gas-oil ratios.

BY MR. BRAINARD:

Q I wish you would tell the Commission the conditions which prevailed at the inception, and what prevails at the present time, and what has caused the difference.

A The first survey of the Loco Hills field for gas-oil ratios was taken by the Lea County operators with the assistance of the engineers of the Continental Oil Company. This check-up was taken in September, 1940, and shows very low ratios in the entire field.

Q That is when the field was first brought in?

A The ratios were from around two and three hundred, up to a maximum of eighteen hundred on one well, and another with eleven hundred. Most of these ratios running from three to seven hundred.

BY MR. BOWERS: May I ask what the average ratio was at that time?

A I do not have the average ratio on all of the wells.

BY MR. BOWERS: What would you estimate it to be for the field?

A I would estimate it to be about seven hundred.

BY MR. BOWERS: What was the rate of production at that time?

A The rate of production in September, 1940 was 44 barrels per well for the full allowable well.

BY MR. BRAINARD: That was when the field was new?

A Yes, sir.

BY GOVERNOR MILES: What date did you give?

A September, 1940. The first well was drilled in December, 1938, but not put on production until January, 1939.

BY MR. KELLY: How many wells, more or less, was included in that first survey?

A 127 wells.

BY MR. BRAINARD: Gentlemen, excuse me a minute, not to drag this out too far: This information he has charted. For instance, we have every well listed. He has the gas-oil ratio, and the bottom hole pressure for the ninth month of 1940, taken by the Commission; the gas-oil ratio and bottom hole pressure for the ninth month of 1941, and allowable. He has the same

information for the third month of 1942, with allowable, and the sixth month, with allowable for 1942, and the gas-oil ratios which have just been taken in the field, and we would like to submit that as evidence.

BY MR. KELLY: The Commission will accept it. I think Mr. Jacobs should state the average. (Marked Exhibit No. 2.)

A I have these charts here. For convenience we have divided the wells into different ratio groups. On our March survey we took 24 wells with ratios under a thousand feet per barrel of oil. We took these same wells through all of these surveys. The ratio in September, 1940 was 508; in September, 1941 it had raised to 1190. In March we only got the bottom hole pressure,- not the ratio. In June, of this year, after the pressure maintenance had been in effect from October, last year, we had reduced the ratio to 670. In August there was a further reduction to 655.

BY MR. KELLY: On these 24 wells?

A The 24 wells. The greatest bottom hole pressure in September, 1940 was 740; it declined in September, 1941 to 676; in March, 1942, after six months of the Pressure Maintenance it had increased to 699, and in June of this year was practically the same, 697. And that would be Exhibit No. 3.

(Marked Exhibit No. 3)

Our second group, of 17 wells, with 1000 to 1500 cubic feet gas-oil rato, in September, 1940 shows 440 feet; an increase in September, 1941 to 1376 feet; six months later,-- nine months later, in June 1942, after six months of pressure maintenance and decreased allowables for March, April, May and June, the ratio had decreased to 1271, and the August survey just finished, to 1165.

BY MR. SELINGER: Is it convenient to give the comparative rate of production?

A I have the rates. In September, 1940, the rate of production was 43 barrels. In September, 1941 to September 1942, and in March of this year, the allowable was 42 barrels. By the last

half of the month the pipe lines reduced this allowable to 65% for the last half, and then in April we had a 29-barrel allowable, with the pipe line companies taking 21. The May allowable was 24, with Sinclair taking 21 and Continental taking 24. With Sinclair taking about 80% of the oil in June, with a 26-barrel allowable.

(Chart marked Exhibit 4)

Under this group (referring to next chart, Exhibit No. 5), our June survey still showed an increase to 1827. Our August survey shows a decrease in gas-oil ratio to 1552. We feel the reason this did not show a decrease in our earlier survey -- in June was the high ratio on these wells -- was they were depleting the gas from the area faster than we could replace it from our pressure plant.

(Chart marked Exhibit No. 5)

Our fourth group, of thirty wells, with ratios from 2000 to 3000 cubic feet per barrel, the survey shows for September, 1940, 542; September, 1941, 2089 cubic feet; June, of this year, 2384. In August, of this year, it was reduced to 1952. That, again, would indicate that with the high allowable on these wells, the area was being depleted to such an extent there was not a chance for operators to stablize the area.

(Chart marked Exhibit No. 6)

BY MR. BOWERS: Didn't you have a higher allowable in August than June?

A 33 barrels in August, of this year.

BY MR. KELLY: What was the June allowable?

A 26 barrels.

Our fifth group of 25 wells, with gas-oil ratios of 3000 cubic feet and over, with a few wells as high as 5600, we had a gas-oil ratio in September, 1940 of 485; September, 1941, 2894; June of this year, 4386; and in August a reduction to 3762. The bottom hole pressure on this same group of wells started at 731 in September 1940; 560 in September, 1941;

451 in March, 1942; and 443 in June of this year. Which shows these wells still declining in bottom hole pressure, or getting close to the point where they soon will quit flowing, and pumping equipment, or some other type of lift equipment will have to be used, and at this time pumping equipment is practically unobtainable. (Marked Exhibit No. 7)

BY MR. KELLY: At what bottom hole pressure do you think the wells will cease flowing?

A We have wells, one or two, flowing at about 300. Of course that depends quite a bit on the amount of oil in the hole.

BY MR. KELLY: I meant the average well in your field.

A It seems to be around 300.

Our pressure maintenance plant was designed to handle four million cubic feet of gas per day, and with an allowable of about 30 barrels per day, with the declines in the gas-oil ratios, we have been able to get the last six months, we hope in a short time we will be able to handle practically all of the gas and return it to the formation. When we started the plant with a 44-barrel allowable, we had 9½ million feet of gas, the month of October we only returned 6776,000 feet of gas; in November, 55,555,000; in December 72,324,000; in January, 81,004,000.

BY MR. BRAINARD: 1942?

A 1942.

BY MR. WILLS: Do you have the figures to show the amount of gas vented to air?

A We had material on gas vented to air until March. We are short meters, and up to that time we measured about 3,000,000 feet of gas.

BY MR. WILLS: Would you say two million per day?

A In the month of January we had 81 million returned.

BY MR. WILLS: And approximately 3,000,000 per day going to air?

A Approximately 3,000,000 going to air. In February, 76,914,000; in March, 87,349,000; April, 64,998,000; May, 86,350,000; June, 90,580,000; July, 96,504,000; August we estimate 90,000,000.

That gives 822,444,000 cubic feet returned to the formation since we started the plant in October.

BY MR. BRAINARD:

Q Right there, before we had this pipe line proration cut-back to 20 to 25, is it true we were running through about nine million cubic feet per day?

A We started up with that, but we immediately went to work --

BY THE GOVERNOR: To reduce the gas-oil pressure what did you inaugurate?

A We inaugurated the system right after we started the plant in Oct.

BY MR. BRAINARD:

Q Let me finish my question. Isn't it true you were running nine million feet of gas through the plant?

A We were running eight and a half to nine million through the gathering system.

Q We were producing that much gas?

A Yes, sir.

Q How much was the rate of withdrawal of oil?

A 44 barrels per day.

Q How much of the eight and a half to nine million feet were we actually putting back in the formation?

A About one-third.

Q At an allowable of 44 barrels per day -- or a withdrawal of 44 barrels we were wasting five and a half million feet in the air?

A That is right.

BY MR. KELLY: That was in October, 1940?

A October to the first of the year.

BY MR. KELLY: Until the pipe line proration set in?

A In the area the Premier and the Grayburg had meters in the field, and we had a few extra meters, and of course set the meters in the field and started to check the high ratio wells. Since that time several operators have been able to secure meters -- I believe six, and we have bought seven additional meters, and with the five we had we have now sixteen or seventeen meters in the field. These meters are busy all the

time. The production superintendents are coming to us continually asking us to help check wells -- some are checking all of their wells. There has been a steady decrease of ratio on all of these high wells. Many wells in this survey show at least a 50% reduction, and some show more than that.

BY MR. BOWERS: One other question: Isn't it true that since the first of the year, continuing up to date, a great deal or further effort has been made on the part of the producers to effect, by their maintenance practices, a further reduction in the gas-oil ratio?

A I believe that is true. There is a continued increase in the desire to decrease the ratio?

BY MR. BOWERS: Has it not been effective?

BY MR. LIVINGSTON: I believe it would be well for the record to show the parties whom you are representing.

BY MR. BOWERS: I am representing Helen M. Bowers and Katherine Bowers, producers in the area. I don't want to seem to be haggling, but to bring out what seems to be pertinent facts.

A Our records show some gain in our June survey, which happened three months after the decreased allowables started, but our big decrease in gas-oil ratios happened in the last three months.

BY MR. BRAINARD: The last three months, since the pipe line proration went into effect, and we went from 44 down to 20 or 25.

A That is so, and it is also shown up in the bottom hole pressure. In some of the wells, where we didn't expect to see much gain, they have shown an increase in bottom hole pressure, due to a stablization of the area. In other words, many wells in the Loco Hills field, right up to the point where they might just make 30 barrels allowable, these wells did not have much chance to make 40 or higher, but with the reduced allowable in the field, we have been able to stabilize the entire area, and on the last bottom hole survey, taken in June, on 122 wells taken the average decline

for the entire group in three months was only two pounds per well.

Q What was the average bottom hole pressure drop during that time?

A From January to June, as I remember, it was 11 pounds per well.

BY MR. BOWERS: For what period of time did that continue?

A September, 1941, to March.

BY MR. BRAINARD:

Q During the period of high production?

A Yes, sir.

Q And during the period of pipe line proration the bottom hole pressure reduction was about two pounds per month?

A Yes, sir.

BY MR. BOWERS: In voiding less reservoir space, you naturally would anticipate less drop in bottom hole pressure?

A However, in 72 wells in the eastern half of the field, for the period from March to June, we showed an average increase of 26 pounds per well.

BY MR. BRAINARD:

Q Will you explain that, Mr. Jacobs?

A We believe that to be the benefits derived from returning this amount of gas, plus stabilization gained by reducing the allowable. These wells are all by 40-acre spacing. If a well on a 40-acre tract produced a higher rate than the allowable,- than the average withdrawal, thereby it would deplete the pressure around the well. If the well produced a lower allowable than the top given the area, the effect is to stabilize, and the pressure to come in from the surrounding area.

BY MR. BOWERS: In this type of reservoir?

A Yes, sir.

BY MR. BRAINARD:

Q What type is the Loco Hills reservoir?

A It is a gas sand, with no water.

BY MR. BOWERS: What type of drive?

A Gas driven.

BY MR. LIVINGSTON: The area involved is, to all practical purposes, largely that area embraced in the Loco Hills Pressure Maintenance project?

BY MR. BRAINARD: Mr. Livingston, I want to bring that point up a little bit later.

BY MR. LIVINGSTON: I withdraw the question.

BY MR. BRAINARD: That is all, I think, for the time being.

BY MR. KELLY: Mr. Bowers, do you have any questions?

BY MR. BOWERS: There is one question I would like to ask: In the general practice of repressuring isn't it customary to anticipate the necessity of returning a greater amount of gas than is withdrawn, in order to bring about the ideal result from the operation of a plant?

A I believe not. In many fields they have even reduced the amount of gas returned to the sand to obtain the desired result, in some areas, depending upon the approximate drive in that area.

BY MR. BRAINARD:

Q Mr. Jacobs, at the past rate of decrease, before we had stabilized the field, isn't it possible that in the next year,- or two years, at the rate of reduction, that the field would possibly all go on the pump?

A Well, I don't think there is any doubt but what, with the high allowable, or the 44-barrel we had last year, that many wells in the area now would be on the pump.

Q It is desirable to produce these wells as flowing wells, instead of allowing them to become pump wells, as equipment is not available and very expensive, and whenever you put a well on the pump you lose fifty to seventy-five per cent of the oil you might recover?

A I would say you will.

Q By pumping a well you would lose more oil than by flowing?

A Yes, sir.

Q Will you explain that?

A I mean a pressure system works in a field to stabilize the

oil moving through the formation, and actually you can recover by this means much more,- by flowing. The oil flows off, and with it the gas, and you depend on the oil that seeps into the bore hole.

Q I still don't understand how you arrive at that conclusion.

A Provided there is a stabilization, and you do not lose the gas,- when it goes back into the formation. If you produce by pumping, you lose energy, and the oil does not move into the bore hole.

Q That would result in waste of oil?

A That would result in waste of oil.

BY MR. KELLY: Mr. Jacobs, do you have any figures, or will you furnish the Commission with figures as to the amount of oil your repressure association has produced, the amount of gas returned to the ground, and the estimated gas vented to air?

A I have the oil runs,- I can make a tabulation of the figures.

BY MR. KELLY: Will you sent that in for the record?

A Yes, sir.

BY MR. KELLY: Also, the average field gas-oil ratio during the same period?

A Yes, sir.

BY MR. KELLY: Any questions to be put to the witness?

Witness dismissed.

CHARLES ASTON,

being called as a witness, and being first duly sworn to tell the truth, the whole truth, and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q State your name?

A Charles Aston, geologist and general superintendent of the Franklin Petroleum Corporation.

Q What is your experience in supervisory and geological work, and what part have you had in the organization of the Loco Hills Pressure Maintenance Association?

A In the early part of 1940 my company inaugurated --

Q Give your experience first.

A In 1939 I started work for the Franklin Petroleum Corporation as geologist. In the latter part of 1939 and the early part of 1940 my company --

Q Are you a certified geologist of the State of New Mexico?

A No, sir. My company began a survey as to the advisability of a pressure maintenance project among the operators owning and producing in the Loco Hills pool. In the early summer of 1940 the Loco Hills Operators Committee was formed to study the same subject. I was asked by them to make the original survey for the field as a whole, which I did, and since that time I have been working very closely and associated with the operation of this plant, as Chairman of the Engineering Committee for the Loco Hills Pressure Maintenance Association, and also because of my affiliation with the Franklin Petroleum Corporation.

Q At that point would you please state who forms the Loco Hills Pressure Maintenance Association Engineering Committee at the present time?

A Mr. E. P. Keeler, of the Continental Oil Company; Glenn Staley, Proration Umpire, Hobbs; Mr. Harvey Yates, geologist and oil producer, of Artesia; Mr. Jewel Herd, Superintendent for the Grayburg Oil Company and the Premier Petroleum Corporation, of Artesia, and myself.

About all I have to say in evidence is that from the

studies of the various phases, as Mr. Jacobs has presented them -- engineering figures -- that on June 30, 1942 the Engineering Committee of the Loco Hills Pressure Maintenance Association recommended to the Board of Directors of the same, that they petition the Conservation Commission to set the allowable -- that is, the allowable in the Loco Hills Field, at not in excess of 30 barrels per day for the ensuing 12-months period. It was the opinion of the Committee at that time that this was a true conservation measure.

BY MR. KELLY:

Q In what way is this a true conservation measure?

A By so reducing the production, and thereby reducing the gas-oil ratio. The pressure maintenance plant will handle approximately all of the produced gas, which, of course, is produced with the oil, and thereby return it to the formation and stabilize the field as a whole as to bottom hole pressure and gas oil ratio.

Q Will that reduce the present gas-oil ratio?

A I would not say it would reduce the present gas-oil ratio. I would say that by maintaining the production at 30 barrels, the present gas-oil ratio will in some cases be lowered, and in some cases will maintain it at the present rate.

BY MR. BRAINARD:

Q You mean by producing at a lower rate, you mean produce less gas in the course of a given time?

A It is worded a little differently. In the event the allowable were raised to fifty barrels, or as it was to forty-four, I think definitely that the gas-oil ratio would be much higher than it is now. Considerable percentage of the reduction is due to remedial practices in the production of wells, and we intend to continue such practices and attempt to further improve the gas-oil ratio conditions. If the production is increased above 30 barrles, in my estimation, and the estimation of the committee, the gas-oil ratio would increase regardless of what production methods we used. Does that

answer your question?

Q To what extent do you think the further application of remedial measures on the part of the producers might affect the oil-gas ratios under the present set-up?

A That is difficult to say. In my estimation, I believe that within the next six months, with production set at not over 30 barrles, we can reduce the gas-oil ratio to where the plant capacity will be sufficient to take care of the gas in the field.

Q Is there any data at the present time to preclude the possibility that great benefit could be had, in an effort toward further reduction, on the part of the operators by using whatever means necessary? A great deal of pressure has been put on the operators to get them to do things to reduce the ratio. Don't you think an even greater rate of production, with still more improvement in practices, that the ratios will be reduced?

A No, generally speaking, the field as a whole -- the operators and field men have finally come to our way of thinking. They have come over on our side and are doing their utmost to reduce the gas-oil ratio, and have been for a considerable length of time.

Q I agree with that. Don't you think with a slightly greater rate of production, with more having changed their attitude toward the proposition, and having become cooperative, that still a great deal of improvement could be made, at a slightly greater rate of production?

A Yes, I think so.

BY MR. BRAINARD:

Q Do you think by an increased production, it would not be likely to get out of hand, and that what we have been working for here might be lost?

A Definitely. I think if we increased the production we would get back to where we were before.

BY MR. BOWERS:

Q By what criterion?

A It has been my experience, and from all the information I have read, on available reports, the gas-oil ratio increases as the field gets older. Under greater production conditions, if you increase the daily production to the point where the plant cannot take care of the gas, therefore it comes out. This stabilization we have achieved is by virtue of the fact that we are putting the gas back, and if you produce more than the plant can take care of, you are going to void more gas and knock the field, therefore the gas is going to come out of solution.

At the inception this field ran, from surveys of the reservoir pressure, 1½ barrels to every barrel produced. I imagine the rate is probably double that, at least,- a third to a half more. If that is true, and we reduce that and let the same condition exist by reason of increased production, eventually you are going to reach the point where we will raise the viscosity of the oil to such a point,- the reservoir energy will be gone, and the oil will not get to the well bore, and you will have, as Mr. Jacobs and Mr. Kelly brought out, you have waste of oil, and contributing to that, you have waste of gas.

BY MR. KELLY: Any questions?

Witness dismissed.

E. P. KEELER,

being called as a witness, and being first duly sworn, to tell the truth, the whole truth, and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q Mr. Keeler, will you please state your name and position?

A My name is E. P. Keeler. I work in the petroleum engineering department of the Continental Oil Company at Hobbs for the past six years, and I have been District Petroleum Engineer for

approximately two and a half years.

BY MR. KELLY: The Commission will accept his qualifications.

Q You are familiar with engineering studies, Mr. Keeler?

A I am.

Q You have done quite a bit of that work yourself?

A Yes, as a member of the Engineering Committee of the Pressure Maintenance Association, together with my own company's work, as an employee of the Continental Oil Company, I have made quite a thorough study.

Q Just tell the Commission here, in your opinion, without stabilization in regard to production in the pressure maintenance plant, what probably would have been the condition of the Loco Hills field, at the present, or in the near future, as regards to production?

A I believe that the bottom hole pressure decline would have been much greater had we not commenced installing this plant and commenced returning gas to the ground, and I feel several wells in the field, and several of our own wells would have been pumping at the present time.

BY MR. KELLY: Have you any pumping wells?

A We have two pumping wells out of fifteen that we operate in the field. I feel that we have several wells, other than those two, whose reservoir energy would have been expended to such an extent that they would be pumping at the present time had it not been for the return of gas to the formation.

BY MR. BRAINARD:

Q In quantities commensurate with the gas we are taking out?

A Yes, sir. I will put it this way: Anything that goes in there will be held, and the more we get in the formation, and the less we blow to the air, the better it will be.

Q Would your wells in that particular area, from the standpoint of waste, justify more than thirty barrels a day, at the present time, in your opinion?

A I don't know what you mean.

Q From the standpoint of waste, or maximum recovery of oil, would your wells stand a greater rate of production? Would the

length of the life of the wells, or the time before they would have to be put on the pump, be shortened?

A If our wells were producing at a higher rate, that, in turn would cause a greater amount of gas to be wasted, which, in turn, would reduce the reservoir energy and bring the time closer to the end when the installation of pump equipment would be necessary to continue production from the well.

Q If you had to put some wells on the pump in the near future would you be able to obtain pumping equipment?

A I am not qualified to answer that question. I know it is hard to purchase equipment. It is possible that we might have some pumping equipment on hand.

Q For the average man, who does not have pumps himself, it would be almost impossible to obtain it at the present time?

A Itmight be.

Q In your opinion, could considerable more conservation of gas be effected in the general production area of Loco Hills by the operators?

A I believe that is true, that further reductions in result could be accomplished. However, if the allowables were increased, even with the reductions, we would not possibly be able to return all of the gas to the formation.

Q There is more gas being produced than the plant is capable of handling?

A That is true. We feel if we hold the allowable to thirty barrels, together with a continuance of the extensive effort in reducing the ratios, after a period of time we may be able to return all of the gas to the formation.

BY MR. KELLY: Has the plant at any time ever returned all of the gas to the formation?

A Not to my knowledge.

BY MR. KELLY: You are producing more gas than is returned to the formation?

A That is true.

BY MR. KELLY: There would be no incentive to waste any more gas than

they are producing at the present time.

BY GOVERNOR MILES: You talk about the plant not being able to return any more than it now returns.

A Yes, sir.

BY GOVERNOR MILES: Could the plant be increased?

A No, sir, we have tried to install more compressors, but on account of the war we cannot get them.

BY MR. KELLY: The plant was designed and put in effect when?

A In October.

BY MR. KELLY: When were the designs drawn?

A Four or five months previously. During the length of time we were designing the plant, the gas-oil ratios and bottom hole pressure increased, and we found we did not have capacity enough, and since that time we have tried to install additional compressors, but could not buy them.

BY MR. CHUCK ASTON: I want to clear up one point. I do not know the entire situation,- with regard to a statement made by Mr. Barnard,- I forget the exact figures,- fifty to seventy-five per cent of the oil would not be recovered by pumping wells in the field. I know I have read of several instances, especially in the old fields in eastern Pennsylvania, and other fields, that had been pumped for several years, and it was thought they were entirely depleted. Years later they were treated by water floating, and they recovered, I am not sure how much oil, but almost as much as by the original methods.

BY MR. BRAINARD: Didn't those wells pump from the beginning? They never flowed. What I mean, you can draw no comparison between flowing wells and pumping wells.

A I was looking at it, under production methods,- the time would come when we would be pumping all our wells, and we would have oil, but no driving force to get it into the bore hole, and by pumping tests the oil would not get in there; by the use of pressure maintenance, or some driving power in the formation

it would.

BY MR. ASTON: The point I did not get clear, without pressure maintenance the pump well would leave oil in the ground?

A That is the point.

BY MR. KELLY: Any more questions of this witness?

Witness dismissed.

C. J. DEXTER,

being called as a witness, and being first duly sworn to tell the truth, the whole truth, and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q State your name and title.

A C. J. Dexter, Artesia, New Mexico; President of the Loco Hills Pressure Maintenance Association.

Q You are an old producer in southeastern New Mexico?

A Yes, sir.

Q You are connected with the Grayburg and Premier Oil Company in the Loco Hills field?

A Yes, sir.

Q Will you tell the Commission just what you think should be done, and why?

A As President of the Association I would not care to add to whatever has been said. I think that is sufficient.

I might spend a moment's time on what is the desire of the Loco Hills Pressure Maintenance Association, and what we are asking, and that is an allowable of thirty barrels. I think our companies, both the geological department and the production men in the oil business have just one feeling, which is to keep the field in operation,- they want to get all of the oil out of the ground that they can. If you reduce the allowable more than you should, you injure them. If we can get thirty-three of the forty operators to go down the line to conserve, it is because we feel it is best for the field.

It is our own money we are spending to build this plant, perhaps a quarter of a million dollars. We want to prolong the field as long as we can. It will help the state and the producers. So far as the engineers are concerned, and the operation of the well, I am not familiar, but I know our department continues to make studies of this. In the old days, when you make one good well produce as long as it would, that was all anyone cared about.

BY MR. KELLY: That was before the days of the Oil Conservation Commission, I hope.

A I think when you gentlemen get that many operators thinking the right way, you have done a pretty good job. I believe we are mainly interested in a chance to produce the field and make it live longer.

BY MR. KELLY: You believe a satisfactory allowable will prevent depletion?

A We have only eight wells. On all of them we could double the production, and by doing it we would not only lose gas, but lose the oil also.

Witness dismissed.

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BERT ASTON,

being called as a witness, and being first duly sworn, to tell the truth, the whole truth and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q State your name.

A Bert Aston, operator. I represent the Franklin Petroleum Corporation and Aston & Fair, both New Mexico operators in the Loco Hills field.

BY MR. KELLY: Are you associated with the Loco Hills Pressure Maintenance Association?

A I am director and vice president.

BY MR. BRAINARD:

Q Will you state, in your own words, what you think should be done, and your reasons?

A Well, it so happens that I have had experience on a property very similar to the one Ed Keeler referred to. I drilled a well, 12 or 15 years ago, in Oklahoma. At the inception of the field, before any conservation measures were being brought into use, it was a rat race to see who could get the most oil. This 80-acre lease produced seventy-five to a hundred thousand barrels a month. In 1933 -- I long since had gone to east Texas -- the properties dropped to where they were uneconomical to operate. My associates, the Bullock Oil Company, asked if I would return to Oklahoma and find out what was the matter. By that time we had all of our properties developed in East Texas, and I returned to Oklahoma at their request. I spent some time on this lease. We finally got the idea of flowing gas into the sand, as we had done in Texas and see what would happen. We had nothing to lose, and everything to gain. So in about 1935 or 36 we started injecting a small amount of gas in the formation, and as a result, while the leases were already down to pumpers, and this 80-acre lease had already produced a million barrels of oil, we have leveled off for the last five years, we have had a constant curve. It has been almost straight, no down curve, and it is still operating at almost the same level. On these stripper leases, we found that by putting a small amount of gas in the formation, we were able to stop the decline and put that well on a straight line, and it is still in that position. It does not vary but very little from month to month. Due to that fact, it occurred to me during that particular time, and also having had experience in East Texas, where we watched the bottom hole pressure, with water drive, when we got into this Loco Hills area, after the second well I went up to the U.S.G.S. and talked the proposition of pressure maintenance, and with their very efficient cooperation, and the cooperation of Grayburg and Premier and Mr. Barnard -- a great deal of credit is due them,- we decided it was better

to lock the door before the horse was stolen, and not let the field be depleted before we did anything. I think if we will hold the withdrawals to the amount of oil which would produce the approximate amount of gas we could hope to get back into the formation, we will be able to produce oil in Loco Hills without waste.

There is another think I would like to bring to the Commission's attention, a think I know you are fully aware of. The OPC is now carrying on a mid-continent survey, of all fields in the mid-continent. I happened to have accidentally seen Mr. Steel in the last few days, and Mr. Herdy the other day, and this is the job, as I understand their program: Not to try to get all the oil they can out of the ground right now, but to make a survey of the available oil whereby the war machine can be supplied for a five or ten years war, on a constant basis, and be assured that this oil can be produced as needed.

BY MR. KELLY: Before you leave that question, isn't Illinois producing all it can?

A You bet. As we would say in the language of the oil industry, they are gutting their field. This survey will probably reveal that fact very glaringly.

Take the Loco Hills field, if we continue to produce,- I am not talking about 44 barrels a day,- I am talking now about back allowables,- I can refer you to several wells that could produce 60 barrels a day. If we would conduct an open flow of around forty or fifty barrels a day, we would do to our field what Illinois has done to theirs. The time would come when we would have to go on pump, and could not get pumps. If you cannot get pumps, you cannot get out that oil.

I am not giving this opinion as an engineer,- it is merely my opinion from my experience and observation.

BY MR. KELLY: In your opinion, 30 barrels a day is the maximum figure to prevent waste?

A That is my opinion. The engineers made the study, and I believe that is as nearly correct as could be arrived at. A little time will tell the story.

BY MR. BOWERS:

Q The pools you cited, about rapid withdrawals and rapid declines, at what rates were those wells started?

A That was back in the old days, when you just cocked open the well and let them go.

Q About how much did they produce a day?

A Those wells were producing at that time,- I cannot remember the figures, but we produced two and three hundred barrels per well, but inside of twelve months from the time the field was discovered, the one particularly in Oklahoma,- within a year proration went into effect, and still there was over production of the wells. They paid no attention to gas-oil ratios and bottom hole pressure. They allowed 75, 80 or 100 barrels a day for a number of years.

Q Those of us in the business know there was no maintenance program pursued at that time, but I want to know if the rate of withdrawal was not very rapid on the flush production?

A It was the first year, and compared to our rate, it was fast. They were four and five hundred barrel wells, but the wells leveled off even while they were still flush. We got under proration, but it was still too great.

At this time there is a great deal of land in the area under government leases. I asked the U.S.G.S. to comment on our proposal to regulate production. I believe they sent you a letter, copies of which I have. If there is no objection I will read this letter.

(Witness reads Exhibit No. 8)

Witness dismissed.

BY MR. BRAINARD: Now, just one other witness I would like to have say a few words.

H. B. HURLEY,

being called as a witness, and being first duly sworn to tell the truth, the whole truth, and nothing but the truth, was examined by Mr. Brainard, and testified as follows:

DIRECT EXAMINATION

Q Mr. Hurley, I am only going to ask one question, if you will state to the secretary your name and what position you hold.

A My name is H. B. Hurley, employed by the Continental Oil Company in the capacity of General Superintendent of the Texas-New Mexico Division.

Q Mr. Hurley, what I want to ask you,- I have a lot of letters written voluntarily on the part of the producers of the Loco Hills area, authorizing and requesting a maximum rate of withdrawal. We did not request letters. I think your office received a letter in which we merely inquired if you are in favor, or was not in favor of this proposition in your operation of your 15 wells in the Loco Hill pool.

A That is correct.

Q And you are in favor of a maximum rate of withdrawal of 30 barrels a day?

A Yes, sir.

BY MR. KELLY: Did you make a study of the recommendations made?

A We have made a preliminary study of the recommendations offered by the Engineering Committee, together with a study of the report of our own engineers, and from the testimony offered here today, we are in full accord with the plan as submitted.

Witness dismissed.

BY MR. BRAINARD: Now, gentlemen, in winding this thing up, we notified -- to go back a little further: We have in the present so-called Loco Hills area 182 producing wells. Out of that 182 producing wells, not all of these wells are producing from the Loco Hills pay. The Loco Hills pay is exposed in half a dozen of these wells, but not making much oil. They have gone deeper. The Loco Hills pay is exposed in six or eight of the 182 wells. Out of those 182 wells, 164 are members of our Association. That leaves 18 wells in the entire area not members for various reasons,- some are in a lower horizon.

Out of the 18 wells not members, Mr. Wooley has four, all top allowable, good wells. The reasons why he is not a member is too long drawn out to go into now. He is paying his assessments to the association the same as members.

Flynn, Welch & Yates have three wells on the July proration sheet they are given 33, 33 and 15. I question whether two of the wells will make 33. They are not in the Association, the wells are not in the Loco Hill pay.

Flynn, Welch & Yates are members of our Association for four other wells. I have a letter from Flynn, Welch & Yates as to these four wells, and they are in hearty accord with our proposal.

The Texas Trading Company has two wells, one 14 and one six. The Texas Trading Company we have not been able to get into the Association. They are edge wells, and that very likely accounts for it.

Kleiner Brothers have four, two in the heart of the field, which they have over produced to such an extent that they will not make the allowable of 23, 19, 18 and 23. They refuse to become members of our Association for reasons which I don8t care to go into.

Suppeer & Suppeer have three wells, making 23, 23 and 7, on the lower horizon. They are not members of our Association. They are not producing from our horizon, although the pay

is exposed definitely, some of our engineers report.

Frank Montgomery has two wells, both top allowable. He has signified his desire to join our Association, but due to title trouble he has not done so yet. That accounts for 18 wells without our Association. That, in turn, accounts for all of the wells, some in our horizon, and some in a lower one, that we have any record of in the Loco Hills area.

I am going to turn in these letters. As I have said, some were sent in voluntarily, and as to others, we talked to operators as we saw them around town, and if the Commission desires, we could get letters from them to present.

There is a total of 154 wells in this group, members of the Association, who have signified their willingness and desire to limit production to 30 barrels a day.

In addition, the Continental has 15 wells for which they have signified their willingness to limit the production in accordance with our proposal, which practically accounts for the members.

The other 18 are not members. However, on most of these the limitation would not hurt, as most of them can't make their allowable. Mr. Kelly has a list of those that can make it, outside of Frank Montgomery, who has two top allowable wells and wants to join the Association, but can't now.

I think that is all I have to say at the present time.

BY MR. KELLY: How many wells in your Association?

BY MR. BRAINARD: 164.

BY MR. KELLY: That makes 171 out of the 182 that are in accord with this proposal?

BY MR. BRAINARD: That is right, so far as we know, unless there is some objection we have not heard of. Approximately a month ago we wrote letters to all members asking them to advise us if they were in accord, and if we did not hear from them, we would assume they were. To date we have no letters stating

any unit is not in accord with this program.

BY MR. BOWERS: I wish to make a point clear. You claim at the present time one unit is not in accord with this recommendation. I say, with due humility, that one producing well is a unit. As to the Association factor, at the present time our objection is not to the conservation measure,- we are heartily in accord with --

BY MR. BRAINARD (Interrupting): I would prefer that Mr. Brainard testify.

BY GOVERNOR MILES: You wish to testify now?

BY MR. BOWERS: Yes, sir.

B. A. BOWERS,

being called as a witness in his own behalf, and being first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. BRAINARD: Do you wish to qualify yourself?

BY MR. BOWERS: I don't think anybody has asked me anything about qualifications. I don't pose as a high-powered petroleum engineer. I have had some 24 years experience in practically all phases of the petroleum industry, and I am a registered professional engineer. What I mean to say is, not in any one particular line, but possibly a somewhat competent engineer in many lines, in connection with the petroleum business and petroleum.

We wish to submit at this time there is not a sufficient preponderance of evidence that this is the ideal rate of withdrawal. If it is shown that 20 barrels is the ideal rate of withdrawal, we are heartily in accord, and will conform to that figure, because it would lead to the greatest ultimate recovery.

We submit that the present plant is inadequate, and was inadequate at its inception. Had it been adequate it would have taken care of the gas for the allowables in this field.

Another point, the State of New Mexico, which established

this Commission, has not justified the discrepancies between pools, except in compulsion of purchasing power.

BY MR. LIVINGSTON: The Commission has limited production for the purpose of preventing waste in the various formations. The physical aspects of the fields, and the exceeding of the market demand are the only times there has been any discrepancies between pools. That has been justified by the Commission where the purchasing power has necessitated it.

BY MR. BOWERS: I believe it is justified, so far as is possible to know, and I believe all members of this body prefer, wherever possible, to keep an equity of production between pools, unless there is some substantial reason that has been shown conclusively for doing otherwise, and we feel it would be a bad thing to do before definitely knowing it was necessary, to limit the production of pools to a frozen amount, and we feel --

BY MR. CHUCK ASTON (Interrupting): Frozen amount? If you will recall in the letter of the U.S.G.S. to Mr. Brainard, they recommended the amount be set, but not frozen, but subject to change upon the submission of engineering data shown at a later date.

BY MR. BOWERS: Yes, that is right, but in the present petition do you not ask that it be frozen for a period of twelve months?

BY MR. BRAINARD: No. (Reading from resolution) "That a maximum rate of withdrawal of 30 barrels per day per well be established for the Loco Hills area, including back allowables, until conditions justify a further increase as shown by engineering studies." Which may be a week, two weeks, a month, six months.

BY MR. BOWERS: Well, in any event I will withdraw that part of it. Your proposal is to freeze the allowable until it could be shown that you were justified in changing it?

BY MR. BRAINARD: That is right.

BY MR. BOWERS: Our only contention has been that the Association has not completely exhausted all other means, and until that

is done, there is not sufficient data to justify the Commission in fixing the allowable at 30 barrels a day, which is less than the amount of oil that can be withdrawn and still maintain proper conservation.

BY MR. BRAINARD: May I ask how much the well you repsesent,- how much that well would make?

BY MR. BOWERS: That well, to my knowledge, is capable of making 250.

BY MR. BRAINARD: What is the present gas-oil ratio?

BY MR. BOWERS: The present gas-oil ratio is less than a thousand; the present ratio is nearer 700 feet.

BY MR. BRAINARD: What is it, Mr. Jacobs (Addressing Mr. Jacobs) actually? -- It does not make any difference.

(Addressing Mr. Bowers) You think the allowable should go up to 40 or 50,- you think that would not hurt the well?

BY MR. BOWERS: That is my personal opinion.

BY MR. BRAINARD: What would it do to the neighboring wells?

BY MR. BOWERS: My belief is that 40 or 50 would not be injurious.

BY MR. BRAINARD: I mean, do you admit the neighboring wells, if you opened up, would not have a lower gas-oil ratio? What would it do to the bottom hole pressure?

BY MR. BOWERS: It would, of course, drop the bottom hole pressure to some extent, and it would raise the gas-oil ratio to some extent.

BY MR. CHUCK ASTON: Mr. Bowers, you said the evidence presented is not sufficient to justify setting the rate of withdrawal,- to substantiate the rate of withdrawal we have indorsed?

BY MR. BOWERS: Yes, sir.

BY MR. ASTON: In your experience and knowledge of the oil industry, how would you determine that without the use of trial and error?

BY MR. BOWERS: That is the only way. But my contention is that it has not been tried long enough. We are not at the present time confronted with the problem of a great increase in allowable. If we get any increase, the transportation problems are going to remain about as they are for quite a period of time. There

is no use doing these things hurridely when we are afforded time to get more data. We are not going to damage the field by studying the problem for six months. During that period, we are not going to be called upon to transport too much out of the field.

BY MR. BRAINARD: In your opinion, do we have the Loco Hills field pretty well stabilized?

BY MR. BOWERS: Yes, I agree on that. I do not agree it is due entirely to low allowables.

BY MR. CHUCK ASTON: In your experience have you ever seen an area where the average bottom hole pressure has been increased by gas injections --

BY MR. BOWERS: Yes, -

BY MR. ASTON: Wait. With average high rate of withdrawal, where gas injection in the formation has raised the bottom hole pressure unless coupled with reducing the production? We have raised the bottom hole pressure, in the last six months, and we know, from experience, it is coupled with the lowered rate of production.

BY MR. BOWERS: I grant the point to you, but it has taken,-- that has not all happened in the last six months. That is the result of the whole program.

BY MR. ASTON: You do not think the reduction in the rate of production, or withdrawal, plays no large part?

BY MR. BOWERS: I don't think it has near as much effect as the continuing effort to conserve production.

BY MR. ASTON: Have you ever known of a field where gas has been injected into the formation, and there has been no reduction in the steady routine allowable, where the bottom hole pressure has been increased by any method?

BY MR. BOWERS: Over a period of years you will have a gradual, slow decline, regardless of the fact that you put back all of the gas produced.

BY MR. ASTON: I submit the increase in the bottom hole pressure in this field is due to the reduced allowable.

BY MR. BOWERS: Of course, that can be carried to the point of only taking out one barrel per day.

BY GOVERNOR MILES: I am not sure I understand,- you say now,- you state it is the rate of withdrawal rather than the gas injected?

BY MR. ASTON: I said they are so closely coupled together that you would, if you did not reduce the rate of withdrawal, and just injected gas, you would have nowhere near the results obtained. By virtue of reducing the production, you have caused an up-trend, instead of a down-trend, which would be otherwise impossible with increased withdrawals from the field.

BY MR. BOWERS: Let me, in turn, ask a question. How do you account for the two months in the middle of this period, when there was no rising allowable, and there was not any decrease in the gas-oil ratio?

BY MR. ASTON: The deciding factor is not over a period of one or two months. It is going to be as you maintain stabilization over a much longer period. That is what we feel we are trying to do. We are concerned about this maintenance over a period extending to six months, where possible, not three or four months, but where the field can operate under stabilized conditions over a period of time.

BY MR. BOWERS: Let me ask Mr. Hurley a question.

Do you anticipate that within the next four or five months, there will be afforded the Loco Hills field the opportunity to market very much more oil than it is marketing at the present time?

BY MR. HURLEY: I cannot answer that question.

BY MR. BOWERS: Would you be willing to give an opinion?

BY MR. HURLEY: No.

BY MR. BOWERS: I imagine the probability is very remote, that during that time the conditions will be more or less static, and will afford this Engineering Committee opportunity to go further and get more evidence to justify their request.

BY MR. BERT ASTON: Don't you think that is a guess, as to the

market possibilities of the Loco Hills oil field, as to whether we will have to furnish more or less oil than we are now furnishing? I would like to ask if he does not think he is asking us to accept his guess that the production curve would remain constant? He is asking us to go further on his guess than the opinion of our engineers that 30 barrels is the proper allowable for this field.

BY MR. BOWERS: Your point is justified, but the fact remains, and I want to go on record,- the fact remains you have not had sufficient time to justify this assumption. We have gone off half-cocked on a lot of things we have done in the oil industry. We have said "This is the answer -- let's do this, or that", and many times it would have been better if we had taken more time and known more before many of these things have been done.

BY MR. BERT ASTON: I think that is a little far fetched.

BY MR. BOWERS: This is no criticism of the Commission, or of the members of the Commission, but with these conditions static, with further time to study the field,- we may get two or three barrels more or less on our allowable, but we would have time for further studies, and the Commission would have more information on which to base a decision.

BY GOVERNOR MILES: The Commission does not take this as a personal criticism.

BY MR. CHUCK ASTON: May I ask another question?

Isn't it your personal opinion, from your experience,- we are put on this 30-barrel allowable that we know, from a trial and error method, will stabilize the field,- wouldn't it be better at the present time to fix the allowable at a given low rate, which we feel relatively sure, from the information we have, will maintain the stabilization which we have achieved, for this period? Mr. Bowers says there will be a relatively small increase in production. Wouldn't your opinion be that it would be better to maintain stabilization and do our experimenting during that time?

BY MR. BOWERS: If you at the present time adopted and operated

under the 30-barrel allowable, in the end you will have nothing to base your opinion on.

BY MR. CHUCK ASTON: I disagree.

BY MR. BOWERS: What does the Commission think?

BY MR. KELLY: The only answer we can give is the decision of the Commission.

BY MR. DEXTER; You say that twenty-four years ago you started in to produce oil, and you produced your wells to capacity. Don't you think it would have been better to have pinched them down?

BY MR. BOWERS: The recovery would have been much greater. I am strongly in favor of any conservation measure, whenever it is shown that you have the right factors before you jump at conclusions.

BY MR. DEXTER: In jumping at this conclusion, most of the operators have taken this up with our men in the field, and in each case they are in favor of it.

BY MR. BOWERS: I realize I am in the minority, and I want to assure you gentlemen that as far as I am concerned, I am heartily in accord with any proper conservation measure that can be made.

BY MR. HURLEY: I am somewhat impressed with the operating conditions in the Loco Hills area, during the past six years. It would appear to me we ought to go along with them in their recommendations. It is possible this may be an experiment. At the same time, I don't believe any of us have anything to lose. If, in asking the top allowable be fixed at 30 barrels, we have made a mistake, the only thing we have lost is a delay in production.

BY MR. BOWERS: And that is right, and I understand their sole aim is the good of the field, but I am still a Doubting Thomas. I don't think they know the answer.

BY MR. HURLEY: If we have made a mistake, that can be remedied.

BY MR. KEELER: I believe you made the statement that you agreed in principle with the idea being sought here, and that probably some different rate of production would prove correct, and your contention is that they have not made a thorough

enough study?

BY MR. BOWERS: My contention is that there has not been a sufficient time period, and it has not been worked out under enough variable conditions.

BY MR. DEXTER: The way we look at it is this: Even at the 30-barrel allowable, we are still blowing some gas to the air.

BY MR. BOWERS: That is right.

BY MR. DEXTER: As long as we are doing that, even at 30 barrels, a small amount is blown to air at 30 barrels, in the future we can reduce the gas-oil ratio. Although 30 barrels may not be the ideal allowable, it is certainly better to have it set below the present day allowable, so that we will have that allowable in case that goes up, we will keep it at 30. If it should go below 30, our allowable will be reduced, but in no case would we be allowed to produce over 30. In this way we would not be dependent on the demand, and certainly it could be changed if later studies proved this not correct.

BY MR. KELLY: You say at 30 barrels they will be blowing some gas to air?

BY MR. DEXTER: That is right.

BY MR. KELLY: And you are protecting the waste to the size of your plant?

BY MR. DEXTER: That is true. If the plant was larger, we could produce a greater rate of allowable. Under present circumstances, this is the only solution to handling all the gas.

BY MR. KELLY: Is there actual physical waste being caused in Loco Hills at 30 barrels a day?

BY MR. DEXTER: Of course that would be relative; there would be a greater waste at a greater allowable.

BY MR. KELLY: A greater amount of gas vented to air?

BY MR. DEXTER: A greater amount of gas vented to air.

BY MR. BRAINARD: May I interrupt? I have one well we have been testing recently. If I produce a certain amount, say 40 to 50 barrels, my gas-oil ratio jumps to 5000. We have finally found a point where we can produce without increasing the gas-oil ratio unduly. I have found that at 1750 we make

about 35 barrels. If I increase production my gas-oil ratio jumps all out of proportion.

BY MR. KELLY: Is that true in any gas drive field?

BY MR. BRAINARD: That is right. The gas, which is a natural resource, should be conserved. Any waste of gas can decrease the bottom hole pressure.

BY MR. KELLY: I agree with you there. But are you predicating this request here on the capacity of the plant?

BY MR. BRAINARD: There is no physical waste in the field, in proportion.

BY MR. KELLY: Can you furnish the Commission with the several rates of flow?

BY MR. BRAINARD: We have firnished you with that.

BY MR. KELLY: This is in groups. I mean of individual wells, the different rates of flow and the gas-oil ratios?

BY MR. BRAINARD: We have some information along that line which we can furnish.

BY MR. CHUCK ASTON: The point you are making is, at 30 barrels, if the plant could handle the gas being produced with the oil?

BY MR. KELLY: No, what I was getting at is, if the plant had three times the capacity, is 30 barrels still the point where waste would cease?

BY MR. ASTON: I think with a plant three times the capacity, or half, or double, 30 barrels would be the point.

BY MR. BOWERS: What do you predicate that on?

BY MR. ASTON: Over the past six months, with exhaustive tests, with 30 barrels, we achieved a point where the wells produce the least amount of gas.

BY MR. KELLY: That should be a definite test.

BY MR. ASTON: The point I am making, over that period of time, trying various methods of flow, stop cock, cocked open flow, shut in, we found you could say, as an average for the wells in the field, it looks as though 30 barrels would be about right. Above this the increase in gas-oil ratio is out of proportion.

BY MR. JACOBS: Many wells in the west half of the field, when

produced at over 30 barrels, the percentage more than doubled. In the first group some of the wells might produce from 50 to 75 without raising the ratio, but mostly the majority of the wells in the field, with a higher allowable, the ratio jumps up.

BY MR. KELLY: You can furnish some records of individual wells?

BY MR. JACOBS: In making those tests, our records show various time periods of flow. Sometimes the flow was for 24 hours a day, and sometimes for lesser periods, and for different methods, sometimes stop cocking, sometimes open flow.

BY MR. KELLY: Is such a tabulation made?

BY MR. JACOBS: Our methods of work was to check the high ratio wells. We take the method we think might work out on that well, and we run the test on exactly the way we produce the well. If we are not satisifed, we try another method; if not satisfied,- if the gas-oil ratio should rise, we go on that way until we find a method that will produce at the lowest ratio. I think the 30-barrel allowable, with shut-down time, we will not get to produce that well over 26 days a month. Whenever the level is reached, there will be a shut-in period for the rest of the month.

BY MR. BOWERS: I again suggest you make an effort, by various methods, to find where, in the most of the field, we will have the greatest amount of conservation in the gas produced. Conservation has been accomplished very recently, and we feel that still greater savings can be effected by continuing that work.

I will quit with the request that you let the allowable alone and see what further remedial work can be done to reduce the gas-oil ratio.

BY MR. BRAINARD: We appreciate the point Mr. Bowers has brought up today. I might ask this question? Who operates your well?

BY MR. BOWERS: Mr. Emery Carper.

BY MR. BRAINARD: What is his attitude toward this proposal?

BY MR. BOWERS: I think Mr. Carper thinks along the same lines you do.

BY MR. BRAINARD: We have a letter from Mr. Carper.

It is not the desire of this Association,- Mr. Bowers is representing Mrs. Bowers and Katherine Bowers, who own one well. They are members of the Loco Hills Pressure Maintenance Association. Mr. Bowers is the only member out of 164 we have found not completely in accord with our program.

I would like to introduce these rough notes in evidence, which show the rest of the 182 wells -- I would like to leave that for what it is worth.

BY MR. KELLY: Are you introducing it in evidence?

BY MR. BRAINARD: Yes, sir.

(Marked Exhibit No. 9.)

We would like to ask this: In considering our proposal, if you find we are justified in asking this, and you agree with our request, we would like to have the area embraced in the outside boundaries of this may included in that order, for the simple reason that the 182 wells are all plotted on this map, which include the 18 wells listed on these notes. We have taken in a little larger jurisdiction than our production covers, but at the same time, the acreage in the area covered by this map is all potential area.

BY MR. KELLY: Are there any more producing wells covered by this map?

BY MR. BRAINARD: No, just what I have already discussed.

BY MR. KELLY: Which are in the original Loco Hills Pressure Agreement?

BY MR. BRAINARD: No, the 182 are all embraced in the Loco Hills area, for the present because we did not know what did constitute the Loco Hills area. We can put in the contract any wells in this area.

BY MR. LIVINGSTON: The call for this hearing, this call is applicable to the Loco Hills are. Now you request inclusion of that map?

BY MR. BRAINARD: This is the Loco Hills area.

BY MR. LIVINGSTON: That can be done this way: If you introduce the map into evidence as an exhibit, why then the order can refer to the exhibit.

BY MR. KELLY: In the Loco Hills plan, which the Commission approved,

you outlined a certain area. This is a change of area.

BY MR. BRAINARD: Yes, but it will not change the Loco Hills production area. It has no relation to our organization. We are asking you to include in this order this map because anywhere in this area you will pick up the Loco Hills pay.

BY MR. KELLY: You want our order to cover this area (indicating map, marked Exhibit No. 11)?

BY MR. BRAINARD: Yes, sir.

BY MR. KELLY: For a 30-barrel per day allowable?

BY MR. BRAINARD: Yes sir. For the information of you gentlemen, and the others present, this area we are asking for, includes Sections 31 and 32 in 17-30; 3 and 6 in 17-29; 1 to 10, inclusive in 18-29; 5, 6, 7, and 8 in 18-30, and 12, in which you are liable to pick up the Loco Hills pay.

BY MR. LIVINGSTON: For the purpose of limiting the production which you, as petitioners, ask, you wish that area designated?

BY MR. BRAINARD: That is right, the outer boundaries of this map.

BY MR. LIVINGSTON: That would be better designated in the order by sections and townships.

BY MR. KELLY: We set out the Loco Hills field in previous orders. You are asking for more than the Loco Hills area as so designated?

BY MR. BRAINARD: No, we are not asking for that.

BY MR. CHUCK ASTON: There are a few wells not in this pay, or that cannot produce full allowable. If this order does not include those wells, those wells will be permitted to produce full allowable.

BY MR. KELLY: Your petition is for the Loco Hills field?

BY MR. BRAINARD: Yes, sir.

BY MR. KELLY: Is that set out in the proration schedule? That is what we have to consider?

BY MR. BRAINARD: There are no wells in this area except what is in the Loco Hills horizon that would be affected.

BY MR. KELLY: As set out in the proration schedule?

BY MR. BRAINARD: No, you have the proration schedule, it takes in the field of Loco Hills.

BY MR. KELLY: That is the way you ask to have this set out, to have these sections definitely included in the order?

BY MR. BRAINARD: Isn't it advisable to take in the area the geologists tell us you might pick up the Loco Hills area sand, change the Loco Hills area to take in this area?

BY MR. KELLY: We are arguing that you will have to ask that in your petition.

BY MR. ASTON: When we made our original petition I am sure we furnished a map and included in the petition the Grayburg.

BY MR. KELLY: You ask for a certain area. If you want to change that area,- you have already filed your petition for a certain area for this hearing, and if you want to change the designation, shouldn't that be on a petition to make that change?

BY MR. BRAINARD: I don't know anything about that. Mr. Morrall came down and asked me if there was any other area included, and I told him no, the Loco Hills horizon are all in this area. We are definitely asking that that area be taken in.

BY MR. KELLY: If it can be in the call made. Mr. Livingston will tell us how.

BY MR. BRAINARD: Now, one other point. We are not asking that the allowable be set at 30 barrels for any definite length of time. What we would like to do, we would like to have the allowable set at 30 barrels, with a maximum and a minimum, subject to engineering studies, and we suggest a minimum of 20 barrels and a maximum of 40. If we find, by engineering studies we can produce 35, we want to produce that, if the bottom hole pressure and gas-oil ratio can be stabilized at that. We want to be able to change this if we can justify a revision upward or downward by engineering studies. Can that be written into the order, that we may do that upon request of the State Geologist, without another hearing?

BY MR. KELLY: An opinion on that would have to be given by Mr. Livingston.

BY MR. LIVINGSTON: I think there could be allowed a certain amount

of leaway upon the recommendation,- by whom would you want that recommendation?

BY MR. CHUCK ASTON: By the Association.

BY MR. BRAINARD: We would like to have it come from the Engineering Committee. A minimum of 20 and a maximum of 40 barrels. Our Engineering Committee is capable of passing upon that, if you would be satisfied with the Engineering Committee's recommendation and reports, and it might do away with the necessity of another hearing.

BY MR. LIVINGSTON: I think that could be done, upon proper recommendation, with the understanding the Commission is to reserve judgment. You understand I am not binding the Commission in my statement.

BY MR. KELLY: Within the limits of the market demand.

BY MR. BRAINARD: Of course, suppose the market demand was 50, the Engineering Committee would still decide what the allowable should be, but cannot exceed the market demand. If it were not within the market demand, and an increase in the allowable was requested, with proper recommendations, we would have to have a hearing.

BY GOVERNOR MILES: The Association would not control?

BY MR. BRAINARD: No, sir, the Engineering Committee, as set up, must make the recommendation on all matters pertaining to the production of oil, in the Association, before the Directors can act on it.

BY MR. KELLY: Your Directors can approve or disapprove the recommendation of the Engineering Committee?

BY MR. BRAINARD: That is so, but cannot make,-- I will not say cannot, but it is not the policy to do it without the recommendation of our experts.

BY MR. LIVINGSTON: Mr. Brainard, you brought up one question, so far as any order is concerned out of this hearing, it will have to be confined to the Loco Hills area as it is known on the proration schedule, for the reason that your petition calls for the Loco Hills Area, and the advertisement is for

the Loco Hills area. As to any area outside of that, the operators will not be on notice.

BY MR. BRAINARD: We understand it will have to pertain to the present area, but we are asking if the area cannot be changed.

BY MR. KELLY: I understand there is a petition that is going to be presented for change of area. You could present yours in that.

BY MR. BRAINARD: You mean we can request it in that petition?

BY MR. STALEY: If it is not included in the boundary lines, as set out in the petition, I would naturally want to take it up.

BY MR. BRAINARD: This is not a radical change; it includes just one or two half sections that fill in.

BY MR. STALEY: They probably have been taken in by the recommendation. Do you know whether the recommendations made to you incluse those sections?

BY MR. BRAINARD: They include most, but not quite all. They include the tier of half sections on the north. We are not asking for any area with any production, except these enumerated here. It takes in no other known production, except what is connected with the Loco Hills production field. However, if it is not too late, we will write you a letter about that.

BY MR. LIVINGSTON: For clarification, the area which you will include will be different from what is included in the petition, so that in the changes of boundaries in the various fields, there will be some operators brought in which are not now in this area?

BY MR. BRAINARD: There is no production on it. I am simply speaking of Loco Hills.

BY MR. LIVINGSTON: There is no production on the area you are bringing in?

BY MR. BRAINARD: Except Loco Hills production.

Just one other point that has been called to my attention. I don't know how to bring this out. As you know, gentlemen, we are asking for this to conserve natural resources. We don't know how large that area is around there,-- we know the Loco Hills horizon may extend into the lime production, and

I believe if any wells are drilled in that area, and it can be proved they are producing from the Loco Hills horizon, they should be included in some future order.

BY MR. CHUCK ASTON: Both of you misquoted "production" rather than major part of potential. What we are trying to do here,-- here is the map,-- here is where Harvey Yates jumped over on what we thought was impervious sand, and was not shown in the Loco Hills pay, and we don't know but what somewhere in this field there may be another area similar to that. I think the point Fred is asking me to explain is that up in the lime banks Grayburg encountered another horizone. It is known production, relatively speaking. We did not try to bring those wells under control. That would not affect more than one in five thousand.

BY MR. KELLY: When you do get production in the Loco Hills horizon, you ask that it be taken in, rather than that the Commission now make a blanket order. I think you are right.

BY MR. BRAINARD: Mr. Kelly, any of these orders are open for revision and further evidence. You will note this order we are asking for may be opened upon the presentation of new facts, so it would be new matter to present.

That is all I have. I want to thank you gentlemen for your consideration. In conclusion, we have had a heck of a time with the Loco Hills production. We are getting some results, and we wouldn't want to tear down our efforts by what some ill advised operator might do. We think we know what we are doing, and if we can get this order through, we propose to handle this matter as we have handled these matters in the past, not only for the benefit of the operators, but the Government and the State.

I believe that is all I have to say today. Does anybody else have anything to say against this proposal? If not, I am through, and I thank you for your consideration.

BY MR. KELLY: Any further evidence in this case?

The Commission will hold the case open until Mr. Jacobs has time to furnish the statistics requested.

C E R T I F I C A T E

I hereby certify that the foregoing and attached forty-five pages of typewritten matter are a true, correct and complete transcript of the shorthand notes taken by me on August 28, 1942, in Case No. 35, before the Oil Conservation Commission of New Mexico, and by me extended into typewriting.

Witness my hand this 12th day of September, 1942

Esther Barton

Esther Barton