THE RAILROAD COMMISSION OF TEXAS

BRONCO (WOLFCAMP) FIELD,

LEA COUNTY, NEW MEXICO,
YOAKUM COUNTY, T E X A S

Austin, Texas,
April 13, 1954.

TRANSCRIPT OF TESTIMONY

H. Ray Pardue
Official Reporter.

RAILROAD COMMISSION OF TEXAS

OIL AND GAS DIVISION

* *

OIL AND GAS DOCKET NO. 126

#8 - 31,132

IN RE: CONSERVATION AND PREVENTION OF WASTE OF CRUDE PETROLEUM AND NATURAL GAS IN THE BRONCO (WOLF-CAMP) FIELD, YOAKUM COUNTY, T E X A S

* *

HEARING HELD IN AUSTIN, TEXAS,

APRIL 13, 1955.

* *

B E F O R E

HONORABLE E. S. WALKER, COMMISSIONER OF PUBLIC LANDS AND MEMBER OF NEW MEXICO OIL COMMISSION

HONORABLE W. B. MACEY, STATE GEOLOGIST, MEMBER AND SECRETARY OF NEW MEXICO OIL COMMISSION

MR. HERBERT L. McCRACKEN, SENIOR ENGINEER

* *

TRANSCRIPT OF TESTIMONY

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MR. McCRACKEN: This is Oil and Gas Docket No. 126 #8 - 31, 132, hearing pertaining to a determination of equitable allowables and the adoption of field rules for the Bronco (Wolfcamp) Field.

We have representatives of the Oil Conservation

Commission of New Mexico, Mr. Walker and Mr. Macey here, to represent New Mexico.

Can we have appearances, please?

APPEARANCES

Name	Representing
Mr. R. S. Christie Mr. J. A. Rauhut	Amerada Petroleum Corp.

* * * * * * * * * * *

R. S. C H R I S T I E was thereupon called as a witness and, having been first duly sworn, testified as follows:

EXAMINATION

BY MR. RAUHUT:

Q State your name.

A R. S. Christie.

Q You live in Tulsa, Oklahoma?

A Yes, sir.

Q Employed by Amerada Petroleum Corporation?

A Yes, sir.

Q Are you a petroleum engineer?

A Yes, sir.

Q Have you made a petroleum engineering study of this subject field, the Bronco Wolfcamp Field, Yoakum County, Texas, and Lee County, New Mexico?

A Yes, I have.

I have tried to explain the productivity indexes in Exhibits 6 and 7. Number of producing wells, 5; none of the wells are making any water; one well is on the pump, the other 4 are flowing naturally; the average oil production to February, 1955, is 562 barrels per calendar day; the cumulative production through February, '55, is 61,621 barrels; the average gas-oil ratio taken from potential tests, which is an arithmetical average, actually, 800 cu. ft. As pointed out previously, one well has been abandoned. We estimate that the proven oil acreage developed is about 280'. It appears that there will be approximately 1,000 productive acres, total. This would give us an average density of about 56 acres per well at the present time. Of course, the reservoir is relatively new, in the flush stage of production. The average daily gas production is estimated to be 450,000 cu. ft., of which approximately half of it is used on lease operations and the remainder is flared.

Now, Exhibit 10 are the proposed field rules. We propose six rules for the orderly development of this particular field. Rule 1 is the surface casing rule which requires that casing be set below all fresh water sands, and is the same rule that applies to the Siluro-Devonian reservoir. We didn't choose to add any of the other strings because operators have different casing programs. We thought probably it would be just ambiguous to include two or three different casing programs in the casing rule, so we didn't propose any. If you will notice on Exhibit 3,

Q You are fully familiar with the call of this hearing and will you simply proceed in the interest of time in your own language to present the data that you have prepared for this hearing?

A The Bronco (Wolfcamp) Field is located in Yoakum County, Texas, and Lea County, New Mexico; thus, a part of the field is located in Texas and a part in New Mexico, making it advisable to adopt rules and regulations providing for orderly development, and an allocation formula which will permit approximately equal withdrawals for the protection of equity.

The geology of the Bronco (Wolfcamp) Field, this is an anticlinal structure located within the general Permian Basin Province. The Wolfcamp formation is the lower series of the Permian System, being one of the important oil producing formations within the Basin. It is difficult to differentiate the Wolfcamp from the underlying Pennsylvanian formation; therefore, it sometimes is questionable from which formation oil is being produced. We interpret the production from the Bronco (Wolfcamp) Field as coming from the Pennsylvanian formation. The discovery well was classified as a producer in the Wolfcamp, so in order not to confuse the records, all completions have been reported in this formation.

Q This Wolfcamp or Pennsylvanian, whichever it is; it's officially called Wolfcamp, is that or not a common reservoir that is being produced in that field?

A Yes, it is a common reservoir.

Q Both on the Texas and New Mexico side?

A Yes, sir. The Bronco Wolfcamp Field overlies the Bronco Siluro-Devonian Field, for which we have field rules applicable in both states. The first evidence of oil production in the Wolfcamp was found in the discovery well in the Bronco Siluro-Devonian Field, which was the Amerada Petroleum Corporation's Weems No. 1. However, the first well completed in the Wolfcamp was the Honolulu Oil Corporation's Weems No. 1, the discovery date being January 3rd, 1954. This well has since been plugged and abandoned. The second well was The Texas Company's Barnes No. 1 which was plugged back from the Devonian September 20th, 1954. Subsequently, Amerada has completed four wells and has one drilling. Thus there remain five completed wells and one drilling well.

I would like to submit the following exhibits and I will explain them as I go along. Exhibit No. 1 is an area map of the field. It simply shows the Wolfcamp wells within the Wolfcamp Field. You will note that there are five completed wells, one plugged well, and one drilling well.

Q The plugged well is shown down there to the southeast?

A Yes.

Q Honolulu ---

A Honolulu Weems No. 1. Exhibit No. 2 is a structure map contoured on top of the Pennsylvanian. The top of the Pennsylvanian is a very good marker and is very easily identified, and for that reason the structure is drawn on the top of the

Pennsylvanian. The Wolfcamp is very difficult to recognize, as far as the top is concerned, and you will note from the data in Exhibit No. 3 that all of the production comes below the top of this Pennsylvanian formation that we call the producing formation in this field. Exhibit 2 shows the different wells that tested the Wolfcamp oil; some of them were flowing drill stem test and others were -- just recovered free oil without flowing characteristics.

Q The bulk of the wells shown on Exhibit 2 were drilled to and completed in the Silurio-Devonian?

A Yes, that is correct. With the few number of Wolfcamp wells, there is not enough control to draw any contours, so the information was taken from all wells drilled through or to the Pennsylvanian into the Silurio-Devonian.

Exhibit No. 3 is a well data sheet which shows the wells that have been completed or plugged in the Wolfcamp formation. You will note that the Honolulu Weems No. 1 -- it was first drilled to the Devonian and plugged back to the Wolfcamp and produced until about October, September or October of 1954, and was plugged in the Wolfcamp and then taken back down to the Devonian to try to recomplete it in the Devonian. It produced for a short time and then was finally plugged. Exhibit 3 shows the general information, including the location, the elevation, spudding and completion date, casing program, and the top of the Wolfcamp and the top of the Pennsylvanian, total depth, perforations, and the amount of acid treatment, and the potential

tests after completion.

Exhibit No. 4 is a tabulation of production by leases, by months, and field total, field cumulative, and number of wells. At the end of February, you will note there were four wells. There has since been one completed in March of this year, making a total of five. The cumulative production through February, 1955, was 61,621 barrels.

Exhibit No. 5 shows the bottom hole pressures that have been taken on wells within the Wolfcamp formation. I would like to point out that the Amerada Ward No. 4 had the highest pressure and we consider that the initial reservoir pressure for the reservoir.

Exhibits Nos. 6 and 7 are copies of our flow tests to determine PIs. It is very difficult to establish a definite PI in this type of well; therefore, I have included the entire tabulation and the graph to show to the Commissions the results of a flow test on what we call the declining type PI well. If you will turn to the graphs which show, among other things, the slope of the PI curve, you will note that at no place on that curve can you pick a constant PI, therefore, it's arbitrary to call a PI in any well a definite value. For example, on Ward No. 4, the PI for the initial hour was .0527, and it was constantly declining until the 24th hour when the PI was .0138. Off the record --- (Off record discussion)

For the record again, Exhibit No. 8 is the core summary of our Weems No. 5. Reviewing it briefly, we had 95% recovery,

the feet of permeable productive formation is 51.3, the average permeability is 45 -- incidentally, the permeability as determined from flow tests on this particular well check very closely with this core analysis figure -- the average porosity is 7.4%, average residual oil saturation, 7.2%; gravity of the oil, 40; and total water -- average total water saturation and also the calculated connate water saturation is 39.6%.

Exhibit No 9 depicts the MER data as required by the Texas Commission in establishing MER for the field. Reviewing that briefly, as I pointed out, the discovery date for the Wolfcamp formation was January 3rd, 1954; the average depth of wells in this field are 9,650', and the average porosity, including the core analysis and calculated porosities from electric logs average 9%; average permeability, 45 millidarcys, and I have given the residual oil and water saturation; the average net oil pay, 65'; the average gravity of all wells completed to date is 43° API; the formation volume factor, 1.65, which is an estimate; and the solution gas-oil ratio is 1,200 cu. ft., which is also an estimate; viscosity, .5, which is also an estimate. We have not run a bottom hole sample analysis. These estimates are based on figures obtained from other, comparable reservoirs, and they could be in error either plus or minus to a small degree, but it is certainly much better than taking a figure out of the air. The original reservoir pressure is 3,640 pounds per square inch at 5,800' subsea. The average reservoir pressure as of March, 1955, is 2,980 PSI; reservoir temperature, 138°.

we usually run -- or do run three strings. Some operators prefer to run just two strings. Rule 2 provides for 40 acre proration units. This rule, incidentally, is similar to the Siluro-Devonian rule also. It has a 20 acre tolerance feature. Rule 3 is the allocation rule which provides for 100% on straight acreage, on acreage.

Q Likewise the same as the Siluro-Devonian?

A Same as Siluro-Devonian. Rule 4 is the usual statewide 2,000:1 gas-oil ratio. Rule 5 provides for the dates of testing. I might add that this is the same date, or these are the same dates, that are in the other fields, the Siluro-Devonian Field. If the Commission would rather have some other date, we have no objection. It is simply convenient to the operators to take all your ratios at the same time. The Rule 6 provides for annual bottom hole pressures on all flowing wells. Actually, this is a copy from rules of the Siluro-Devonian Field except for the depth, and I note that the last sentence reads, "Said pressures shall be taken on all flowing wells with subsurface pressure gauge or other method of equal accuracy, and may be taken on pumping wells with sonic devices or other methods of equal accuracy." We would recommend that it not be necessary to take tests on pumping wells, so that part of the rule should be stricken, as far as Amerada is concerned, at least. The Commission may still feel that they should be taken.

Q What you are proposing is that the last line and a half of Rule 6 dealing with the pumping wells be eliminated, leaves operators -- it reads in a permissive way, any way.

A Yes. I would leave out that part ---

Q To avoid any ambiguity, you didn't want to have it in there where it would suggest to someone maybe they were required to make a sonic pressure test.

A Yes.

Q They still do that permissively, if they wish, as far as flowing wells are concerned, but you are not required to take bottom hole pressures on pumping wells.

A That's correct, yes, sir. As in the Siluro-Devonian Field, we have not recommended any spacing program. We believe that the field can be developed on the various state spacing patterns. That has proved satisfactory in the Siluro-Devonian and we believe it will operate sufficiently in this field. That concludes the explanation of exhibits.

MR. McCRACKEN: Mr. Macey, do you or Mr. Walker have any questions?

MR. MACEY: I have no questions.

MR. WALKER: I have no questions.

A Did you have any at this stage?

MR. McCRACKEN: Not at this time, no, sir.

A The Bronco Wolfcamp reservoir appears at this time to be of a solution type. It is our opinion, based on the permeability, the fluid -- permeability obtained from cores and calculated electric logs, and also from the fluid characteristics, that is, rather high gravity and high gas-oil ratio, solution gas-oil ratio, and with an efficient allowable that one well will

adequately and efficiently drain in excess of 40 acres.

As to the allowable that we wish to recommend, I would like to point out that at the present time the discovery allowable is still in effect on the Texas side, which is 200 barrels per day. I believe that the discovery allowable should run out about June, since the discovery date was January of '54. At that time, the allowable in Texas would be 182 barrels, based on the 1947 yardstick for that depth and for 40 acre units. I have made a calculation in my statement here, shows that by applying the shut down days, the allowable would then be reduced to 105. That's based on 17 days in the 30 day month, for the month of April. Obviously, that will very likely be different by June when the discovery allowable runs out, but at any rate, it will be somewhere in the neighborhood of that. Now, on the New Mexico side, the allowable for that depth on a 40 acre unit is 155 barrels, so using my calculations, there would be a difference of 50 barrels in favor of the State of New Mexico.

We propose here that we more or less compromise these figures and have suggested an allowable of 125 barrels per calendar day for all wells in both states. We are not yet ready to call this an MER because the -- that is a considerable reduction from the present allowable and we would like to at least study that rate for a time before we definitely make up our mind what an MER should be, or what an MER is.

Q (By Mr. Rauhut) Mr. Christie, does that conclude that statement?

A Yes.

A No, I believe that's all. I might point out that on Exhibit 2 there is a dashed line that includes -- that is not very prominent -- it includes Amerada's Weems lease and Amerada's Ward lease and the Federal "A" lease. This was originally established as a drilling unit and is composed of the Amerada, the Magnolia, Sinclair, and Coates, and they have been advised of this hearing and of our recommendations and as far as I know they have no objection. Warren Petroleum is also in the unit, and they have given permission to Amerada for them to concur in our recommendation.

MR. McCRACKEN: Are there any tracts within the productive limits of the field which are smaller than the recommended 40 acre proration units?

A You will note along the boundary of the state line that there is one tract there that's owned originally and may still be owned by The Texas Company. I believe that is 8-1/2 acres. It shows 8-1/2 acres. The part that is adjacent to the south half of the Amerada Weems lease is a part of the Weems unit, or the drilling unit, and as to the strip south, I'm not qualified to say just what the status of it, except I do know that there is a well location made and, I understand, drilling. That is 300 out of the northwest corner of that Block "D" and I assume they have taken in this strip along the west side of that Block "D" in order to obtain the full 40 acre unit.

Q (By Mr. Rauhut) You are referring there to Exhibit 1, are you?

A Exhibit 1.

Q Now, you have summarized your testimony in writing and attached to it the various exhibits that you have referred to, Exhibits 1 to 10?

A Yes, sir.

MR. RAUHUT: We would like to offer the original of that in evidence as our Exhibit A, including all the numbered exhibits attached.

Q (By Mr. Rauhut) Is it your purpose and intention to propose, in order to bring about this uniformity of development, to propose in New Mexico the identical rules and allowable which you here propose to the Texas Railroad Commission?

A Yes, it is.

Q And in the event that uniform rules and allowable are adopted in the two states where application for this field located on the state line, a part in each state, is it your opinion that rules and allowable which you have proposed will tend to prevent waste of oil and gas through bringing about uniform and orderly development of the field?

A Yes, sir.

Q What is your opinion as to whether these rules and allowable, if adopted, would likewise enable each owner in this common reservoir to produce ratably, roughly in proportion to the interest that he owns in the field, once it's fully developed, of course?

A Well, in my opinion, I think it will.

Q Do you have anything else to offer?

Q And the location you are referring to ---

A It's not shown on the plat.

Q --- would be roughly east of the Amerada No. 4 Ward?

A No, northeast of the Honolulu Weems No. 1 dry hole.

MR. MACEY: Northwest or northeast?

A I'm sorry, northwest.

Q (By Mr. Rauhut) In other words, it's right in that same corner as the Honolulu well that was plugged and abandoned?

A Yes, sir.

Q Produced for a while, did it not?

A Yes, sir.

Q And will simply be closer to the northwest line in that particular well?

A It's my understanding that it's located 330' from the north line and 211' east of the west line of that Block "D", or Section 414.

Q That's on the Texas side?

A That's on the Texas side.

Q The Railroad Commission presumably has notice of intention to drill filed ---

A I think what has happened, they located it 330' from the state line and have probably filed an application for a 40 acre unit. Outside of that one strip along the state line, there are no other tracts on the Texas side that ---

Q To be a regular location there, why, it would take in a portion -- that would be on the basis of having pooled a portion

of this 8.5 acre tract?

A Yes. It would either have to have a Rule 37 case on it or take that in.

MR. RAUHUT: Mr. Examiner, that information we can ascertain for you, what has been done on that particular matter, where neither of us have seen the file. If you like, we would be glad to look into that, but it appears to us you would either have to take it in or get a Rule 37 exception. I presume they have taken it in.

Q (By Mr. Rauhut) You have no notice of a Rule 37 exception, so far as you know?

A No, sir.

MR. McCRACKEN: Do either you, Mr. Macey, or Mr. Walker have any questions?

MR. MACEY: I notice in connection with the acreage, Sinclair has a tract that's 27 acres in New Mexico.

A Well, I was speaking of the Texas side.

MR. MACEY: I realize that. Of course, they have an offset. Whether or not they are going to drill it is questionable. Don't they have a Devonian well on that 27 acre tract?

A Yes, they do have. Of course, based on the suggested allocation rule, if that is still a 27 acre tract, they will only get 27/40th in the unit. As a matter of fact, our Federal "B" No. 2 was drilled on a lot of approximately 25 acres and may still be just getting 25/40th, but we have in mind unitizing

it with additional acreage to make a full unit.

MR. McCRACKEN: Are there any additional questions? Does Amerada have anything further?

MR. RAUHUT: We have no further questions. We would like to say that we recommend these rules as common rules for the two states to prevent waste and protect correlative rights.

MR. McCRACKEN: The hearing is adjourned.

* *

HEARING ADJOURNED

* *

STATE OF TEXAS |

COUNTY OF TRAVIS |

I, H. Ray Pardue, official reporter for the Oil and Gas Division, Railroad Commission of Texas, do hereby certify that the above and foregoing 16 pages constitute a true and correct transcript, to the best of my ability, of the testimony introduced and proceedings had upon the hearing of the foregoing docket, which hearing was held in Austin, Texas, on April 13, 1955.

Witness my hand on this the 14th day of April, A.D., 1955.

H. Ray Pardue

OFFICIAL REPORTER

THE RAILROAD COMMISSION OF TEXAS

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Q Likewise the same as the Siluro-Devonian?

A Same as Siluro-Devonian. Rule 4 is the usual statewide 2,000:1 gas-oil ratio. Rule 5 provides for the dates of testing. I might add that this is the same date, or these are the same dates, that are in the other fields, the Siluro-Devonian Field. If the Commission would rather have some other date, we have no objection. It is simply convenient to the operators to take all your ratios at the same time. The Rule 6 provides for annual bottom hole pressures on all flowing wells. Actually, this is a copy from rules of the Siluro-Devonian Field except for the depth, and I note that the last sentence reads, "Said pressures shall be taken on all flowing wells with subsurface pressure gauge or other method of equal accuracy, and may be taken on pumping wells with sonic devices or other methods of equal accuracy." We would recommend that it not be necessary to take tests on pumping wells, so that part of the rule should be stricken, as far as Amerada is concerned, at least. The Commission may still feel that they should be taken.

Q What you are proposing is that the last line and a half of Rule 6 dealing with the pumping wells be eliminated, leaves operators -- it reads in a permissive way, any way.

A Yes. I would leave out that part ---

Q To avoid any ambiguity, you didn't want to have it in there where it would suggest to someone maybe they were required to make a sonic pressure test.

A Yes.

Q They still do that permissively, if they wish, as far as flowing wells are concerned, but you are not required to take bottom hole pressures on pumping wells.

A That's correct, yes, sir. As in the Siluro-Devonian Field, we have not recommended any spacing program. We believe that the field can be developed on the various state spacing patterns. That has proved satisfactory in the Siluro-Devonian and we believe it will operate sufficiently in this field. That concludes the explanation of exhibits.

MR. McCRACKEN: Mr. Macey, do you or Mr. Walker have any questions?

MR. MACEY: I have no questions.

MR. WALKER: I have no questions.

A Did you have any at this stage?

MR. McCRACKEN: Not at this time, no, sir.

A The Bronco Wolfcamp reservoir appears at this time to be of a solution type. It is our opinion, based on the permeability, the fluid -- permeability obtained from cores and calculated electric logs, and also from the fluid characteristics, that is, rather high gravity and high gas-oil ratio, solution gas-oil ratio, and with an efficient allowable that one well will

adequately and efficiently drain in excess of 40 acres.

As to the allowable that we wish to recommend, I would like to point out that at the present time the discovery allowable is still in effect on the Texas side, which is 200 barrels per day. I believe that the discovery allowable should run out about June, since the discovery date was January of '54. At that time, the allowable in Texas would be 182 barrels, based on the 1947 yardstick for that depth and for 40 acre units. I have made a calculation in my statement here, shows that by applying the shut down days, the allowable would then be reduced to 105. That's based on 17 days in the 30 day month, for the month of April. Obviously, that will very likely be different by June when the discovery allowable runs out, but at any rate, it will be somewhere in the neighborhood of that. Now, on the New Mexico side, the allowable for that depth on a 40 acre unit is 155 barrels, so using my calculations, there would be a difference of 50 barrels in favor of the State of New Mexico.

We propose here that we more or less compromise these figures and have suggested an allowable of 125 barrels per calendar day for all wells in both states. We are not yet ready to call this an MER because the -- that is a considerable reduction from the present allowable and we would like to at least study that rate for a time before we definitely make up our mind what an MER should be, or what an MER is.

Q (By Mr. Rauhut) Mr. Christie, does that conclude that statement?

A Yes.

Q Now, you have summarized your testimony in writing and attached to it the various exhibits that you have referred to, Exhibits 1 to 10?

A Yes, sir.

MR. RAUHUT: We would like to offer the original of that in evidence as our Exhibit A, including all the numbered exhibits attached.

Q (By Mr. Rauhut) Is it your purpose and intention to propose, in order to bring about this uniformity of development, to propose in New Mexico the identical rules and allowable which you here propose to the Texas Railroad Commission?

A Yes, it is.

Q And in the event that uniform rules and allowable are adopted in the two states where application for this field located on the state line, a part in each state, is it your opinion that rules and allowable which you have proposed will tend to prevent waste of oil and gas through bringing about uniform and orderly development of the field?

A Yes, sir.

Q What is your opinion as to whether these rules and allowable, if adopted, would likewise enable each owner in this common reservoir to produce ratably, roughly in proportion to the interest that he owns in the field, once it's fully developed, of course?

A Well, in my opinion, I think it will.

Q Do you have anything else to offer?

A No, I believe that's all. I might point out that on Exhibit 2 there is a dashed line that includes -- that is not very prominent -- it includes Amerada's Weems lease and Amerada's Ward lease and the Federal "A" lease. This was originally established as a drilling unit and is composed of the Amerada, the Magnolia, Sinclair, and Coates, and they have been advised of this hearing and of our recommendations and as far as I know they have no objection. Warren Petroleum is also in the unit, and they have given permission to Amerada for them to concur in our recommendation.

MR. McCRACKEN: Are there any tracts within the productive limits of the field which are smaller than the recommended 40 acre proration units?

A You will note along the boundary of the state line that there 1 is one tract there that's owned originally and may still be owned by The Texas Company. I believe that is 8-1/2 acres. It shows 8-1/2 acres. The part that is adjacent to the south half of the Amerada Weems lease is a part of the Weems unit, or the drilling unit, and as to the strip south, I'm not qualified to say just what the status of it, except I do know that there is a well location made and, I understand, drilling. That is 300 out of the northwest corner of that Block "D" and I assume they have taken in this strip along the west side of that Block "D" in order to obtain the full 40 acre unit.

Q (By Mr. Rauhut) You are referring there to Exhibit 1, are you?

A Exhibit 1.

Q And the location you are referring to ---

A It's not shown on the plat.

Q --- would be roughly east of the Amerada No. 4 Ward?

A No, northeast of the Honolulu Weems No. 1 dry hole.

MR. MACEY: Northwest or northeast?

A I'm sorry, northwest.

Q (By Mr. Rauhut) In other words, it's right in that same corner as the Honolulu well that was plugged and abandoned?

A Yes, sir.

Q Produced for a while, did it not?

A Yes, sir.

Q And will simply be closer to the northwest line in that particular well?

A It's my understanding that it's located 330' from the north line and 211' east of the west line of that Block "D", or Section 414.

Q That's on the Texas side?

A That's on the Texas side.

Q The Railroad Commission presumably has notice of intention to drill filed ---

A I think what has happened, they located it 330' from the state line and have probably filed an application for a 40 acre unit. Outside of that one strip along the state line, there are no other tracts on the Texas side that ---

Q To be a regular location there, why, it would take in a portion -- that would be on the basis of having pooled a portion

of this 8.5 acre tract?

A Yes. It would either have to have a Rule 37 case on it or take that in.

MR. RAUHUT: Mr. Examiner, that information we can ascertain for you, what has been done on that particular matter, where neither of us have seen the file. If you like, we would be glad to look into that, but it appears to us you would either have to take it in or get a Rule 37 exception. I presume they have taken it in.

Q (By Mr. Rauhut) You have no notice of a Rule 37 exception, so far as you know?

A No, sir.

MR. McCRACKEN: Do either you, Mr. Macey, or Mr. Walker have any questions?

MR. MACEY: I notice in connection with the acreage, Sinclair has a tract that's 27 acres in New Mexico.

A Well, I was speaking of the Texas side.

MR. MACEY: I realize that. Of course, they have an offset. Whether or not they are going to drill it is questionable. Don't they have a Devonian well on that 27 acre tract?

A Yes, they do have. Of course, based on the suggested allocation rule, if that is still a 27 acre tract, they will only get 27/40th in the unit. As a matter of fact, our Federal "B" No. 2 was drilled on a lot of approximately 25 acres and may still be just getting 25/40th, but we have in mind unitizing

it with additional acreage to make a full unit.

MR. McCRACKEN: Are there any additional questions? Does Amerada have anything further?

MR. RAUHUT: We have no further questions. We would like to say that we recommend these rules as common rules for the two states to prevent waste and protect correlative rights.

MR. McCRACKEN: The hearing is adjourned.

* *

HEARING ADJOURNED

* *

STATE OF TEXAS |

COUNTY OF TRAVIS |

I, H. Ray Pardue, official reporter for the Oil and Gas Division, Railroad Commission of Texas, do hereby certify that the above and foregoing 16 pages constitute a true and correct transcript, to the best of my ability, of the testimony introduced and proceedings had upon the hearing of the foregoing docket, which hearing was held in Austin, Texas, on April 13, 1955.

Witness my hand on this the 14th day of April, A.D., 1955.

H. Ray Pardue

OFFICIAL REPORTER

TESTIMONY PRESENTED BEFORE

Texas Railroad Commission
Oil & Gas Docket No. 126, No. 8-31,132
April 13, 1955

Oil Conservation Commission of New Mexico
Case No. 880
April 20, 1955

Introduction

The Bronco (Wolfcamp) Field is located in Yoakum County, Texas and Lea County, New Mexico; thus, a part of the field is located in Texas and a part in New Mexico, making it advisable to adopt rules and regulations providing for orderly development, and an allocation formula which will permit approximately equal withdrawals for the protection of correlative rights.

Geology

The Bronco (Wolfcamp) Field is an anticlinal structure located within the general Permian Basin Province. The Wolfcamp formation is the lower series of the Permian System, being one of the important oil producing formations within the Basin. It is difficult to differentiate the Wolfcamp from the underlying Pennsylvanian formation; therefore, it sometimes is questionable from which formation oil is being produced. We interpret the production from the Bronco (Wolfcamp) Field as coming from the Pennsylvanian formation. The discovery well was classified as a producer in the Wolfcamp so in order not to confuse the records, all completions have been reported in this formation.

History of Development

The Bronco (Wolfcamp) Field overlies the Bronco (Siluro-Devonian) Field. First evidence of oil production in the Wolfcamp was found in the discovery well in the Bronco (Siluro-Devonian) Field; however, the first well completed in the Wolfcamp was the Honolulu Oil Corporation's Weems No. 1, the discovery date being January 3, 1954. This well has since been plugged and abandoned. The second well was The Texas Company's Barnes No. 1, which was plugged back from the Devonian September 20, 1954. Subsequently Amerada has completed four wells and has one drilling. Thus there remain five completed wells and one drilling well.

Exhibits

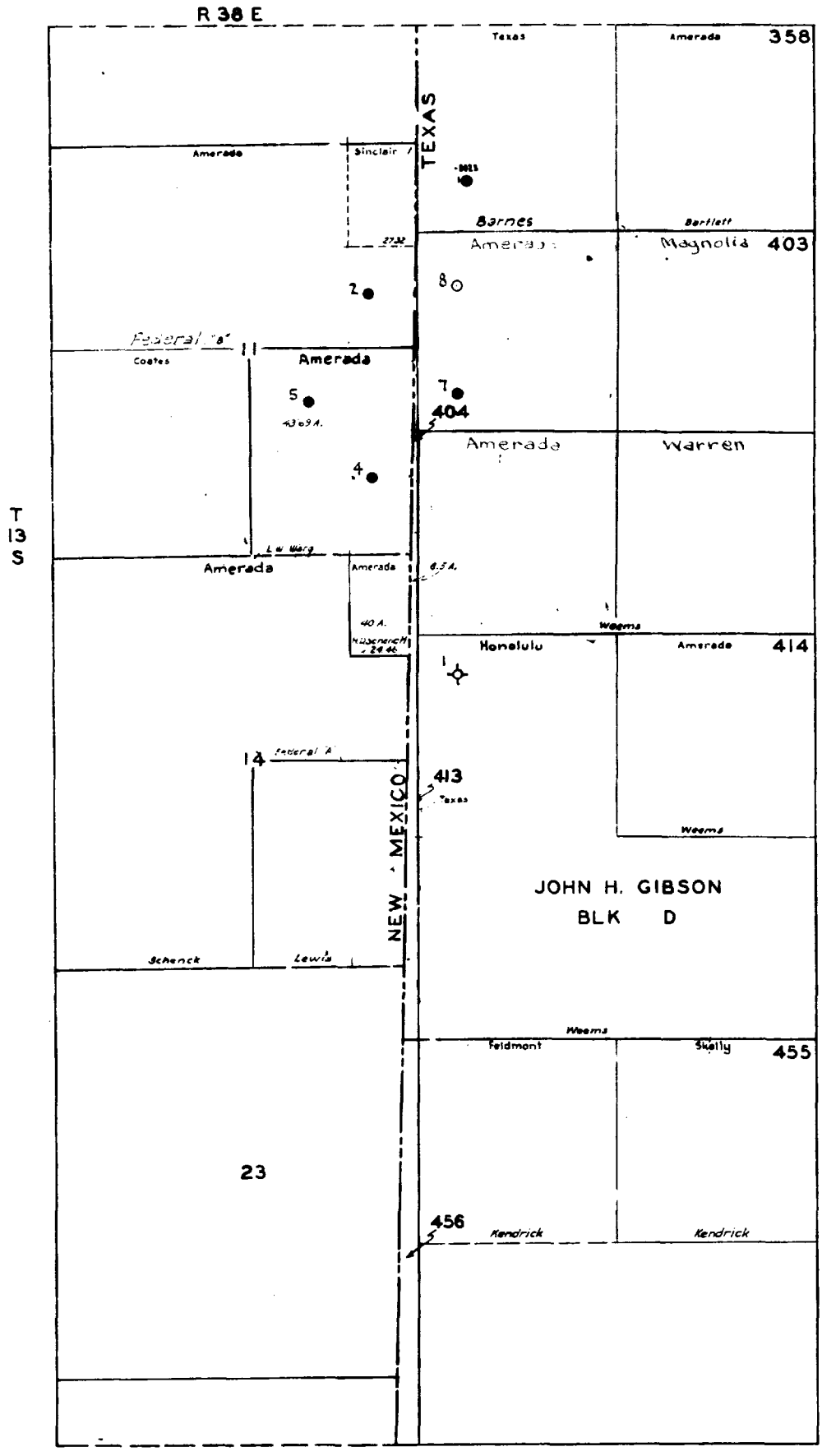
Exhibit 1	Area map of the field
Exhibit 2	Structure map contoured on the top of the Pennsylvanian
Exhibit 3	Well data sheet
Exhibit 4	Production data sheet
Exhibit 5	Bottom hole pressure data
Exhibit 6	Flow test on Amerada Ward No. 4
Exhibit 7	Flow test on Amerada Weems No. 7
Exhibit 8	Core summary on Amerada Weems No. 5
Exhibit 9	MER data
Exhibit 10	Proposed field rules

General Reservoir Mechanics

The Bronco (Wolfcamp) reservoir appears at this time to be of a solution type. It is our opinion based on the permeability, the fluid characteristics and with an efficient allowable that one well will adequately and efficiently drain in excess of 40 acres.

Recommendation for Allowable

At the present time the wells within the Texas boundary are assigned a discovery allowable of 200 barrels daily, whereas within the New Mexico boundary, the allowable is 155 barrels for each 40-acre unit. The discovery allowable on the wells in Texas will run out in June, at which time the allowable would be reduced, in accordance with the 1947 yardstick, to 182 barrels for a 40-acre unit and on a calendar day basis would approximate 105 barrels. Therefore, the difference in the allowable for the two states would be 50 barrels. As a compromise, we recommend an allowable of 125 barrels per calendar day for all wells in the field capable of making same. This is not considered an MER which can be more properly determined following a period of production under the lower rate.



BRONCO WOLFCAMP FIELD

LEA CO., NEW MEXICO
YOAKUM CO., TEXAS

EXHIBIT 1

SCALE: 1 INCH = FEET
ONE MILE

PERTINENT WELL DATA
BRONCO WOLFCAMP FIELD

Operator & Lease	Location	Elevation	Spudded	Completed	Casing Program	Top Wolfcamp Top Penna.	Total Depth	Perforations	Acid Treatment (Gals.)	Potential Test
Amerada										
Weems No. 7	2050.7' FNL; 589.3' FWL Sec. 403, Bl. "D" J. H. Gibson Survey Yoakum County, Texas	3807'	9-2-54	10-24-54	13-3/8 - 314' 8-5/8 - 4531' 5-1/2 - 11043'	8964' 9424'	11,043' 9700' PBD	9466-9610'	4,500	219 B/6 Hrs. 3/8" Choke GOR 1197 Gr. 44.3°
Ward No. 4	400' FNL; 990' FSL Sec. 11-13S-38E Lea County, N.M.	3809'	10-29-54	12-8-54	13-3/8 - 318' 9-5/8 - 4517' 7 - 9645'	8423' 9375'	9645' 9631' DOD	9607-9628'	500	224 B/10 Hrs. 20/64" Choke GOR 582 Gr. 43.8°
Ward No. 5	1982.75' FSL; 1414.7' FEL Sec. 11-13S-38E Lea County, New Mexico	3810'	12-12-54	1-24-55	13-3/8 - 318' 8-5/8 - 4531' 5-1/2 - 9660'	8960' 9415'	9660' 9656' DOD	9508-9545' 9554-9574' 9580-9586' 9641-9655'	10,500	235 B/22 Hrs. 24/64" Choke GOR 868 Gr. 44.5°
Federal "B" #2	1983' FNL; 548.46' FEL Sec. 11-13S-38E Lea County, New Mexico	3810'	2-2-55	3-17-55	13-3/8 - 318' 9-5/8 - 4536' 7 - 9652'	8985' 9439'	9660' 9647' PBD	9446-9472' 9488-9518' 9530-9592'	1,500	103 B/12 Hrs. 24/64" Choke GOR 765 Gr. 40.5°
Honolulu										
*Weems No. 1	660' FNL; 660' FWL Sec. 414 Bl. "D" J. H. Gibson Survey Yoakum County, Texas	3811'	6-29-53 (Recompletion) 8-4-54	2-15-54 9-17-54	13-3/8 - 371' 9-5/8 - 4586' 7 - 11700'	8885' 9339'	12,103' 9642' PBD	9438-9510' 9525-9596' 9610-9621'	12,500	85 B/10 Hrs. Swb.
Texas Company										
**Barnes No. 1	670' FSL; 664' FWL Sec. 358 Bl. "D" J. H. Gibson Survey Yoakum County, Texas	3815'	10-24-53 (Recompletion) 9-10-54	3-6-54 9-23-54	13-3/8 - 341' 8-5/8 - 4550' 5-1/2 - 11901'	9050' 9495'	11,901' 9616' PBD	9576-9616'	1,000	231 B/24 Hrs. 3/8" Choke GOR 493 Gr. 43.6°

* P&A October 1954
** PB From Devonian

Exhibit 3

OIL PRODUCTION DATA

BRONCO WOLFCAMP FIELD

	AMERADA				HONOLULU	TEXAS CO.			
Month	Ward	Weems	Total	Cumulative	Weems #1	Barnes #1	Field Total	Field Cumulative	No. Wells
1954									
January					1,457		1,457	1,457	1
February					478		478	1,935	1
March					1,062		1,062	2,997	1
April					289		289	3,286	1
May					0		0	3,286	1
June					152		152	3,438	1
July					0		0	3,438	1
August					0		0	3,438	1
September					268	2,045	2,313	5,751	2
October		1,830	1,830		P & A	2,742	4,572	10,323	2
November		6,007	6,007	7,837		3,060	9,067	19,390	2
December	2,282	6,212	8,494	16,331		3,011	11,505	30,895	3
1955									
January	6,549	6,200	12,749	29,080		2,235	14,984	45,879	4
February	8,650	5,601	14,251	43,331		1,491	15,742	61,621	4
Total	17,481	25,850	43,331		3,706	14,584	61,621		

Exhibit 4

BOTTOM HOLE PRESSURE DATA
BRONCO WOLFCAMP FIELD

Amerada Ward No. 4	12-12-54	3640 psi @ -5800'
Amerada Ward No. 4	3-4-55	2950 psi @ -5800'
Amerada Ward No. 5	3-4-55	2747 psi @ -5800'
Amerada Weems No. 7	1-10-55	3363 psi @ -5800'
Amerada Weems No. 7	3-4-55	3244 psi @ -5800'
Texas Co. Barnes No. 1	11-2-54	2398 psi @ -5775'

Exhibit 5

AMERADA P 204

AMERADA BOTTOM-HOLE PRESSURE-[redacted] REPORT

F & S CODE

R.P.G. 3 NO. 4703 CLOCK NO 1931 SPEED 24 HR LEASE L.W. WARD WELL NO. 4

ELEMENT NO 10,655N RANGE 0-6000 CORR TO - F LOCATION Bronco Wolfcamp Field, Lea Co., New Mexico

RUN BY JRE-DEB LEK CALCULATED BY JRE-DEB LEK REPORTED BY JRE-DEB LEK DATE RUN 12-11-54 ME 2:54PM PULLED 12-13-54 ME 12:52 PM

WELL DATA

12-8-54 -10hr. PBD 9631'

POTENTIAL CHOKE 20/64 OIL 223.94 WATER 0 G.O.R. 582 ZONE Penn. TOP 9607 BOTTOM T.D. 9645'

HOW PRODUCED Natural flow thru tbg. P.I. CASING 7" DEPTH 9645 TUBING 2-3/8" DEPTH 9628

HOURS SHUT IN 71.75 WELL HEAD PRESS. CAS Pkr TUB 1010 TOP LINER PERFORATIONS 9607 - 9628

LAST RESERVOIR PRESSURE Initial DEPTH -5800 DATE ELEVATION 3809DF GRAVITY OF OIL 43.8 SP. GR. OF GAS

Flow Line @ 735' of 2" Trap Pressure 42# Packer set @ 8627

Est. Shrinkage: .54 TEST RECORD Gas measurement by orifice well tester.

PURPOSE OF TEST To determine flowing and pressure build up characteristics.

TIME	DEPTH	[redacted] PRESSURE	Press. Decline	Prod. Tbg.	Prod. Net	Prod. Net Avg.	P.I.	Tbg. Press.	[redacted] GOR	Remarks
2:54PM	0									Mark Chart
3:24PM	9609	3640								Arr.@ Run Depth
3:45PM	9609	3640						1010		Open well on 20/64" Pos. Chk. Oil to surface in 2 mins. 35 sec.
4:45PM		3200	440	+0.15	24.65	23.18	.0527	545	855	
5:45		3133	507	-0.37	21.71	20.90	.0412	540	902	
6:45		3065	575	-0.26	20.10	19.98	.0347	515	940	
7:45		3020	620	-0.15	19.86	19.54	.0315	495	920	
8:45		2988	652	-0.10	19.22	18.75	.0288	480	936	
9:45		2955	685		18.29	18.12	.0265	465	959	
10:45		2920	720		17.94	17.59	.0244	450	948	P.I. Slope - 21@
11:45		2898	742		17.59	17.42	.0235	440	950	
12:45		2870	770		17.25	17.25	.0224	430	944	
1:45		2845	795		17.25	17.25	.0217	420	928	
2:45		2827	813		17.25	17.09	.0210	410	911	P.I. Slope - 32@
3:45		2803	837		16.92	16.74	.0200	400	911	
4:45		2785	855		16.56	16.21	.0190	395	921	
5:45		2773	867		15.87	15.70	.0181	385	943	
6:45		2750	890		15.53	15.36	.0173	380	952	
7:45		2738	902		15.18	15.01	.0166	375	966	
8:45		2723	917		14.84	14.66	.0160	375	977	P.I. Slope - 21@
9:45		2703	937		14.49	14.49	.0155	375	989	
10:45		2687	953		14.49	14.66	.0154	375	989	
		[redacted]								
11:45		2672	968		14.84	14.84	.0153	375	966	
12:45		2657	983		14.84	14.54	.0148	375	966	
1:45	9609	2642	998		14.15	14.54	.0146	375	1025	Pull & re-run gauge. Bottom Hole Temp.- 138@
2:45		2627	1013		14.84	14.54	.0144	375	1008	
3:45		2612	1028		14.15	14.15	.0138	375	1038	Close in well for pressure build up.
4:00		2795								
4:15		2837								
4:30		2858								
4:45		2872								

NX

Exhibit 6

MAKE FURTHER EXPLANATIONS ON BACK OF SHEET

EXPLANATIONS OR CHART

[redacted]

NX

MAKE FURTHER EXPLANATIONS ON BACK OF SHEET

AMERADA P 204

AMERADA BOTTOM-HOLE PRESSURE-TEMPERATURE REPORT

F & S CODE

R.P.G. NO. CLOCK NO. SPEED HR. LEASE L.W.WARD WELL NO. 4

ELEMENT NO. RANGE CORR. TO F LOCATION

RUN BY CALCULATED BY REPORTED BY DATE RUN TIME PULLED TIME

WELL DATA

POTENTIAL: CHOKE OIL WATER G.O.R. ZONE TOP BOTTOM T.D.

HOW PRODUCED P.I. CASING DEPTH TUBING DEPTH

HOURS SHUT IN WELL HEAD PRESS. CAS. TUB TOP LINER PERFORATIONS

LAST RESERVOIR PRESSURE DEPTH DATE ELEVATION GRAVITY OF OIL SP. GR. OF GAS

TEST RECORD

PURPOSE OF TEST

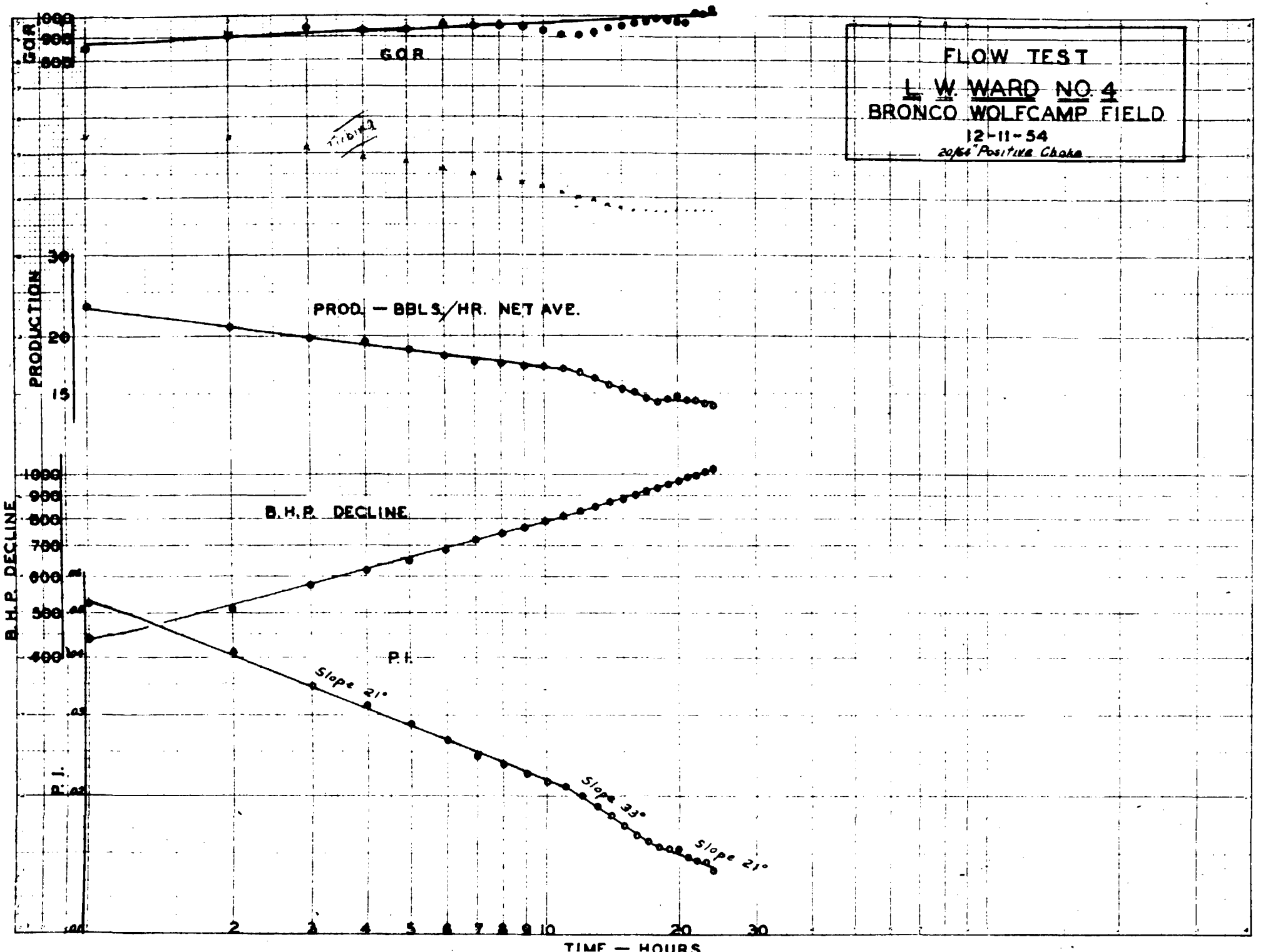
TIME	DEPTH	TEMP. PRESSURE				REMARKS
5:45	9609	2934				
6:45		2982				
7:45		3030				
8:45		3072				
9:45		3104				
0:45		3139				
1:45		3172				
2:45		3202				
1:45		3222				
2:45		3250				
3:45		3275				
4:45		3290				
5:45		3311				
6:45		3323				
7:45		3340				
8:45		3360				
9:45		3370				
0:45		3380				
1:45		3395				
2:45		3405				Pulled gauge test concluded.

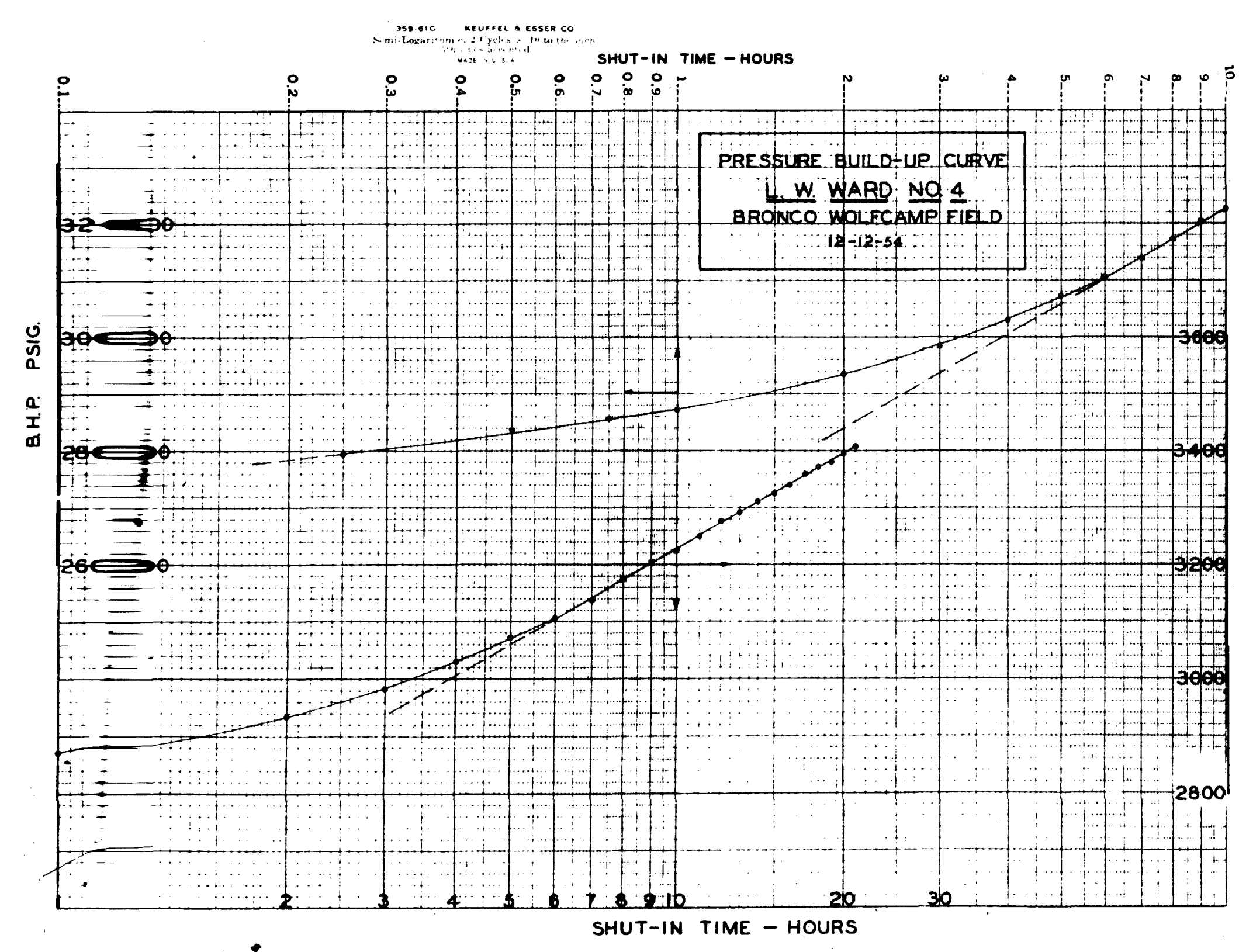
EXPLANATIONS OR CHART

NY

MAKE FURTHER EXPLANATIONS ON BACK OF SHEET

NO. 3123. LOGARITHMIC: 2¾ BY 2 3¼-INCH CYCLES.
CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS.
PRINTED IN U. S. A.




359-61G KEUFFEL & ESSER CO
SHUT-IN TIME – HOURS
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
3
4
5
6
7
8
9
10
PRESSURE BUILD-UP CURVE
L. W. WARD NO. 4
BRONCO WOLFCAMP FIELD
12-12-54
B.H.P. PSIG.
32
30
28
26
3600
3400
3200
3000
2800
2
3
4
5
6
7
8
9
10
20
30
SHUT-IN TIME – HOURS

AMERADA P-204

AMERADA BOTTOM-HOLE PRESSURE ~~[illegible]~~ REPORT

F CODE

R.P.G. 3 NO. 4703 CLOCK NO. 1931 SPEED 24 HR. LEASE L.R. WEEMS WELL NO. 7

ELEMENT NO 4783-N RANGE 0-4065 CORR. TO — °F. LOCATION Bronco Wolfcamp Field, Lea Co., New Mexico

RUN BY JRE/DEB QLEK CALCULATED BY jre-DEB LEK REPORTED BY jre/LEK DEB DATE RUN 1-10-55 TIME 10:25AM PULLED 1-11-55 TIME 6:15 PM

10-24-54-6 hr.

WELL DATA

POTENTIAL: CHOKE 3/8 OIL 219.28 acid WATER 42.64 G.O.R. 1197

ZONE Penn. TOP 9424 BOTTOM 10,904 T.D. 11,043 PBD 9700

HOW PRODUCED Natural flow thru tbg. P.I.

CASING 5-1/2 DEPTH 11,043 TUBING 2-3/8" DEPTH 9615

HOURS SHUT IN 49.5 WELL HEAD PRESS. CAS. Pkr. TUB 730

TOP LINER PERFORATIONS 9466-9496, 9508-9520, 9526-9550, 9560-9575, 9588-9610.

LAST RESERVOIR PRESSURE Initial DEPTH — DATE —

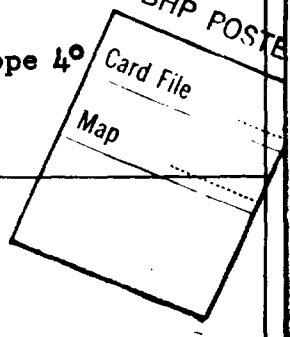
ELEVATION 3807DF GRAVITY OF OIL 44.3 SP. GR. OF GAS

Flow Line: 506' of 2". Trap Pressure: High: 590 Packer set @ 9316

Estimated Shrinkage: 0.54 Low: 47 TEST RECORD Gas measurement by orifice meter and orifice well tester.

PURPOSE OF TEST To determine flowing characteristics.

TIME	DEPTH	~~[illegible]~~ PRESSURE	Press. Decline	Prod. Tbg.	Prod. Net	Prod. Net Avg.	P.I.	Tbg. Press.	~~[illegible]~~ GOR	Remarks
10:25A	0									Mark Chart
10:56	8597	3000								
11:11	9597									Arr. @ Run Depth
11:30	9597 (-5790)	3360								
	9607 (-5800)	~~3363~~								~~Calculated Static BHP @ -5800~~
11:30	9597	3360						730		Open well on 24/64" Pos. choke. Oil to surface in 1 min. 40 secs.
12:30P		3297	63	-0.26	32.86	2893	0.459	610	721	
~~1:30~~		~~3292~~	~~68~~	~~-0.18~~	~~25.00~~	~~25.79~~	~~0.379~~	~~635~~	~~734~~	
2:30		3289	71	-0.02	26.58	27.59	0.389	635	782	
3:30		3286	74	-0.02	28.61	28.82	0.389	635	758	P.I. Slope 4°
4:30		3278	82	-0.05	29.03	28.83	0.352	635	824	
5:30		3272	88		28.63	29.84	0.339	630	835	
6:30		3265	95		31.05	30.36	0.320	625	820	
7:30		3262	98		29.67	29.33	0.299	620	829	
8:30		3257	103		28.98	28.98	0.281	620	852	
9:30		3253	107		28.98	28.80	0.269	620	795	
0:30		3249	111		28.63	28.29	0.255	620	793	
1:30		3245	115		27.95	27.95	0.243	615	802	
2:30A		3242	118		27.95	27.95	0.237	615	812	2% Water in tank 0 BS
~~1:30~~		~~3238~~	~~122~~		~~27.95~~	~~27.95~~	~~0.229~~	~~615~~	~~823~~	~~[illegible]~~
2:30		3235	125		27.95	27.95	0.224	610	823	
3:30		3232	128		27.95	28.12	0.220	610	838	P.I. Slope 26°
4:30		3228	132		28.29	28.29	0.214	610	843	
5:30		3225	135		28.29	27.60	0.204	610	857	
6:30		3222	138		26.91	27.08	0.196	610	878	
7:30					27.26	27.26		610	867	
8:30					27.26	26.74		620	889	
9:30					26.22	26.22		610	876	Pull & re-run gauge. Clock had run out.
0:30		3212	148		26.22	25.88	0.175	610	870	
1:30		3210	150		25.53	25.53	0.170	610	894	Shake out 3% Water OBS
2:30 P		3207	153		25.53	25.70	0.168	605	894	



MAKE FURTHER EXPLANATIONS ON BACK OF SHEET

Exhibit 7

AMERADA P-204

F CODE

AMERADA BOTTOM-HOLE PRESSURE-TEMPERATURE REPORT

R.P.G. NO. CLOCK NO. SPEED HR. LEASE L.R. WEEMS WELL NO. 7

ELEMENT NO. RANGE CORR. TO °F. LOCATION

RUN BY CALCULATED BY REPORTED BY DATE RUN TIME PULLED TIME

WELL DATA

POTENTIAL: CHOKE OIL WATER G.O.R. ZONE TOP BOTTOM T.D.

HOW PRODUCED P.I. CASING DEPTH TUBING DEPTH

HOURS SHUT IN WELL HEAD PRESS.: CAS. TUB TOP LINER PERFORATIONS

LAST RESERVOIR PRESSURE DEPTH DATE ELEVATION GRAVITY OF OIL SP. GR. OF GAS

TEST RECORD

PURPOSE OF TEST

TIME	DEPTH	PRESSURE	Pres. Decline	Prod. Tbg.	Prod. Net	Prod. Net Avg.	P.I.	Tbg. Press.	REMARKS GOR	Remarks
1:30	9597	3205	155		25.88	25.70	0.166	610	871	
2:30		3202	158		25.53	25.36	0.161	620	873	
3:30		3200	160		25.19	25.36	0.159	620	880	
4:30		3198	162		25.53	25.36	0.167	620	868	Shake out 4% water 0 BS
5:30		3196	164		25.19	25.19	0.154	620	880	Pulled gauge. Test Concluded.

EXPLANATIONS OR CHART

Production prior to test - 15,878 Bbls. Oil
Production during test - 826.60 Bbls. Fluid

Acidized well 9466 to 9496 with 500 gal.
9508 to 9520 and 9526 to 9550 with 500 gal.
9560 to 9575 and 9588 to 9610 with 500 gal.
9466 to 9610 with 3000 gal.

Productivity calculated on total fluid basis.

BHP POSTED

Card File .....

Map .....

MAKE FURTHER EXPLANATIONS ON BACK OF SHEET

NO. 3123. LOGARITHMIC: 2¾ BY 2 3¼-INCH CYCLES.
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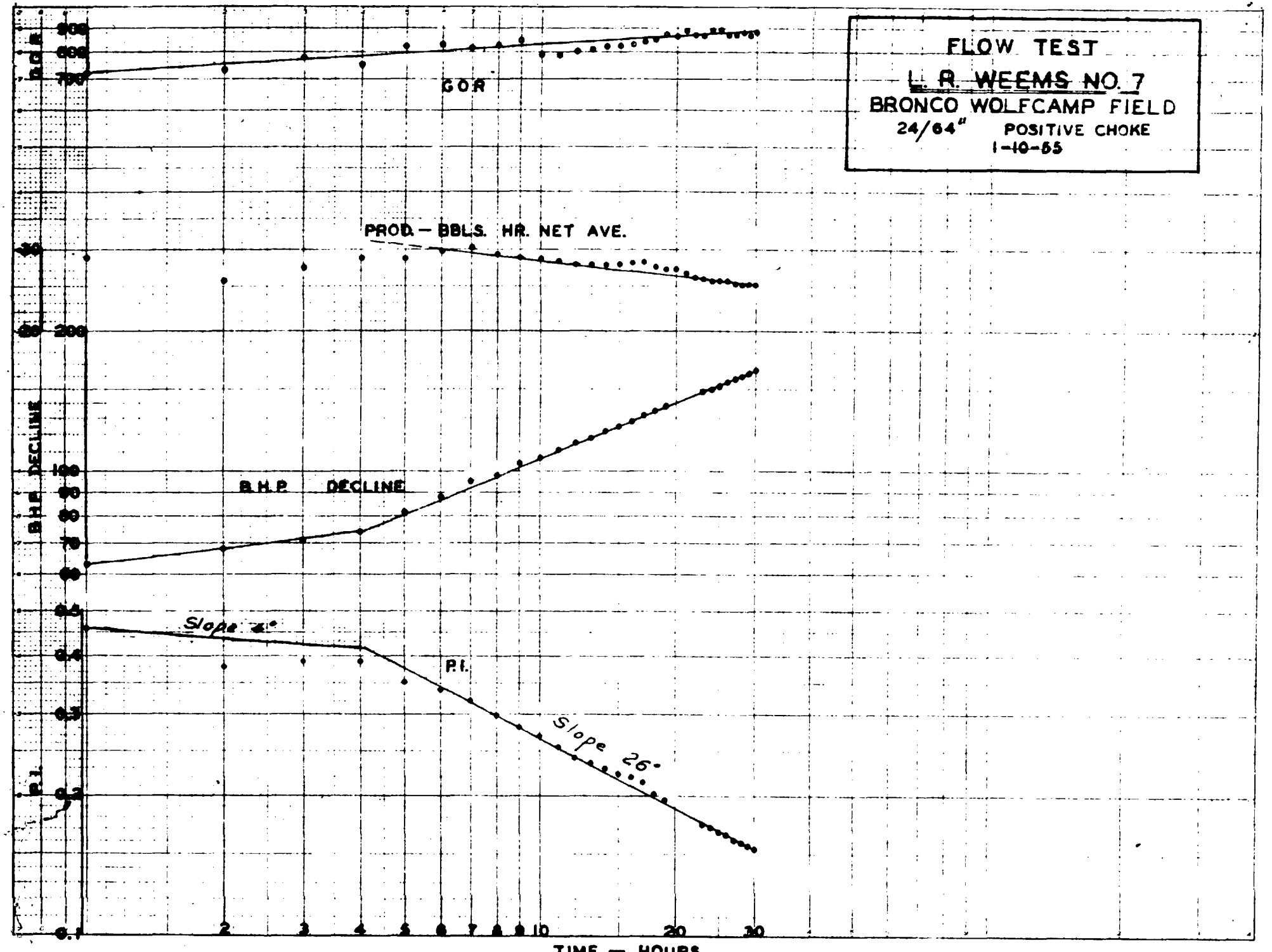

CORE SUMMARY
AMERADA WEEMS NO. 5
BRONCO WOLFCAMP FIELD

Formation Name		Wolfcamp
Depth, Feet		9527.5-9682.0
% Core Recovery		95
Feet of Permeable, Productive Formation Recovered		51.3
Average Permeability, Millidarcys	Max.:	45
	90°:	25
Capacity - Average Permeability x Feet Productive Formation	Max.:	2309
	90°:	1283
Average Porosity, Percent		7.4
Average Residual Oil Saturation, % Pore Space		7.2
Gravity of Oil, °A.P.I.		40
Average Total Water Saturation, % Pore Space		39.6
Average Calculated Connate Water Saturation, % Pore Space		39.6

Exhibit 8

MER DATA

BRONCO (WOLFCAMP) FIELD

YOAKUM COUNTY, TEXAS
LEA COUNTY, NEW MEXICO

1. Discovery Date - 1-3-54 (Honolulu Weems No. 1)

2. Average Depth - 9650'

3. Physical Properties of the Reservoir Rock

   a) Average Porosity - 9%
   b) Average Permeability - 45 md
   c) Average Residual Oil Saturation - 7.2%
   d) Average total water saturation - 39.6%

4. Structural Features of Reservoir

   a) Type - Anticline
   b) Average net oil pay - 65'

5. Characteristics of the Reservoir Fluids

   a) Average gravity of oil - 43° API
   b) Salinity of water - Not known
   c) Saturation pressure - Not known
   d) Formation volume factor - 1.65 (Est.)
   e) Solution gas-oil ratio - 1200 (Est.)
   f) Viscosity - .5 (Est.)

6. Pressures and Temperatures

   a) Original reservoir pressure - 3640 psi @ 5800'
   b) Average reservoir pressure, March 1955 - 2980 psi
   c) Reservoir temperature - 138°
   d) Productivity index (see exhibits 6 and 7)

7. Statistical Data

   a) Number of producing wells - 5
   b) Number of wells producing water - None
   c) Number of wells on artificial lift - 1
   d) Average daily oil production, February 1955 - 562 barrels
   e) Average daily water production - None

Exhibit 9

7. Statistical Data (Cont'd)

f) Cumulative oil production through February 1955 - 61,621 barrels
g) Gas-oil ratio - 800 cubic feet (based on potential tests)
h) Number of abandoned wells - 1
i) Proven oil acreage developed - 280
j) Proven oil acreage undeveloped - 1,000
k) Average well density - 56 acres
l) State of depletion of reservoir - Flush

8. General

Average daily gas production is estimated to be 450 Mcf, of which approximately 50% is used for lease operations, the remainder flared.

PROPOSED FIELD RULES
BRONCO WOLFCAMP FIELD
YOAKUM COUNTY, TEXAS
LEA COUNTY, NEW MEXICO

RULE 1: The surface casing shall consist of new or reconditioned pipe with an original mill test of not less than one thousand (1,000) pounds per square inch, and shall be set and cemented below the top of the red beds; provided, however, that not less than three hundred (300) feet of surface string shall be set. Cement shall be by the pump and plug method, and sufficient cement shall be used to fill the annular space back of the pipe to the surface of the ground or the bottom of the cellar. Cement shall be allowed to stand a minimum of twelve (12) hours under pressure and a total of twenty-four (24) hours before drilling the plug. The casing shall be tested by pump pressure of at least five hundred (500) pounds per square inch applied at the well head. If at the end of thirty (30) minutes the pressure shows a drop of one hundred and fifty (150) pounds per square inch, or more, the casing shall be condemned. After the corrective operations, the casing shall again be tested in the same manner.

RULE 2: The acreage assigned the individual oil well for the purpose of allocating allowable oil production thereto shall be known as a proration unit. No proration unit shall contain more than forty (40) acres except as hereinafter provided, and the two points farthermost removed one from the other and contained within any proration unit shall not be in excess of twenty-one hundred (2100) feet apart; provided, however, that in the case of long and narrow leases or in cases where because of the shape of the lease such is necessary to permit the utilization of tolerance acreage the Commission may, after proper showing, grant exceptions to the limitation as to the shape of the

proration units as herein contained. All proration units, however, shall consist of acreage which can reasonably be considered to be productive of oil.

If after the drilling of the last well on any lease and the assignment of acreage to each well thereon, in accordance with the regulations of the Commission, there remains an additional unassigned lease acreage of less than forty (40) acres, then and in such event, the remaining unassigned lease acreage up to and including a total of twenty (20) acres may be assigned to the last well drilled on such lease or may be distributed between any group of wells located thereon so long as the proration unit or units resulting from the inclusion of such additional acreage meets the limitations prescribed by the Commission.

Operators shall file certified plats of their properties in the field, which plats shall show all of those things pertinent to the determination of the acreage claimed for each well hereunder.

RULE 3: The daily oil allowable for the field as fixed by the Commission after deductions have been made for marginal wells, high gas-oil ratio wells, and wells incapable of producing their allowable shall be distributed among the remaining producing wells in the field on the following basis:

The daily average allowable for each remaining well shall be that proportion of one hundred (100) per cent of such remaining daily field allowable that the acreage assigned to such well bears to the total acreage assigned to all of such remaining wells in the field.

RULE 4: The permitted gas-oil ratio for all wells shall be two thousand (2,000) cubic feet of gas per barrel of oil produced. Any oil well producing with a gas-oil ratio in excess of two thousand (2,000) cubic feet of gas per barrel of oil shall be allowed to produce daily only that volume of gas obtained by multiplying the daily oil allowable of such well as determined by the applicable rules of the Commission by two thousand (2,000) cubic feet. The gas volume thus obtained shall be known as the daily gas limit of such well. The daily oil allowable therefore shall then be determined and assigned by dividing the daily gas limit by its producing gas-oil ratio.

RULE 5: Gas-oil ratio tests shall be conducted annually on all wells during the months of April and May; the results thereof to be reported to the Commission on Form GO-2 on or before the fifteenth (15th) of June of each year.

RULE 6: The datum reservoir pressure of all flowing wells in the field shall be determined annually and the testing period shall be during the months of October and November; the results thereof to be reported to the Commission on or before the fifteenth (15th) of December of each year. All pressure determinations shall be reported at a datum of fifty eight hundred (5800) feet below sea level. Prior to testing, all wells shall be shut in for a period of not less than forth-eight (48) hours or more than seventy-two (72) hours. All offset operators shall be notified at least forty-eight (48) hours before such test is made on any well, and any operator in the field shall have the privilege of witnessing such pressure determinations. Said pressures shall be taken on all flowing wells with subsurface pressure gauge or other method of equal accuracy and may be taken on pumping wells with sonic devices or other method of equal accuracy.

AMERADA P-204

EXHIBIT "D"

AMERADA BOTTOM-HOLE PRESSURE-~~TEMPERATURE~~ REPORT

155 12

F CODE

R.P.G. 3 NO. 4703 CLOCK NO. 1931 SPEED 24 HR. LEASE H. D. Schenck WELL NO. 1

ELEMENT NO. 10655M RANGE 0-6000 CORR. TO — °F. LOCATION Bronco S/D Field, Lea County, N.M.

RUN BY JRE/CMH CALCULATED BY JRE REPORTED BY JRE DATE RUN 6-18-53 TIME 10:00am TALLED 6-19-53 TIME 4:00 pm

Pkr @ 11,527

WELL DATA Sweet 2-Stage tool @ 11,521 11,780

POTENTIAL: CHOKE 3/4 OIL 559.89 WATER 12.63 G.O.R. 205 ZONE Siluro-Devonian TOP 11,338 BOTTOM T.D. 12,548

HOW PRODUCED Natural flow through tbg. P.I. CASING 7" DEPTH 11,411 TUBING 2" DEPTH 11,726

HOURS SHUT IN 61 WELL HEAD PRESS.: CAS. 695 TUB 810 TOP LINER 11,335 PERFORATIONS 11,520 - 11,515 11,555 - 11,615 11,700-11,780

LAST RESERVOIR PRESSURE 4629 DEPTH 11,810 DATE 4-27-53 ELEVATION 3810DF GRAVITY OF OIL SP. GR. OF GAS

Flow Line - 375' of 3" -5300 Estimated Shrinkage - 12%

Trap Press- 28 psi TEST RECORD Gas measured by orifice well tester.

PURPOSE OF TEST TO DETERMINE FLOWING CHARACTERISTICS OF WELL

TIME	DEPTH	~~TEMP.~~ PRESSURE	Press Decline	Csg.Tbg. Prod.	Prod. Net	Prod.Net Avg.	Pressure P.I.	Tbg.	Csg.	GFR	Remarks
:30A	10,960	4501									
:00A	11,460	4670									
	11,810	4788									Run depth Calculated BHP @ -8000' datum.
:00A	11,460	4670	-	-	-	-	-	810	695	-	Open well on 3/8" positive choke. On fluid immediatel
:00		4186	484	-0.90	42.19	39.15	0.0809	300	225	137	0.7% BS&Mud o.2% Water
:00N		4147	523	-1.09	36.11	36.04	.0689	280	195	148	
:00P		4135	535	-0.08	35.96	35.96	.0672	265	180	145	0.7% BS&Mud 0.2% Water
:00		4123	547	-0.85	35.97	34.02	.0622	260	170	143	
:00		4114	556	-0.36	32.07	32.60	.0586	255	165	152	
:00		4108	562	-	33.12	32.60	.0580	250	160	153	0.6% BS&Mud 0 Water
:00		4102	568	0	32.06	31.90	.0562	250	155	158	
:00		4096	574		31.74	31.57	.0550	240	~~250~~ 150	~~158~~ 155	
:00		-	-		31.39	31.57	-	230	150	152	Pull & Rerun Gauge
:00		4084	586		31.74	31.23	.0533	230	145	148	0.6% BS&Mud 0.2% Water
:00		4084	586		30.71	30.88	.0527	220	145	151	
:00		4078	592		31.05	30.71	.0519	220	145	147	
:00		4072	598		30.36	30.19	.0505	220	140	150	0.7% BS&Mud 0.1% Water
:00M		4069	601		30.02	30.02	.0500	220	135	150	
:00A		4069	601		30.02	30.54	.0508	220	135	150	
:00		4069	601		31.05	30.71	.0511	220	135	145	
:00		4063	607		30.36	30.36	.0500	220	130	148	0.5% BS&Mud 0 Water
:00		4063	607		30.36	30.36	.0500	220	130	145	

EXPLANATIONS OR CHART

:00	4060	610	30.36	30.19	.0495	220	130	145		
:00	4057	613	30.02	29.67	.0484	220	130	147		
:00	4057	613	29.33	29.16	.0476	220	125	151	0.6% BS&Mud 0.2% Water	
:00	4057	613	28.98	29.02	.0473	220	125	152		
:00	4057	613	30.36	30.19	.0492	220	120	148		
:00	4057	613	30.02	29.67	.0484	220	120	152		
:00	4057	613	29.33	29.67	.0484	220	120	159	0.6% BS&Mud 0 Water	
:00M	4057	613	30.02	29.67	.0484	220	120	155		
:00P	4057	613	29.33	29.16	.0476	220	120	161		
:00	4057	613	28.98	29.40	.0480	220	120	162	0.6% BS&Mud 0 Water	
:00	4057	613	30.02	29.67	.0484	220	120	157		
:00	4057	613	29.33	29.33	.0478	220	120	159	0.6% BS&Mud 0.1% Water	

Productivity Index calculated on total fluid basis Pull Gauge - Test Concluded

Water percentages determined by shake outs

Acidized from: 11,700 - 780 w/1000 gal., 1000 gal., 2000 gal. DoloFrac, 2000 gal.

Total of 6000 gal.

11,535 - 615 w/1000 gal.

MORE EXPLANATIONS ON BACK OF SHEET

Total Production on test - 944.78 bbls. fluid in 30 hrs. Ave. 0.6% BS&Mud 0.1% Water

NO. 3123. LOGARITHMIC: 2½ BY 3 3/4-INCH CYCLES.
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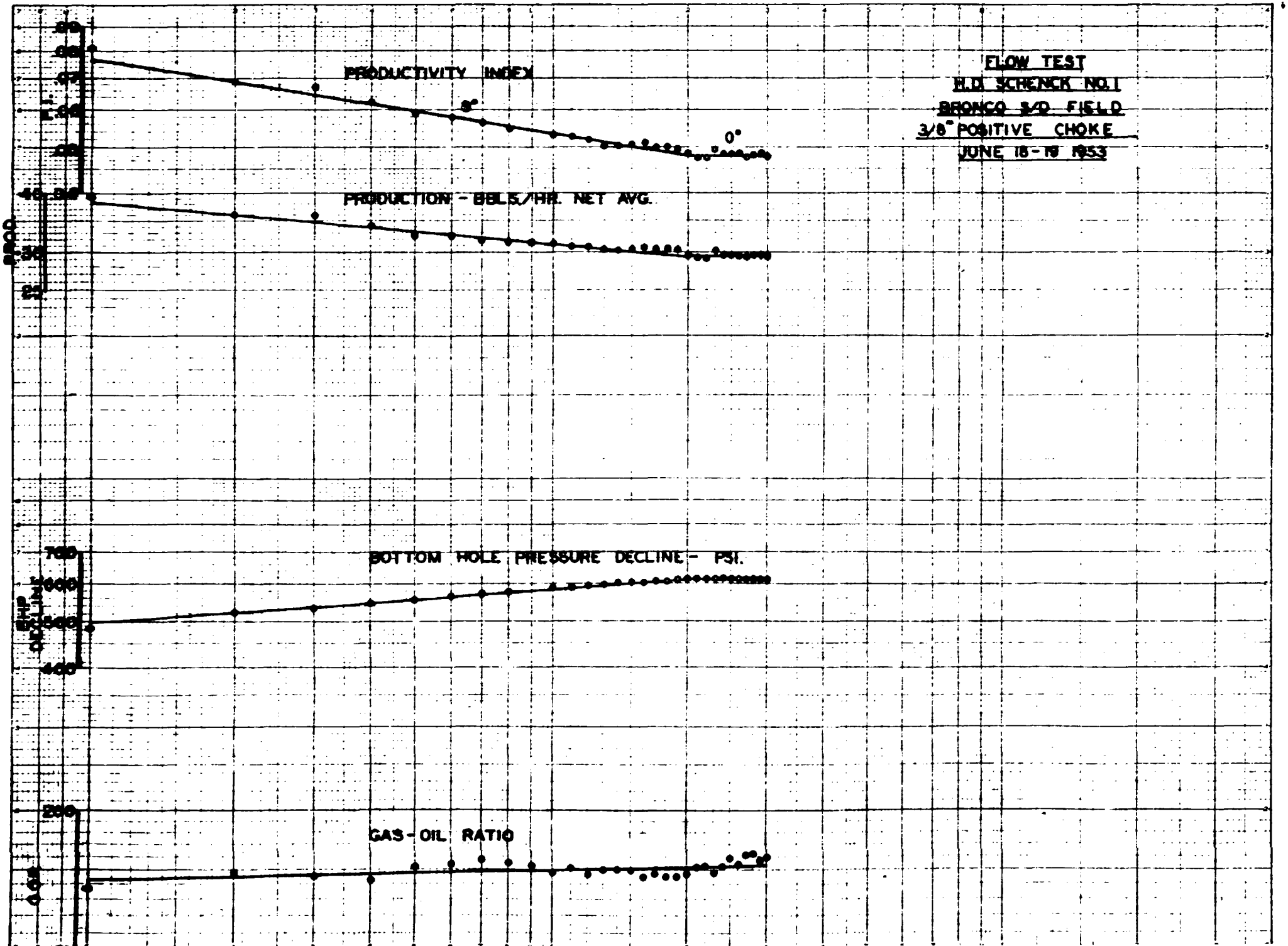

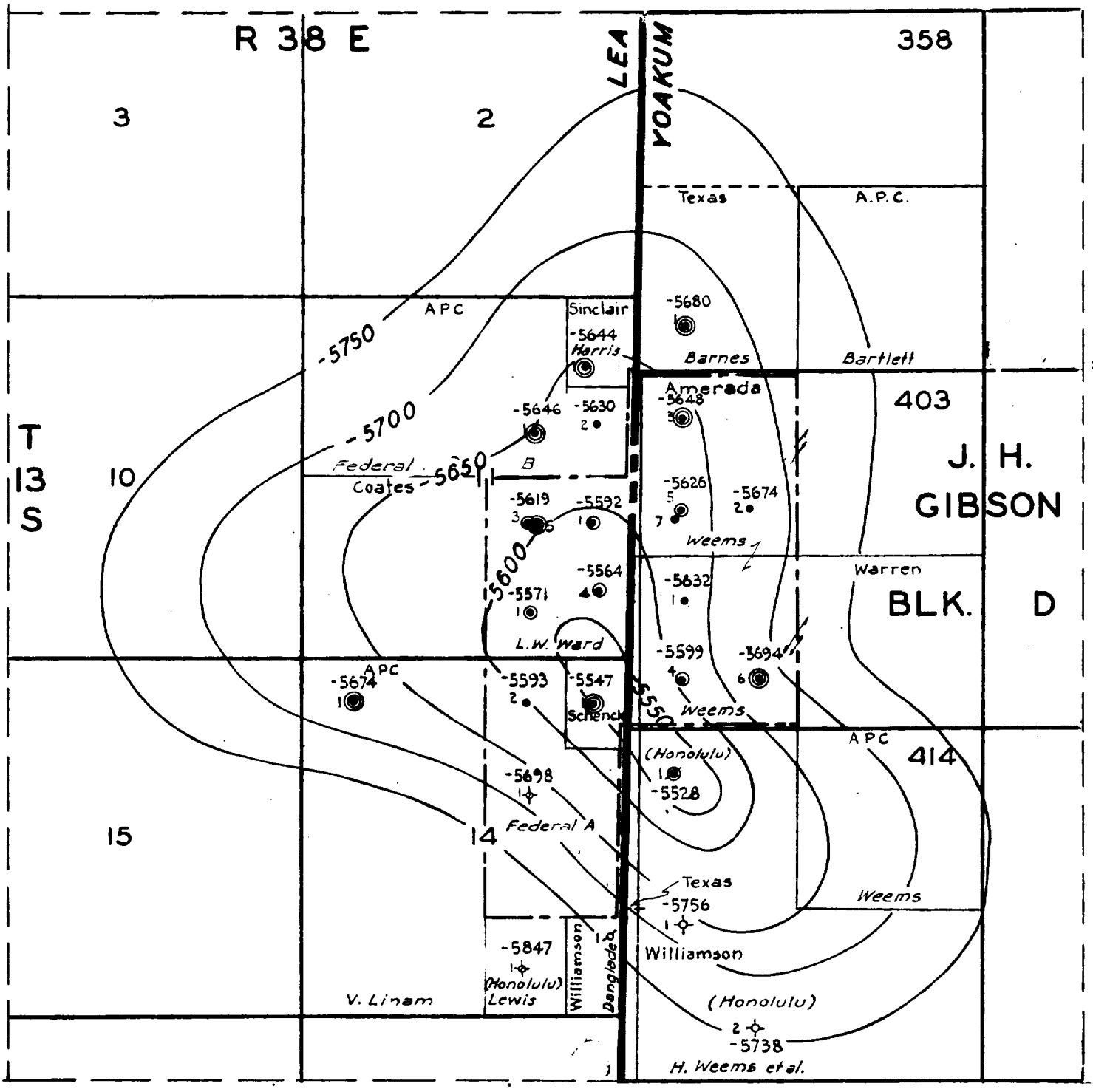

CONTOURS ON TOP OF PENNSYLVANIAN

Unit Outline

Wells flowing Wolfcamp oil on drill stem test

Wells recovering free Wolfcamp oil on drill stem test

BRONCO POOL

LEA CO., NEW MEXICO
YOAKUM CO., TEXAS

EXHIBIT 2

SCALE: 1 INCH = 2000 FEET