CASE 4873: Appli. of MOUNTAIN STATES PETROLEUM CORP. FOR GAS PRORATIONING, EDDY COUNTY, N.M.

Case Number

4873

Application

Transcripts.

Small Exhibits

ETC.

Mountain 11/29
States
Petr Corp
gas proration;
W2S4 Atoka-
Morrow Gas
Pool
Eddy Co
(R-416-created
this pool
called in by
Jim Jennings
Atel 11/8/72

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
Wednesday, November 29, 1972

EXAMINER HEARING

IN THE MATTER OF:

Application of Mountain States Petroleum Corporation for gas prorationing, Eddy County, New Mexico.

Case No. 4873

BEFORE: Richard L. Stamets,
Examiner

TRANSCRIPT OF HEARING

MR. STAMETS: The hearing will come to order. We will call Case 4873, application of Mountain States Petroleum Corporation for gas prorationing, Eddy County, New Mexico. I ask for appearances in this case, 4873.

MR. JENNINGS: James T. Jennings of Jennings, Christy and Copple appearing for the applicant, Mountain States Petroleum Corporation.

MR. MORRIS: Mr. Examiner, I'm Richard Morris of Montgomery, Federici, Andrews, Hannahs and Morris, Santa Fe, appearing on behalf of David Fasken. We may have one witness.

MR. STAMETS: Okay. Mr. Havenor has been sworn in the previous case. If there is no necessity to swear your witness, we won't.

Mr. Jennings, you may proceed.

K. C. HAVENOR,

a witness, having been previously duly sworn according to law, upon his oath, testified as follows:

DIRECT EXAMINATION

BY MR. JENNINGS:

Q Would you state your name and occupation, please, sir?

A My name is K. C. Havenor. I'm a Geologist with Mountain States Petroleum Corporation, Roswell, New Mexico.

MR. STAMETS: The Examiner understands the witness' qualifications. You may proceed.

Q (By Mr. Jennings) Mr. Havenor, are you familiar with the

application filed herein by Mountain States Petroleum Corporation?

A Yes, I am.

Q There is an application for gas prorationing in the West Atoka-Morrow Gas Pool.

A That is correct.

Q Referring to what has been marked as Exhibit 1, would you refer to that and just point out the wells in the pool and your well and the other producing wells in the pool and then generally explain the exhibit?

A This is an Isopach map of the sand of the Morrow formation. The map shows the location of the producing wells in the West Atoka-Morrow Field, being specifically the Pennzoil United Number 1 Vandiver in the northwest quarter of Section 13, the David Fasken Number 1 Pennzoil 13 Federal in the southeast quarter of Section 13, the David Fasken Number 1 Brown Yates in the southeast quarter of Section 24, all of these being in Township 18 South, Range 25 East, and the applicant's well, the Mountain States Petroleum Number 1 McCaw, located in the northwest quarter of Section 19, 18 South, 26 East.

Q In connection with this same exhibit, I will refer you to what has been marked as Exhibits 3 and 4.

A Yes, sir.

Q Would you get some for Mr. Morris. I didn't know he was

going to be here.

A Yes, I have a copy.

MR. STAMETS: They could look at this other set I have here.

THE WITNESS: That's all right. We have one here, Mr. Examiner. That's 4 and 3.

A Exhibit 3 is a cross section, an electric log cross section labeled "B" and the line of this cross section is shown on our Exhibit 1 being from the David Fasken Brown Yates Well through the Mountain States McCaw Well to the Fundamental Number 1 Thorp-Sear Well, a dry hole drilled in the southeast quarter of Section 18.

Exhibit 4 is a cross section based on an electric log correlation drawn from the David Fasken Number 1 Pennzoil 13 through the Mountain States McCaw Well to the Read and Stevens Number 1 Irene Brainard Well located in the northwest quarter of Section 29, 18 South, 26 East, the latter well being productive from the "B" Sand and is a well in the Atoka Penn or the Atoka-Morrow Field.

Q Referring to the wells in the pool, Mr. Havenor, are there different types of wells or are the wells comparable?

A Well, there are four producing wells in the field; and it's equally divided between two good wells and two stinker wells.

Q Would you identify the two good wells?

A The good wells are the David Fasken Number 1 Brown Yates and the Mountain States Number 1 McCaw. The low productive wells are the Pennzoil Vandiver and the David Fasken Number 1 Pennzoil 13 Federal.

Q Now, basically what do your Exhibits 3 and 4 show?

A The Exhibits 3 and 4 having a common point in the Mountain States Number 1 McCaw demonstrate the relationship of the sands, the "A" Sands to the "B" Sands and their relative correlativity between the wells in question, primarily the Brown Yates Well, the McCaw Well, and the Pennzoil Well.

The two wells outside of the producing field limits are for reference to the absence of sand as in the case of the Fundamental Well and in the presence of commercially productive "B" Sand in the case of the Read and Stevens Brainard Well.

Q Mr. Havenor, have you calculated or prepared a calculation showing a production from the various wells in the pool during the year 1972?

A Yes, I have these.

Q Is this what has been marked as Exhibit Number 3?

A I believe it's Exhibit Number 2.

Q Exhibit 2. It's a tabulation?

A It's a tabulation taken from the Commission records as

published in the Oil and Gas Engineering Committee reports for the report period January through September, 1972. The production from these wells in this field, as was stated before, is basically divided in half. Two very poor locality wells devloped in thin sands and two good wells, namely the Fasken and Mountain States Well. These two wells have now or during the early part of 1972 reached an equal cumulative production.

So this is maybe 200,000 or 300,000 cubic feet of gas differential between the total cumulative on the wells, but the point being that these are the two wells that are taking the majority of gas out of the formation.

MR. STAMETS: This is the Mountain States Well and the Fasken Brown Yates?

THE WITNESS: Yes, that is correct.

Q (By Mr. Jennings) Just generally what does this exhibit show as to the production from the various wells during the last couple months or in proportion to each other?

A The main difference that is demonstrated is in the rather major difference in amount of pay between the Fasken Brown Yates Well and the Mountain States McCaw Well, being that the remaining two wells shown on Exhibit 2 are rather small in amount being 2,000,000 to 5,000,000 per month, as opposed to from 5,000,000 to as high as nearly 10,000,000 per day for the other two wells.

Q Mr. Havenor, have any pressure tests been made in this pool to your knowledge?

A Yes. The pressure tests specifically have been run on the Mountain States McCaw and on the David Fasken Brown Yates Well; and we find that these pressures are very comparable, only a few pounds differential between the two, the last test having been run, I believe, in July, 1972, on both wells and the pressure being less than a 10-pound differential between the two as reported to the Commission forms to the Hobbs office of the Oil Conservation Commission. See 125.

Q What does that indicate to you?

A This indicates a common reservoir as we have, it supports our geological interpretation of a common reservoir particularly between the Brown Yates and the McCaw Wells.

Q Mr. Havenor, from your experience in this field as one of the operators, do you feel that gas proration is necessary to prevent waste?

A Yes, and that is the purpose of our application.

Q Why do you feel this?

A There are basically two reasons why we feel that production continued along the present pattern would contribute to waste of natural gas. One, the two wells which are located in the northeast quarter of Section 25, the original well, the well on the south being the David

Fasken Number 1 Yates-Hornbaker, which was subsequently whipstocked towards the east by Yates Petroleum Corporation, encountered water in the correlative sands in this formation.

The well in the northeast, northeast of Section 25 is currently being drilled. It was drilled to a total depth, and it's our understanding now that the well is being whipstocked. We don't know what direction or for what reason it's being whipstocked, because the well is being drilled as a tight hole; and we have no access to information.

Therefore, we cannot determine at this point whether or not water is also presently in this location; but because of the very high pull on the formation or the very high daily take from the David Fasken Brown Yates Well, we propose the very real possibility of causing increased encroachment of water from the south in this sand.

This is further complicated by necessity of Mountain States in trying to protect its correlative right by increasing the take from their well. We feel that this further endangers the encroachment of gas or water, excuse me, from the south.

We also feel that the second reason for requesting prorationing in the field is related to the high takes

from the well. We have experienced a rather sharp draw-down in pressures on our well from the time that we accelerated our take trying to maintain approximately equal production with the Yates Well; and as a result of this, part of which we recognize is mechanical in nature because of the constrictions of flow at the higher rates, we recognize that that can be part of it; but because of this rather sharp drop in pressure, tubing pressure, we cut the productivity of our well back because we were afraid of damaging the reservoir and causing either a loss of hole or a certain damage to the formation.

Q Do you know if the two good wells are producing at capacity or close to capacity?

A The Mountain States Well is not producing at this time at capacity, because we refused the take for fear of causing damage to the reservoir and the well. I do not really know what the total capacity, the deliverability of the Brown Yates Well is. I would expect that it is in excess of 10,000,000 cubic feet per day because of the several times that it has reached nearly that much on a 9,000,000 on a monthly average.

Q Take the last two months, what did it produce?

A Close to or slightly over 9,000,000 per day.

Q Do you feel that the failure to prorate this gas pool will

impair correlative rights?

A Yes,we do.

Q Do you further feel that proration would be in the interest of conservation?

A Yes, we do.

Q What do you in effect or what do you anticipate will be the results if the C and K Well, which was proposed to be drilled in the southwest quarter of Section 18, 660 from the south and west lines,is drilled and completed and the pool is not prorated?

A We, of course, in a previous case stated our opposition to this location; and we feel that if it were granted and if the well were drilled and if it made a commercial well, that most of the gas derived to supply the production from that well would be derived from the 640 acres south and southwest of the location, being specifically the acreage committed to the Mountain States McCaw and the David Fasken Yates Wells.

Q Do you have any opinions or suggestions as to the amount in which this gas could be prorated?

A This, of course, is a difficult question; but it would appear to us that on the basis of productive capacities and surface acreage that the Mountain States and the David Fasken Wells, specifically the Number 1 McCaw and the Fasken Brown Yates, has the majority of the producing

acreage or sand located under their respective acreage. The wells to the north and slightly northwest in Section 13 are poorly, are poor producers. They are marginally commercial, and in my own opinion the northern-most well, the Pennzoil United Number 1 Vandiver, is in fact a non-commercial well at its daily rate of 90,000 cubic feet per day.

We would suggest that there may be a reasonable basis here being that primarily two 320 acre or approximately 320-acre tracts are involved, that the average production perhaps from the two better wells for the last six months be compared, and that an average value between the takes of the two be established as some type of guideline for future production which will come from the field and primarily from these two wells.

Q Do you have anything further that you wish to offer in this case?

A No, sir.

Q Mr. Havenor, were Exhibits 1 through 4 prepared by you or under your supervision?

A 1 through 4 were prepared by me, Number 2 specifically being a compilation of the data from the records of the OCC.

MR. JENNINGS: We would offer these exhibits.

MR. STAMETS: Without objection, Exhibits 1 through

4 will be admitted into evidence.

Questions of the witness?

MR. MORRIS: Yes, sir.

CROSS-EXAMINATION

BY MR. MORRIS:

Q Mr. Havenor, when was the Mountain States McCaw Well completed?

A Mountain States McCaw Well was completed October 15, 1970.

Q Were drill stem tests run during the course of its drilling and completion?

A Yes, they were.

Q Have you taken additional bottomhole pressures on that well since it's completion?

A Yes, we have.

Q Are all of those reported to the Oil Conservation Commission?

A Yes, they have been.

Q Do you know when the David Fasken Well was completed?

A David Fasken Brown Yates Well was completed approximately February 15, 1971.

Q Do you know how much gas was produced by the Mountain States Well during the interval from the time it was completed until the David Fasken Brown Yates Well was completed?

A Yes, sir. There was just less than 100,000 cubic feet of gas, and that was for rig fuel for the rig that drilled Mr. Fasken's well. That was the only gas that was produced between the time that our well was completed and the completion date of the Brown Yates.

Q So both wells came on about the same time?

A Yes, approximately at the same time, that is correct, Mountain States Well went into the line. The line was laid to the Mountain States Well, from memory, approximately two months before it was to the Brown Yates.

Q Do you have the information concerning the initial drill stem tests taken in the producing formations in your well?

A I have some summary information available, yes, sir.

Q Could you summarize the initial pressures and flow rates on your well taken on drill stem tests?

A On drill stem tests. The initial shut-in pressure was 3,600 pounds for a 60-minute period. Flow pressures 1,378 to 1,886 pounds. A 90-minute final shut-in pressure was 3,600 pounds.

Q You have a flowing rate on the well as indicated on drill stem tests?

A Estimated only. 4,250,000 cubic feet per day.

Q Initially did the Mountain States Well flow at something

in the neighborhood of 10,000 Mcf per day?

A No, sir.

Q Never did?

A No, sir. 10,000 Mcf per day.

Q I mean as indicated by the initial drill stem tests.

A No, sir. The gas volume was estimated at 4,250,000 on a 24-inch choke and at 3,420,000 on a 1-inch choke. Excuse me, I stand corrected. It was estimated at the rig that at an open 1-inch choke estimated 10,000,000 cubic feet of gas per day, yes. I hasten to point out that this was strictly an estimate from the rig floor. There is no back-pressure tests or other devices used to estimate that. Further, in connection, may I also make another comment that is relative to this, that the absolute accummulated open flow was 3,740,000 cubic feet per day.

Q What is the capacity of the Mountain States Well at this time?

A We have produced for more than a short period a little over 8,000,000 cubic feet per day.

Q Now, you mentioned during your testimony that you recognize there is some mechanical constriction present that would reduce or would act to reduce the flow of your well if you attempted to produce it at capacity. What were you referring to?

A I'm referring to the pressure drop which would be noticed at the surface in flowing tubing pressure, because you are trying to get a higher volume of gas through a given space. However, if this were the only factor to be considered, it could be remedied, for example, by putting in larger tubing in a hole. However, likewise, when you again reduce the rate of flow, the mechanical restriction or the friction loss would disappear and should get a gain in tubing pressure, which is specifically what we indicated we saw did not happen.

We flowed the well at a high rate and the tubing pressure dropped 200 pounds in a very short period of time, a few days, and continued and still remains at a lower level.

Q Is this the only type of mechanical restriction that you are familiar with that exists in your well?

A As far as we know this is the only restriction.

Q Are you aware of any damage to the formation that occurred during drilling and completion that would constitute a restriction by way of skin factor?

A Yes, there was in fact rather noticeable amounts of skin damage as we detected from an analysis of charts. I do not recall exactly what that factor was, but the fact that the well has been of late, consistently producing at the rate of 6,000,000 cubic feet per day

which is considerably over its calculated absolute open flow would indicate that that skin damage has been for the great majority self-corrected.

Q. You have made no attempt to correct whatever skin damage existed by corrective treatment in any way?

A It was our opinion before we drilled the well that should we encounter or have skin damage to the formation, it was our opinion that we would attempt to correct skin damage by production through the zone itself, and this theory appears to have worked at least in this particular case.

Q I believe it was your testimony that and is your testimony that your Mountain States Well has excess capacity over the takes that have been actually experienced from the well during 1972. You could have produced more than you actually have produced?

A Yes, that is correct.

Q Has the pipeline purchaser restricted your takes?

A No, exactly the opposite. Perhaps it's hearsay, but we had a telegram from Transwestern indicating that in response to their receipt of notification on this hearing that they would like to have, I don't recall their exact wording, but they indicated that they had a need and a use for all of the gas that could be produced from this field.

Q So the producing capacity of the wells in this field is not in excess of the purchaser's market demand?

A This is correct.

Q There is just one purchaser in this field; is that correct?

A In this field there is only one transporter pipeline company. However, there is another outlet in the nearby area.

Q In this pool, Transwestern is the only purchaser?

A This is correct. Transwestern is hooked up to all four of the wells indicated as west of Atoka Field in this map.

Q Now, you said that you had two reasons why you thought proration was necessary in this field. The first reason you gave was that the, I believe you said there was one well, that being the Yates Well in Section 25, that had shown presence of some water during the course of its completion or where water had been encountered.

A Yes.

Q Have any of the other wells encountered water?

A Not to my knowledge.

Q You said that you feared that production at high rates would cause encroachment from the south. Now, if this encroachment should occur from the south, it would be the Fasken Well. It would be the first well to feel the

effect of that water, would it not, rather than the
Mountain States Well?

A Not necessarily, because I have not presented a structural map here, but this Mountain States Well is very slightly structurally low; and if we use the time-honored concept of a face movement of water, the Mountain States would in that case be subjected to encountering water first.

However, I do agree that the Fasken Well would be the first to suffer. However, the mere fact that we would have damaged a significant portion of the reservoir is of concern to us.

Q Has the Fasken Well produced any water to date to your knowledge?

A I have no information on that.

Q Are you saying, Mr. Havenor, that you believe that as a probability that the producing Fasken Well at its present rates will cause encroachment of water, or are you just saying that this is a possibility?

A This is a possibility, and this possibility is in evidence in a closely related situation on the down-dip side of the Atoka-Penn Field, where rather strong production there has caused premature water encroachment; and this I think is a valid local example as there is no reason to believe that a similar thing could not happen

here.

Q What rates of withdrawal existed in that situation that you just described, rates of production?

A I don't think that I can answer the question accurately. I don't recall.

Q You don't know whether they are comparable to the rates presently being produced by Fasken in its Brown Yates Well or not?

A No, but I would venture a guess that it was not that high because of the fact that at the time that this encroachment basically occurred was during a period when Transwestern Pipeline, the purchaser, had its line pretty well full of gas, and there was not only proration of the field, but there was also quite a few pipeline restrictions.

Q How much of a draw-down in pressure do you feel has to exist before you have the danger of producing the reservoir too hard? In that, what magnitude are we talking about?

A I don't think I'm qualified to answer the question. My partner who is a Petroleum Engineer has expressed concern to me over this point but has not stated any specific figure, so I can't answer the question.

Q The Isopach that you have shown as Exhibit 1, now, is just an Isopach of what you call the "A" Sand?

A Yes, that is correct.

Q Your well is actually perforated and producing from more than just the "A" Sand, is it not?

A It is perforated also with 10 feet in the zone correlated as the "B" Sand. Initial pressure work which was again done by my engineer partner caused him to reflect to me that he felt that there was no pressure interference between the upper "A" Sand and the "B" Sand; and he, therefore, included, and I am sympathetic on the basis of geology, that the lower sand is not in fact yielding gas to the bore hole and that it just looked good on the log, and we perforated it.

The fact that the "B" Sand, if communicated to the Atoka-Penn Field, would be so significantly lower in pressure that we would see an anomalous drop in pressure as compared to the Fasken Brown Yates Well which is completed only in the "A" Sand; but the pressures are so close that we must, I must conclude that there is no communication through the "B" Zone.

Q Have you made any estimates as to the amount of recoverable gas that exists in this pool at the present time?

A In the entire pool, no, sir. I have --

Q Yes?

A No, sir. I have not.

Q Have you made any estimates as to the recoverable gas that exists under each of the individual separate tracts in the pool at this time?

A Only under the tract operated by Mountain States Petroleum, and we estimated that initial reserves under that tract were in excess of 18,000,000 cubic feet of gas.

MR. STAMETS: 18,000,000?

THE WITNESS: Yes, sir.

MR. MORRIS: That's all I have on Cross.

MR. KELLAHIN: If the Examiner please, Jason Kellahin appearing for C and K Petroleum, Incorporated.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q Mr. Havenor, I didn't quite understand your two points in connection with weight. The first is the possibility of water encroachment; is that correct?

A Yes, that is right.

Q Now, the second one I understood you to say had to do with your sharp drop-down in pressures.

A Yes, that's right.

Q Now, that's in your well?

A Yes, that is right.

Q What constitutes what is in connection with that?

A Well, what is, as we see it, it would be the ability to

produce gas from this reservoir and then having some condition imposed upon the well or the reservoir which would prohibit that recovery; and we would consider that as in this case, for example, might be if our well were to, if we had to sustain a very high production rate, we could possibly draw fins through the formation and cause a blocking somewhere around the bore hole; and if this were not a treatable thing, it would constitute waste in the sense that there is gas which could not be produced from the formation.

Q Now, that's a situation insofar as you know exists only in your well; is that right?

A We do not know that that situation exists. We only pray that it will not exist.

Q You mean in any other well?

A In any other wells in the field, ours or Mr. Fasken's.

Q But you are asking the Commission to protect you by prorating in order to prevent mechanical damage to your well?

A I wouldn't call that mechanical damage, Mr. Kellahin.

Q You wouldn't?

A No.

Q What would you call it?

A Formation damage.

Q Formation damage?

A Yes.

Q As far as you know, it would only affect your well and not any other well?

A I would assume that a similar type thing could also affect other wells.

Q You don't know actually whether it would affect your well or not, do you?

A No, we do not.

Q Now, this water encroachment is a normal thing. The water would lie lower structurally than the gas in a reservoir, would it not?

A Normally.

Q Is your well completed higher in the structure than the Fasken Well or lower, do you know?

A I again have to go by memory since I did not bring a structural map. I believe that it was a few feet lower. There was not a significant difference, but I believe it was a few feet low.

Q But you are considering structually the Fasken Yates-Hornbaker Number 1?

A That is correct.

Q Did you say it produced water?

A It recovered water on drill stem tests.

Q Was it ever produced, or do you know?

A It was plugged.

Q You don't know what the situation is as to the recompletion, do you, of that well?
A We are talking about two different wells.
Q I'm talking about the Number 1 Well which was deviated.
A The Number 1 Well was deviated, and it is my understanding that the well has been abandoned. I have not seen a completion data on the well, but it is my understanding that the well has been abandoned.
Q After it was deviated?
A That is correct.
Q Do you know what the situation is on the Number 2 Well?
A The well in the northeast, northeast?
Q Yes, sir.
A No, sir, they are drilling that as a tight hole. I have no source of information.
Q You don't know if it's made water or not?
A I don't know what it's done at this time. They are reportedly whipstocking the well. For what reason or which direction, I have no personal knowledge.
Q Now, of all the wells that are completed in the pool or were completed in the pool or drilled, the Fasken Yates-Hornbaker is the only one that made water; is that correct, the Number 1 Well?
A Well, see, it was not recompleted in the pool but divided in the area of the pool. It's the only one that I have

knowledge of that had water. Yes, that is correct.

Q You didn't get water?

A That is correct. We received no water.

Q Fasken didn't get any water?

A To my knowledge they had no water.

Q The other two wells in Section 13, as far as you know, didn't?

A As far as I know they had no water.

Q So you are concerned about water down in Section 25?

A Yes, that is correct.

Q I believe you have answered my other questions. Thank you, sir.

CROSS-EXAMINATION

BY MR. STAMETS:

Q I believe, Mr. Havenor, in one of the earlier cases it was pointed out that the Hornbaker Well in the original deviated 120 feet of sand which you don't show on your Exhibit Number 1.

A I have no access to that information, Mr. Examiner. I can't show it.

Q And I would presume that the raisable take in your contract is not a factor here, because you voluntarily have restricted the production from your well.

A That is correct. The well's production was cut back at your request.

Q Looking at your Exhibit Number 3, it would appear that the David Fasken Brown Yates Well has about twice or maybe a little bit more than twice the thickness of pay. Looking at these logs, it's difficult to tell anything about the porosity or pick out the net pay. Do you have any comment on that as to the net pay between these two wells?

A The David Fasken Well does have a thicker sand than we do, and I'm not prepared to state exactly how much net pay either one of the wells have. The gross pay, I think, is fairly close on the Isopach map, your Exhibit 1. I think this is fairly close. I'd be willing to say that the McCaw Well is perhaps only 75 per cent of that figure as far as net pay goes.

Q At the well bore hole there is a difference of two between the two wells, at least two.

A I don't understand your --

Q Well, at the well bore, the Fasken Well, there appears to be at least twice as much pay as at the well bore of the Mountain States Well.

A I don't believe it's quite that much, Mr. Examiner. The total sands section is 47 feet on their electric log, and the total sand section is 42 feet perhaps in the McCaw Well. The question would be specifically how much of that is net; and from these logs, I can't determine

which is actually the net.

There would appear to be, excuse me, 34, 36 feet in the McCaw Well rather than 42 feet which I said earlier. And I repeat that perhaps they have 25 per cent more sand overall than we do.

Q Could this account for some of the difference? Well, I'm sure about the potential of the David Fasken Brown Well. Do you have a figure on that? You said your own well is capable of making 8,000,000 a day?

A I have what was reported as a calculated absolute open flow of 3,250,000 cubic feet per day, which it would be if this report is correct, would be reasonably close to ours, slightly less than ours was originally.

Q In actuality, it must be producing 8,000,000 or 9,000,000 a day?

A Yes, I think that it is in the range of 9,000,000 per day, now.

Q So it would be safe to say that the potential is obviously somewhat higher than that?

A Well, at the time that the potential was taken, this was a valid potential; but there was undoubtedly skin damage; and, of course, the Fasken Well was stimulated; and this will probably account for the rest of it.

Q What I'm getting at is that the Fasken Well may be substantially better than the Mountain States Well.

A In as far as productive capacity goes?
Q Yes.
A This is a possibility at the present time. Again, we are concerned with opening the well as wide open as it will go for fear of causing damage to the formation.
Q Referring to the deviation of the Hornbaker Well by Yates Petroleum, did Mountain States appear at the original hearing on that to protest the deviation of that well?
A No. Mountain States did not appear. However, it was a case where the notification slipped past us and had we noticed it, we would have appeared if that means anything.
Q At this time, there are no good wells located at non-standard locations in the pool?
A That is correct.
Q So as far as that goes, the application is somewhat premature as far as any actual damage?
A Yes, in that respect it is premature. However, we do respectfully relate it to that previous application, because this is of concern.
Q And the formula that you would propose for prorationing here is 100 per cent acreage formula?
A I really, Mr. Examiner, I'm a little reluctant to propose any formula. I suggest that just simply as a possible means. I'm sure that the acreage factor is of

prime consideration here. We would be willing to accept any reasonable prorationing formula.

Q Mr. Havenor, if the pool were prorated and the denominations by the pipeline exceeded the potential of the wells in here, wouldn't you be right back where you started with a marginal well and producing less than Mr. Fasken's well?

A Yes, we would be, and we would be then in the position where we would be forced to attempt to protect our correlative rights and take whatever lumps we might receive. It's our, the purpose of our application is to try to establish some reasonable means whereby this can be prevented.

Q Along this same line, would you have in mind proposing some sort of limit on the well's production based on its percentage of its calculated absolute open flow or its deliverability into the pipeline?

A I don't know of any permanent figure, but this might be a reasonable way to determine the deliverability of the wells and establish a percentage of that deliverability. This would eliminate the problems obviously encountered or the problems corrected from the time of initial production after the calculated absolute flows were reported.

Under my statement, in other words, it would not be

reasonable to base it on calculated absolute open flows as originally reported, because the wells had suffered skin damage and both wells, one well has naturally repaired that damage and the other well has repaired the damage possibly through stimulation.

Q There hasn't been any particular amount of testimony along this line or any evidence along this line in this case?

A No, sir.

Q You mentioned that there was premature water encroachment in the Atoka-Penn Pool. What evidence do you have of this?

A The wells involved, the Penn United and Yates Petroleum, in which it was demonstrated to my satisfaction that accelerated production had caused a lobe of water to encroach into part of the field prior to a frontal advance.

In other words, if everyone withdrew the gas uniformly, it probably would have encroached as a front; but the evidence presented in this particular problem or area very clearly suggests to me that it was high rates of production in relation to offset wells that caused one lobe to proceed farther northwest than did other parts of the waterfront.

Q In that particular case, did you have a water zone down-

dip from the pool extending for several miles along the east boundary?

A Yes, sir. That is correct, and there is no evidence here to assume that a similar situation cannot exist. In fact, we submit that the Yates-Hornbaker Well and the southern-most well in Section 25 is a case that demonstrates that water. And in this sand, we could be looking at that similar situation.

Q This water was found in the channel or what has been referred to as the channel?

A Yes, that is correct.

Q And the Reading and Bates Incorporated Linck Well in Section 24, did it encounter water?

A With your permission, I will read the drill stem test as reported. "The drill stem test from 8,480 to 8,586 was open for two hours, flow day maximum of 3,400 cubic feet of gas per day and recovered 390 feet of slightly gas-cut mud. No water was reported. In a test from 8,760 to 8,880," and I beg your pardon. The previous drill stem test was not in the Morrow sand. I'm sorry. The second test "from 8,760 to 8,880, which was in the Morrow sand, had gas at a maximum rate of 147,000 cubic feet and recovered 340 feet of mud. No water was reported."

I was not present on the drill stem test. However, the geologist that conducted the test called me

immediately after the test and gave me comparable results.

Q Has it been determined that there is a water drive in the West Atoka-Morrow Gas Pool?

A No, sir.

Q Has the pressure decline tended to indicate that instead there is no water drive, that it is gas expansion that is the producing medium?

A I don't believe that we have enough information to state that it's categorically one or the other.

Q What is a pipeline pressure, operating pressure?

A I believe it is now approximately 500 pounds.

Q Are there any liquids produced with these wells?

A The two good wells, the Brown Yates and the McCaw, both produce condensate. The McCaw Well produces condensate at the rate of 10,000,000 to 12,000,000 barrels per million cubic feet of gas. I would assume that the Brown Yates Well is roughly comparable.

Q When you were producing the McCaw Well at 8,000,000 per day, did you see any apparent damage from this?

A We were flowing the well at approximately 6,000,000 cubic feet per day at a stabilized tubing pressure of 1,650 pounds. We increased the take to right at 8,000,000, slightly over 8,000,000 cubic feet of gas per day; and the tubing pressure dropped to 1,400 pounds. After, I

believe it was approximately a week, we cut the well back again to 6,000,000 cubic feet and the tubing pressure remained the same, 1,400 pounds.

Q You have any explanation for that?

A No explanation, but a great deal of concern.

Q I imagine.

MR. STAMETS: Are there any other questions of this witness? You may be excused.

MR. MORRIS: We would like to present a witness.

JAMES B. HENRY,

a witness, having been first duly sworn according to law, upon his oath, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Henry, please state your name and where you reside.

A James B. Henry, Midland, Texas.

Q By whom are you employed?

A Henry Engineering.

MR. STAMETS: What do you intend to qualify him as?

Q (By Mr. Morris) What is your profession, Mr. Henry?

A Consulting Petroleum Engineer.

MR. STAMETS: The Examiner recognizes Mr. Henry's qualifications in that field.

Q (By Mr. Morris) What is your relationship to Mr. David Fasken?

A I'm on a retainer for my engineering services in a consulting category with Mr. Fasken. I also physically operate, produce, supervise the drilling and completion of all of his producing wells.

Q Have you prepared some exhibits to present in this case, Mr. Henry?

A Yes, I have.

Q If you will refer please to Exhibit Number 1 and state what it is and outline the information, summarize the information shown on that exhibit.

A This exhibit is quantitatively a history of this well and its completion.

Q Which well are you referring to?

A David Fasken Brown Yates Number 1 shown on the exhibit. This is an attempt to show typically what happens to the completion of Morrow wells in the county. First of all, we generally try not to start our evaluation by drill stem test of the formation. The first line of this exhibit shows certain data derived from that drill stem test. Now, I notice in the left-hand margin there is a date showing the time chronologically when these events happened. They do proceed chronologically down the page.

The type of test that was run on the well, the next column is labeled "Extrapolated BHP PSIA." Extrapolated

final shut-in pressures determined from a transient-pressure analysis of the bottomhole pressure built up data on a drill stem test. Now, many times the reservoir pressure does not return to its origin during the shut-in period after it's been disturbed and drawn-down by drill stem tests.

As a result, there have been developed engineering techniques very logically lumped into the category of transient pressure testing techniques that allow the extrapolation of the pressure build-up data to a final static shut-in reservoir pressure, and that's what is shown in that column.

It's also shown farther down the column for other testing where the same techniques may apply but are, the data is derived from other testing techniques. The flowing bottomhole pressure observed here is that at a datum near the midpoint perforations on the Fasken Brown Yates Number 1. The flowing well-head pressure in the case of this would have been the flowing drill-pipe pressure ahead of the choke on the test.

And we have another column called "Delta P and Bottomhole Pressure PSIA." That is the pressure drop at the bottom of the hole opposite the formation during the test. You'll note that the 3606 extrapolated pressure and the flowing bottomhole pressure substracted from it

gives us Delta P.

Now, it is this pressure drop that causes gas to flow into the well. This goes back to the fundamentals of reservoir engineering of knowing that everything is not going to flow unless there is a pressure differential and this one flows in here. And the rate at that time due to this drop in pressure caused by opening a valve and an empy drill stem did produce a flow rate of 3,250 Mcf per day.

The last column is a calculated absolute open flow in Mcf per day, and from this test we did not attempt to calculate that. There was not sufficient data to calculate a sufficient overflow. After setting pipe in these wells, we sometimes get an additional drop in productivity due to cementing the pipe and the fact that the perforations in the casing are sometimes less, afforded less than 100 percent of the open-hole flow capacity.

Now, that was the case on this well which was perforated and tested here on February 10, 1971. At that time we had an extrapolated bottomhole pressure from build-up data of 3,631. You'll notice that is slightly different from the one on the drill stem test immediately above it. This is attributed to difference in the gases that were used to measure this pressure.

It's well within the accepted limits of plus or minus a half per cent in measurement.

It had a flowing bottomhole pressure of 1954 which was substantially lower than the flowing bottomhole pressure in the drill stem test, as a matter of fact, about 900 pounds less. The flowing well-head pressure was 1450 PSIA, and the bottomhole pressure-drop opposite the formation face was 1677 pounds or more than twice what it was in the drill stem test. Yet this produced only a flow rate of 2233 Mcf per day or about two-thirds of that experienced on the open-hole drill stem test.

In fact, the absolute open-flow calculated was 3250 Mcf per day which was equivalent to the actual flow rate experienced on the drill stem test. Like I say, when we drill these wells, there is a certain amount of invasion of drilling mud of necessity to control the well. The hydrostatic must exceed the reservoir pressure or the well would flow out; and during the time that his hydrostatic pressure exists in favor of the well bore over the formation, there is a certain flow into the formation even if zero water loss mud.

Again, there is no such thing as a zero water loss. All muds have some water loss, and this thing would continue to invade because of the swelling of certain clays that are indigenous to the Morrow sand. And

furthermore, the cementing and perforating do not restore it to 100 per cent. Sometimes high flow rates will clean this up. We have experienced that the higher the flow rate, the more effect it has on cleaning these wells of this damage.

However, in this case, the well shows very little clean-up; and we performed a 10,000 gallon manufacturing job on the well; and the results shown in, Line 3 shows the results of that, of the flow rates of that fracking job which was an attempt to create an artificial fracture in the formation. As the rock mechanics operate, this would have been a vertical frac at a depth and rates involved.

We verified this by temperature surveys and tracer surveys that these are in fact vertical fractures. The bottomhole pressure at that time there would have been some production from the field was slightly lower than original pressure and at a value of 3,538 PSIA.

The flowing bottomhole pressure at this time was 3,077 for a Delta P or pressure drop at the surface of 780 pounds. You will also notice that the flowing tubing pressure at this time was up to 2,297 pounds. Now, the maximum rate, that is the highest rate on the back-pressure test, was physically 3,672 Mcf actual delivery volume which resulted in the calculated absolute open flow

of 10,000 Mcf per day.

Now, this test was taken after the well had cleaned up but had recovered only about 25 to 30 per cent of the frac fluid. We were still about 70 to 75 per cent of the frac fluid still unrecovered. The well was producing at that time the rate of five or six barrels of water per million which was identified as frac water by a chemical analysis. The well continued to clean; and as it continued to clean with all these small volumes of water, the productivity increased. After about three or four months on the line, this dropped over to two or three barrels per million and has since dropped off to negligible amount of water production; and as these small volumes of water were recovered, the productivity of the well did increase.

July 10, 1972, is depicted on the last line. We ran a pipeline deliverability test with a bottomhole pressure boom in place. At that time, the extrapolated pressure from the pressure build-up data was 3277. The flowing bottomhole pressure was 2841. The well-head pressure was 1609, and the pressure drop at the formation was only 436 pounds. Now, this produced a flow rate of 9,300 cubic feet daily delivered into the pipeline. This is the lowest pressure drop that the well has ever experienced down-hole and is the highest flow rate that it

has experienced or as high as it's average flow rate has been.

There have been occasions we have produced up to 10,000 Mcf per day. This exceeds the capacity of the pipeline's dehydration unit; and we have had to cut back to keep from sweeping the frac all out of the unit.

Q Please refer to Exhibit 2, Mr. Henry, and explain it.

A Exhibit 2 is a comparison of the quantitive analysis of the drill stem test on the Mountain States Petroleum McCaw Gas Unit Number 1 and the David Fasken Brown Yates Number 1. This is the result of this transient pressure testing technique that I explained earlier. At the time these were run, the Mountain States Well had an extrapolated pressure of 3661. The Fasken rate of 3606. The actual pressure in the field we believe to be 3631 as shown in the earlier exhibit. There was about a 30-pound variation each direction, 25 to 30-pound variation each direction for the difference between these two, and again I believe this is due to the difference in the pressure gauges used by the service companies testing it.

The bottomhole pressure boom in the drill stem test cast a terrible beating in running it in the hole. It slips and all the jarring, it is not as accurate as the instruments run on the other testing.

Now, the actual flow rate at the end of the test on

the Mountain States McCaw Well as reported by their service company was 4500 Mcf per day. The choke size and pressure referring to calculated choke number would show that to be correct and verified the Fasken Well at its testing rate which was, on a smaller choke was 3250 Mcf per day flow rate. The surface flowing pressure on the McCaw Well was 800 pounds. The Fasken Well, 2205, again, as a result of smaller choke restricting the flow and showing a higher pressure.

The flowing bottomhole pressure on the McCaw Gas Unit Number 1 was 1982 and was 2874 on the Fasken Brown Yates. Now, on the net pay thicknesses of these two wells which is the next two items compared here, we took those directly from the microlog measurements on each well; and we believe that this represents the best net pay and there may be other tighter sands that are contributing, but there it shows 17 feet open in the McCaw Well and 20 feet open in the David Fasken Well.

That did show good separation and filter cake build-up in the micrologs.

Q Let's get back to my question, Mr. Henry, the Fasken Well has about three feet more pay?

A That's right on this. Now, it does have more gross sand than the McCaw Gas Unit; but as far as the net sand showing permeability, in the microlog, it has three feet

more. Now, we quantitively calculate in these tests a skin factor as by symbols here, and I might explain that all of the symbols and all of the terminology used here is described in a petroleum engineering publication published by the Society of Petroleum Engineers to standardize the terms used in these calculations. It's called SPE Nomogram Number 1 Pressure Build-up Analysis in Oil and Gas Wells, I believe is the name of the publication. All of these nomenclature symbols here come from that publication, and the techniques used come from that publication.

MR. STAMETS: SPE Nomogram Number 1 Pressure Build-up and what?

THE WITNESS: Analysis of Pressure Build-up and draw-down data, I believe. This is the name of it. It's Nomograph Number 1. It's available from the Society of Petroleum Engineers office in Dallas for $15, I believe.

A The skin factor indicates the degree or severity of the plugging around the well bore due to the invasion of mud side in a very short interval around this well bore.

Now, that's the reason it has the term skin factor and I might say here that a large skin factor means a lot of damage, and a small skin factor means a very small amount of damage. After a well is stimulated with a frac job, it can in fact have a negative skin factor so

that its productivity is greater than the natural formation productivity. Now, I passed over a line right above there and I'd like to back up. It says natural formation flow capacity in millidarcic feet. This is determined from the slope of a particular curve of a term we call dimensionless time versus pressure. And from the slope of that we calculate the number of millidarcic feet for the flow capacity of the rocks connected to this well bore away from the damaged zone.

Now, this is done with a later part of this build-up curve. You will note here that the millidarcic feet on the McCaw Gas Unit has 146 as opposed to 95 on the David Fasken Brown Yates Number 1, indicating that the natural formation under damaged capacity in the McCaw Well is 50 percent greater approximately than that of the Fasken Well.

Now, this is the type of flow you would have in an open-hole completion if it were possible to evacuate the well bore rock without introducing any damage to it. If we could just miraculously take it out of there without any drilling fluids or slides invasion, we would have this type of flow capacity. Now, this skin factor reduces that flow, and you'll notice there is a Delta P skin and PSIA listed in the left-hand margin here describing another set of data. This is the number of pounds

pressure-drop it takes to force the gas through this skin.

Now, the 1202 pounds is restricting the flow from the formation into the well bore on the McCaw Well, and there are 223 pounds of pressure-drop through the skin indicated at the time of drill stem test on the Fasken Brown Yates Well. You'll note that this has produced a larger draw-down in the McCaw Well back-up under flowing bottomhole pressure and inordinately low draw-down in the measure of the well bore because of this restriction. Now, under this Delta P skin label, we have something called J (ideal) in cubic feet for PSIA; and this, if you're familiar with productivity increases in oil wells, this is the same thing. It's the number of cubic feet, in this case, that can be produced for each pound of pressure-drop if the skin were not there.

Q In given amounts of time or --

A Per day. This is the amount that would be produced per day. You will note that the index here for this thing is greater for the McCaw Well than for the Fasken Brown Yates, and again this is proportional to the millidarcic feet. This is in the same ratio as the millidarcic feet of the two wells. Now, the flow of efficiency, to get the thing back to everyday oil-field terms that we are used to thinking of, would suggest that the, in per cent

would suggest that what all that means is, if the McCaw Unit Number 1 is producing 28 per cent of the capacity, it would have had all the skin damage be removed. It was actually restricted 72 per cent by this skin damage of its capacity.

The Fasken Well at a 69 per cent efficiency flow, efficiency in suggesting that it was reduced 31 per cent by the skin damage. Now, had we removed all the skin damage and had the same well bore draw-down that was experienced without the skin damage, we have indicated that the McCaw Gas Unit on test at that flowing bottomhole pressure of 1982 pounds would have had a gas flow rate of 15,830 Mcf per day.

The Fasken Well would have had at its flowing pressure of 2874, would have produced 4,680 Mcf per day. Now, this last column or last line down here shows the calculated absolute open flow before fracture, in Mcf per day, for the Mountain States Well and the Fasken Well. Now, that was 8,600,000 daily for the calculated absolute open flow in the McCaw Gas Unit Number 1, and 3,250,000 which was the same number referred to on the earlier exhibit underlying two, suggesting that the natural productivity unfracked of the McCaw Gas Unit was greater than that of the Brown Yates Number 1.

Now, after the frac job, we will now refer back to

Exhibit 1 in the third line. You'll see that this was greatly increased by the fracturing job and is cleaned up since, so that the calculated absolute open flow now is much larger than the 10,000,000 it had earlier. All this says in a nutshell is that the capacity inherently God-given in the McCaw Gas Unit is greater than that of the Fasken Well. They have the same opportunity to produce and greater in the Fasken Well, and the large draw-down they are seeing at the surface is a result of this skin damage that has never been removed.

The Fasken Well now has a negative skin factor because we did several reservoir penetrations and stimulations that will give greater productivity than the nature inherent 95 millidarcic feet.

Q Mr. Henry, it's been suggested that due to the rate of production there may be some water encroachment into this reservoir. There may be a water drive. Do you have any evidence of that?

A No, sir. We have evidence to the contrary as shown on Exhibit Number 3.

Q Would you please explain that exhibit?

A Exhibit Number 3 is a plot of the pressure corrected for compressibility plotted against cumulative gas production from the West Atoka-Morrow Field main reservoir, and by this I've included only the David Fasken

Brown Yates and the Mountain States McCaw Gas Unit Number 1 production and pressure data.

The left-hand column or left-hand side of the paper in the vertical direction shows the pressure corrected for compressibility, and this compressibility is a correction of the naturally occurring hydrocarbon gases for this deviation from a Per Gas Law. Per Gas Law is that pressure times volume divided by temperature is a constant and is equal to any other pressure volume temperature, pressure volume divided by temperature situation when one or the other varies. Now, natural occurring gases are not Per Gases; but from their gravity and composition, we can calculate their deviation from a Per Gas Law; and this Z-factor that you see under the PSIA in that column indicates a correction has been applied.

It is variable with pressure and temperature since in the reservoir the rock remains at essentially the constant temperature we have here, only it's variation with pressure that is used to correct this thing and produce a straight line plot of cumulative production. This corrected pressure factor in cases of a completely volumetric reservoir containing only gas and with no water encroachment, with no external energy being added or subtracted from it or external fluids, I should say,

being added to or taken from the formation.

You'll note on this curve that the line through the points produces essentially a straight line plot. This is, I'll consider from practical engineering points of view, this is a very good straight line plot of these data indicating that there is no water encroachment into this reservoir and further showing that there is good communication between the David Fasken Brown Yates Number 1 and the Mountain States McCaw Gas Unit Number 1. The Mountain States McCaw Gas Unit produced approximately 450,000 Mcf prior to the start of sustained production other than for testing in rig fuel to the Fasken Well.

All of the pressures that you see depicted here were physically measured by bottomhole pressure boom opposite the perforation in the Fasken Well. You'll note that for the first two and a half squares here which would represent actually two and a fourth squares would represent the first 450,000 Mcf production that was a pressure-drop in the Fasken Well as the result of production from the McCaw Well while it was shut in awaiting its pipeline correction, which establishes very good communication positively between these two wells.

The other pressures were measured at later intervals down until the last point which has a notation above it of July 12, 1972. At that time both wells were in a shut-

in status so that there was no interference between the two wells, and I do not have the bottomhole pressure on the Mountain States McCaw, but their surface shut-in pressure is the 6-pound difference. So producing gas of the same gravity and the same liquid content and no water, we can logically conclude that this represents essentially the same bottomhole pressure in both wells.

Q Mr. Henry, while we're talking about water, there was mentioned by Mr. Havenor that water had been encountered in one of the wells drilled in this field. Do you have an opinion as to whether or not that water was encountered in this producing zone?

A I don't believe that the David Fasken Yates-Hornbaker Number 1 in Section 25 that produced water and gas on a drill stem is completed nor was tested in a way that is in any way connected with this accumulation. The sand there had a pressure greater than the field pressure. It produced water at a subsea datum higher than the lower set of perforations in the McCaw Well, which is incompatible with the two being in the same sand accumulation.

Now, there are a lot of descriptions of the sands as to the type of sand accumulation that they are. We have done extensive work with the detonator in sidetracking these wells and trying to further describe

the grain direction, transfer direction, slope of the sand accumulation; and we have had to really on those data, to conclude again that even though these might be stratigraphically correlative that they are not the same sand, because these have a different direction than the other sands.

MR. STAMETS: Did I understand you to say that the Hornbaker Well produced water higher stratigraphically?

THE WITNESS: Structurally. If I said stratigraphically, it was an error. It was structurally higher at that datum. That is higher than the bottom perforation in the McCaw Gas Unit.

MR. STAMETS: Okay.

Q (By Mr. Morris) Mr. Henry, would you identify Exhibits 4 and 5, please?

A I'd like to add one thing to the comments on Exhibit 3. This plot is a straight line descending to the lower right. If water encroachment were in fact occurring, this would begin to flatten and be concave downward and would show a flattening of these pressure general accumulative production plots.

Q Now, would you identify Exhibits 4 and 5?

A Exhibit 4 is a copy of the pay shown on the dual induction letter log and the approximate microlog of the Fasken Yates Number 1. Exhibit Number 5 is a reproduction

of the log through the pay interval of the Mountain States Petroleum Corporation Number 1 McCaw Gas Well in the bottom in the West Atoka Field.

Q Mr. Henry, were you present during Mr. Havenor's testimony in this case?

A Yes, I was.

Q And have you reviewed the exhibits that have been presented by Mr. Havenor?

A Yes, I have.

Q Would you comment upon that testimony and those exhibits in connection with Mr. Havenor's interpretation concerning this reservoir?

A Well, I disagree that first of all that the producing zone and the David Fasken Brown Yates is a zone as commonly known in the Atoka Field to the east. By my correlations this is the B Zone of the Atoka Field, and we have so labeled it and used it in our geological and engineering development work.

I do agree that there is communication to the McCaw Well shown on our Exhibit Number 5. I believe the lower set of perforations from 8889 to 8898 is the B Zone, a remnant of the B Zone, the lower-most part of which is correlative with the bottom of the sand in the Fasken Brown Yates.

MR. STAMETS: Which well are we talking about here

now, the McCaw Well?

THE WITNESS: Right.

A The lower set of perforations as depicted on the induction log is correlative with the perforations shown on the Fasken Brown Yates. I do believe that the upper set of perforations in the McCaw Gas Unit is the A Zone as commonly known in the Atoka area.

Q Mr. Henry, do you have any further comments you'd like to make in connection with this matter?

A The only other thing is in commenting on Mr. Havenor's Isopach map. I disagree that the wells in Section 25 are in the "A" Sand as well as the others I have alluded here to.

Q Were Exhibits 1 through 5, Fasken Exhibits 1 through 5 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: We offer those exhibits, Fasken Exhibits 1 through 5 into evidence.

MR. STAMETS: Without objection, Fasken Exhibits 1 through 5 will be admitted.

MR. MORRIS: That's all we have on Direct.

MR. STAMETS: Questions of the witness?

CROSS-EXAMINATION

BY MR. JENNINGS:

Q Mr. Henry, in referring to your A and B Zones on the last

two exhibits, 4 and 5, in your opinion is there any communication between the two zones in the Mountain States Petroleum log in the two perforated zones?

A You mean vertically?

Q Yes.

A None other than the well bore itself.

Q The B or the A Zone was not encountered in your well?

A That's correct. It was not encountered in our well.

Q But the pressures are identical?

A Yes, sir.

Q In the two wells?

A Yes, sir.

Q So that definitely communication is between which zones?

A The wells are in direct communication, very good communication through very highly particled sands by highly permeable relation to Morrow sands, as indicated on the order of four to six millidarcies.

CROSS-EXAMINATION

BY MR. STAMETS:

Q Mr. Henry, do you see any potential for waste in this pool under the present circumstances of production?

A No, sir.

Q And I believe you show with your Exhibit 3 or at least intend to show with your Exhibit Number 3 that there is no particular amount of water encroachment in this pool

at the present time as far as your well is concerned?

A I submit that there is none in the reservoir that would be reflected in your well. The pressures in our well are reflecting that, the reservoir pressure overall; and I do not believe that there is any encroachment shown into the reservoirs connected to these two wells.

Q How great a rate do you feel that the Brown Yates Well could be produced without damage?

A I do not know of any experience where rate has ever damaged a Morrow gas well except where the well bore itself was underlaid by water and coning could occur. Certainly, there are some unique cases in the Morrow where water drives do exist, and I'm sure that their maximum rate of production would have to be determined individually, but I know of know theoretical nor practical reason why high rates of production would damage a volumetrically controlled gas reservoir. On the contrary, we have found that these wells clean up their skin damage when they are tested, by the fracturing clean up much more rapidly at high rates of production.

Many times we can flow them at low rates of production and see no increase. We can shut the wells in, let the pressure build up, and flow them to the air very rapidly; and they will show some permanent improvement.

Q Does a gas contract that Mr. Fasken has called for appear to have total recoverable reserve to be produced annually, or is the flow rate based on it?

A It can be. Contractually they cannot take less than this amount, but they can take up to any amount where we and they agree is desirable.

Q Are they taking more than that at the present time?

A That was to be based on reserves, and we have never officially determined reserves. So it's never become a factor in this contract, and I've always been in a position to take our total deliverability. Since February of 1972, they have been in the position to take the gas wells delivered to them except for the physical capacity of their dehydrator, and they put in a second and larger one, and they were now attempting to persuade them to put in a third and larger one.

Q On your Exhibit Number 2, the flow efficiency of 28 per cent, 69 per cent, is that based on the 15,000,000 and 4,000,000 figure or is it based on --

A No, that is on the damaged well bore, open hole exposed on the drill stem test that there had been mud invasion and damage to the formation reducing the flow rate of these two wells at the time the drill stem test was taken.

Q I'm not sure what figure I'm comparing with this on the

flow rate, now, of the McCaw Well. They produced four and a half million, and this is more than, well, it's about half of the 9,414,000 that you show there as the ideal.

A That ideal is in cubic feet per pound pressure-drop. We need to compare it with a calculated flow rate of 15,000,000.

Q Okay.

A If you divided the 4500 by the 15,830, you would get this compression flow efficiency of 28 per cent, but the actual wasn't the ideal.

Q Mr. Henry, do you feel that under the present plans in which the pool is being operated that the correlative rights can be injured, correlative rights being essentially each operating pool having the opportunity to produce its just and equitable share of the gas in the pool?

A I believe there is no damage to correlative rights that could not be handled as they now stand in the wells non-prorated. I might exclude there, if one well is arbitrarily reduced in its flow rate, it could damage the correlative rights of the mineral owners under that well, but certainly no change in allowables or anything else is going to force a person to produce at a rate he doesn't care to.

MR. STAMETS: Are there any other questions of the witness?

RECROSS-EXAMINATION

BY MR. JENNINGS:

Q Would your answer be the same, Mr. Henry, if the proposed C and K location in the southwest, southwest of Section 18 is allowed?

A It's been our experience very sadly that it's difficult to predict what we would have when that well is completed and in what sand it would be completed and at what pressure we would find it. I might point out that Mr. Fasken substantially on my recommendation and on his has drilled three dry holes in an attempt to extend this field, one of them being a forked hole and sidetracked in an attempt to improve it. I would say that this would have to be a matter to be judged when that well is completed.

MR. JENNINGS: That's all.

MR. STAMETS: The witness may be excused. Any further testimony in this case? Statements?

MR. MORRIS: I have one very brief statement, Mr. Stamets. I do not intend to argue the evidence that has been presented here, but we simply submit that the applicant has not made a case for prorationing, whereas, in opposition, Mr. Henry on behalf of David Fasken has affirmatively shown that

there is no need for prorationing in this case.

Waste is not occurring. Correlative rights are not being impaired. We would further submit that there is no evidence upon which the Commission could properly make the necessary jurisdictional findings that it would have to make in order to prorate this field.

In that connection I would point out that under many cases that have been decided by our New Mexico Supreme Court, it would be necessary for the Commission, in order to adopt a proration formula for this pool, to determine the correlative rights of each of the operators in the field to make affirmative findings as to the amount of recoverable gas in the pool, the amount of recoverable gas under each tract in the pool, and the percentage of that that could be produced without waste.

There is no evidence in the record from which those determinations can be made, and we would submit that since the Commission is not able to make those determinations that it simply does not have the evidence upon which it can prorate or adopt a proration formula in this field; and I submit that over and above any of the other considerations that exist here, upon which the Commission should deny this application.

MR. JENNINGS: Well, I think that it is entirely within the jurisdiction of the Commission. The Commissioner has had the benefit of a full evening's testimony, and we will

let him make that determination after he hears from Mr. Kellahin.

MR. MORRIS: You have a telegram, I believe, Mr. Stamets.

MR. STAMETS: Yes, I do. I have a telegram from Jack B. Olden, Supervisor, Prorational Location, Transwestern Pipeline Company, concerning New Mexico Conservation Commission Case 4018.

(Whereupon, the telegram was read.)

MR. STAMETS: Case Number 4873 will be taken under advisement. I adjourn the hearing.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JANET RUSSELL, a Court Reporter, in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings to the best of my knowledge, skill and ability.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7102, heard by me on Nov 29, 1982.

Richard L. Stamets, Examiner
New Mexico Oil Conservation Commission

Janet Russell, COURT REPORTER

I N D E X

E X H I B I T S

	ADMITTED	OFFERED
Exhibits #1, #2, #3, and #4	12 & 13	12
Fasken Exhibits #1, #2, #3, #4, and #5	53	53

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

January 9, 1973

GOVERNOR
BRUCE KING
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

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

Re: Case No. 4873
Order No. R-4459
Applicant:
Mountain States Petroleum

Mr. James T. Jennings
Jennings, Christy & Copple
Attorneys at Law
Post Office Box 1180
Roswell, New Mexico 88201

Dear Sir:

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC

Other Richard Morris and Jason Kellahin

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 4873
Order No. R-4459

APPLICATION OF MOUNTAIN STATES
PETROLEUM CORPORATION FOR GAS
PRORATIONING, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 29, 1972, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 5th day of January, 1973, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Mountain States Petroleum Corporation, is the owner-operator of the McCaw Gas Com Well No. 1, located 1650 feet from the North line and 1650 feet from the West line of Section 19, Township 18 South, Range 26 East, NMPM, West Atoka-Morrow Gas Pool, Eddy County, New Mexico.

(3) That there are four wells located in said pool, two of which are capable of only low rates of production while the applicant's well and one other are capable of producing relatively large quantities of gas.

(4) That the applicant's well is not capable of producing at the same rate as the other relatively large well in the pool without experiencing a substantial pressure drop.

(5) That the applicant has voluntarily reduced the producing rate of his well.

(6) That the applicant seeks the institution of gas prorationing in the subject pool to prevent waste caused by premature water encroachment and formation damage resulting from excessive rates of production and to protect correlative rights.

(7) That there is one pipeline serving said pool and that the transporter is capable of accepting all gas made available to it from the West Atoka-Morrow Gas Pool.

(8) That the preponderence of evidence presented indicates that there is no active water drive in the West Atoka-Morrow Gas Pool and that in the absence of such a water drive, current rates of production in the pool will not result in formation damage nor waste.

(9) That the evidence indicates that the applicant has the opportunity to improve the productivity of his well through mechanical stimulation.

(10) That the preponderence of evidence presented indicates that the applicant's correlative rights are not being violated.

(11) That the application should be denied.

IT IS THEREFORE ORDERED:

(1) That the subject application is hereby denied.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

BRUCE KING, Chairman

ALEX J. ARMIJO, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

dr/

JASON W. KELLAHIN
ROBERT E. FOX
W. THOMAS KELLAHIN

KELLAHIN AND FOX
ATTORNEYS AT LAW
500 DON GASPAR AVENUE
POST OFFICE BOX 1769
SANTA FE, NEW MEXICO 87501

TELEPHONE 982-4315
AREA CODE 505

December 1, 1972

Mr. Richard Stamets
New Mexico Oil Conservation Commission
P. O. Box 2088

Dear Mr. Stamets:

Enclosed for your consideration is the statement of C & K Petroleum, Inc., in Case No. 4873, the application of Mountain States Petroleum Corporation for prorating of the West Atoka-Morrow Gas Pool, Eddy County, New Mexico.

With a copy of this letter, copies of the statement are being forwarded to the attorneys of record in the case.

Very truly yours,

Jason W. Kellahin

Jason W. Kellahin

JWK/ks

Enclosures

cc: Mr. Richard S. Morris
Mr. James T. Jennings

STATEMENT OF
C & K PETROLEUM, INC.
CASE NO. 4873

Case No. 4873 is the application of Mountain States Petroleum Corporation for gas prorationing in the West Atoka-Morrow Gas Pool, Eddy County, New Mexico. C & K Petroleum appeared at the Examiner hearing in opposition to the application, and upon agreement made at the hearing, submits this statement in opposition to the order sought by the applicant.

We are greatly concerned that the Commission should be asked to prorate a producing pool on the basis of such evidence as was offered at this hearing.

The basic power of the Commission is stated in Section 65-3-10, New Mexico Statutes, which provide that "The Commission is hereby empowered, and it is its duty, to prevent the waste prohibited by this act and to protect correlative rights, as in this act provided, ***." Throughout the Oil Conservation Commission statutes, it is spelled out that the power of the Commission is the prevention of waste, and in doing so, it must protect correlative rights.

There was very limited testimony on the question of waste offered at the hearing by the proponent of prorationing. The only witness offered stated that he feared water encroachment if the two major producing wells in the pool were produced at high rates. His testimony on water was confined to that shown on a drillstem test in the far southern portion of the pool, more than a mile from any producing well. None of the other wells in the pool have produced any water according to this same witness.

The other item of possible waste was possible reservoir damage, as indicated by the statement that Mountain States' well experienced a high pressure drop when produced at high rates. Only a speculative explanation was given as to the reason for this. There was no other testimony offered as to waste. See

Simms vs. Mechem, 72 N.M. 186.

What is of more concern to us, and we feel should be of concern to the Commission is the complete lack of evidence upon which the Commission could make the basic findings required before it can enter a proration order.

As stated by the New Mexico Supreme Court in Continental Oil Company vs. Oil Conservation Commission, 70 N.M. 310, if the Commission is going to prorate to prevent waste, in doing so, is going to follow the statutory mandate to protect correlative rights, it must first find: 1) the amount of gas in the pool, 2) the amount of gas underlying each tract in the pool, 3) the proration that one bears to the other, and 4) what portion of that arrived at proportion can be produced without waste.

proportion?

This standard was reiterated in El Paso Natural Gas Company vs. Oil Conservation Commission, 76 N.M. 268.

Absent these basic findings required by the statute it is impossible for the Commission to determine if each operator in the pool is being given the opportunity to produce his just and equitable share of the gas in the pool; it is impossible for the Commission to determine if waste will occur.

The only formula proposed for the purpose of prorating the pool was to prorate it on a straight acreage basis, but there was no attempt by the Mountain States witness, nor by any other witness to relate acreage, or any other factor for that matter, to the amount of gas underlying the pool or the individual tracts in the pool. In fact the Mountain States witness testified that he had not made any calculation of reserves except those underlying the Mountain States Tract.

On cross examination he stated that the Commission might possibly use a percentage of open flow or deliverability, but he offered nothing as to the figures to be used, nor to the relationship of such factors, if any, to recoverable gas in place in the pool and under each tract in the pool.

It is the position of C & K Petroleum, Inc., that on the record submitted, it is not only improper, but unlawful for the commission to attempt to prorate this pool.

Respectfully submitted,

C & K PETROLEUM, INC.

By _____
KELLAHIN & FOX
P. O. Box 1769
Santa Fe, New Mexico 87501

Attorneys for C & K Petroleum, Inc.

Docket No. 28-72

DOCKET: EXAMINER HEARING - WEDNESDAY - NOVEMBER 29, 1972

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

The following cases will be heard before Richard L. Stamets, Examiner, or Elvis A. Utz, Alternate Examiner:

CASE 4854: (Continued from the November 1, 1972 Examiner Hearing)

Application of Dugan Production Corporation to commingle gas production prior to metering, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle gas produced from wells located in Sections 25, 26, 35, and 36, Township 28 North, Range 15 West, undesignated Pictured Cliffs gas pool, San Juan County, New Mexico, prior to metering said gas, as an exception to Rule 403 of the Commission Rules and Regulations.

CASE 4860: (Continued from the November 14, 1972 Examiner Hearing)

Application of Craig Folson for an unorthodox oil well location, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill a well to test the Queen formation at an unorthodox oil well location 1340 feet from the South line and 1300 feet from the East line of Section 12, Township 13 South, Range 31 East, Caprock-Queen Pool, Chaves County, New Mexico.

CASE 4857: (Continued to November 29, 1972 Examiner Hearing)

Application of Perry R. Bass for an unorthodox location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for an unorthodox gas well location for his Big Eddy Well No. 7 located 660 feet from the South line and 1980 feet from the East line of Section 19, Township 20 South, Range 31 East, Maroon Cliffs-Morrow Gas Pool, Eddy County, New Mexico, with the E/2 of said Section 19 to be dedicated to the well.

CASE 4866: Application of Roger C. Hanks for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Devonian formation through perforations between 13,000 to 13,300 feet in his Graham Well No. 1 located in Unit F of Section 29, Township 16 South, Range 36 East, East Shoe Bar-Devonian Pool, Lea County, New Mexico.

CASE 4867: Application of Superior Oil Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pennsylvanian formation underlying the S/2 of Section 7, Township 23 South, Range 27 East, South Carlsbad Field, Eddy County, New Mexico, to be dedicated to a

(Case 4867 continued from page 1)

well to be drilled 810 feet from the South line and 1980 feet from the West line of said Section 7. Also to be considered will be the costs of drilling said well, a charge for the risk involved, a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well.

CASE 4868: Application of The Wiser Oil Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Drinkard formation through its Downes "D" Well No. 1 located in Unit K of Section 32, Township 21 South, Range 37 East, Drinkard Pool, Lea County, New Mexico.

CASE 4869: Application of Claude C. Kennedy for the amendment of Order No. R-4263 and for the revocation of Commission Order NSL-586, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-4263 to require that all wells drilled within the Lone Pine Dakota "D" Unit be drilled on locations no closer than 330 feet from the boundary of the quarter-quarter section in which any such well is located, and to prohibit the transfer of allowable to any well located closer than 1320 feet from the outer boundary of the unit area. Applicant further requests the revocation of Commission Order No. NSL-586 dated November 1, 1972, which order authorized Tenneco Oil Company to drill its proposed Lone Pine Dakota "D" Unit No. 29 well at a location 2300 feet from the South line and 1450 feet from the West line of Section 8, Township 17 North, Range 8 West, Lone Pine-Dakota "D" Oil Pool, McKinley County, New Mexico.

CASE 4835: (Continued and readvertised)

Application of Texas Oil & Gas Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface of the ground down to and including the Pennsylvanian formation underlying the S/2 of Section 13, Township 22 South, Range 26 East, South Carlsbad Field area, Eddy County, New Mexico, to be dedicated to a well to be drilled 660 feet from the South line and 1980 feet from the East line of said Section 13. Also to be considered will be the costs of drilling said well, a charge for the risk involved, a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well.

CASE 4870: Application of Sun Oil Company for an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its proposed U. D. Sawyer Well No. 10 at an unorthodox location 986 feet from the South line and 1000.5 feet from the East line of Section 27, Township 9 South, Range 36 East, Crossroads-Devonian Pool, Lea County, New Mexico.

CASE 4871: Application of Samedan Oil Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Langlie-Mattix "B-4" Penrose (Queen) Unit Area, comprising 240 acres, more or less, of Federal lands in Sections 17 and 18, Township 23 South, Range 37 East, Lea County, New Mexico.

CASE 4872: Application of Samedan Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Queen formation through two wells in its Langlie-Mattix "B-4" Unit Area, Langlie-Mattix Pool, Lea County, New Mexico.

CASE 4862: (Continued and readvertised)

Application of Adobe Oil Company for a non-standard gas proration unit and an unorthodox location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for a 520-acre non-standard gas proration unit comprising the NE/4, SE/4, E/2 SW/4, N/2 NW/4, and SE/4 NW/4 of Section 11, Township 23 South, Range 24 East, Rock Tank-Upper Morrow and Rock Tank-Lower Morrow Gas Pools, Eddy County, New Mexico, to be dedicated to a well to be drilled at an unorthodox location 660 feet from the South line and 330 feet from the East line of said Section 11.

CASE 4863: (Continued and readvertised)

Application of C & K Petroleum Inc. for an unorthodox well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be located 660 feet from the South and West lines, or in the alternative, 990 feet from the South line and 660 feet from the West line of Section 18, Township 18 South, Range 26 East, West Atoka-Morrow Gas Pool, Eddy County, New Mexico, to be dedicated to a standard proration unit comprising the S/2 of said Section 18.

CASE 4873: Application of Mountain States Petroleum Corporation for gas prorationing, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the institution of gas prorationing in the West Atoka-Morrow Gas Pool, Eddy County, New Mexico.

VENTED GAS

TOTAL GAS
GASOLINE PLANTS
PROCESSED
NON PROCESSED
LEASES

3
2

MMcf/Mo

J F M A M J J A S O N

1972

Telegram western union

1972 NOV 28 PM 1 42

IPMFEKA SANA
1-042522A533 11/28/72
TLX TEXERN EXC HOU
0001 PD HOUSTON TEXAS
PMS - NEW MEXICO OIL CONSERVATION COMMISSION, P. O. BOX 2088,
SANTA FE, NEW MEXICO

ATTENTION: MR A L PORTER, JR

CONCERNING NEW MEXICO CONSERVATION COMMISSION CASE #4873

THIS IS TO ADVISE YOU THAT TRANSWESTERN PIPELINE COMPANY HAS A NEED FOR AND IS ABLE TO TAKE ALL OF THE GAS MADE AVAILABLE BY THE PRODUCERS IN THE WEST ATOKA (MORROW) FIELD IN EDDY COUNTY, NEW MEXICO.

JACK B OLDHAM
SUPERVISOR PRORATION & ALLOCATION

1540 EST

IPMFEKA SANA

Telegram western union

WEST ATOKA MORROW GAS PRODUCTION 1972

MCFG

Month	Mtn States McCaw	Fasken Brown Yates	Fasken Pennzoil 13	Pennzoil Vandiver
January	127,011	129,650	17,867	10,055
February	105,241	244,475	6,873	5,855
March	107,331	228,023	5,741	3,904
April	123,860	269,651	4,545	3,809
May	128,274	250,950	3,654	2,506
June	124,388	222,363	3,183	2,371
July	130,337	276,280	2,940	2,232
August	134,415	285,950	3,019	3,053
September	180,774	275,323		

Comp 10-15-70

Comp Feb 15/71

Case 4873
Exhibit 2

DAVID FASKEN - BROWN YATES NO. 1

DATE	TYPE TEST	EXTRAPOLATED BHP PSIA	FLOWING BHP PSIA	FLOWING WELLHEAD PRESS PSIA	△ P BHP PSIA	MAXIMUM DAILY GAS RATE MCF	CAOF MCF/DAY
1-21-71	Drill Stem Test	3606	2878	2218	732	3250	-
2-10-71	Initial 4-Point Back Pressure Test	3631	1954	1450	1677	2233	3250
10-22-71	After Frac 4-Point Back Pressure Test	3538	3077	2297	780	3672	10,000
7-10-72	Pipeline Deliverability Test	3277	2841	1609	436	9300	-

732 / 5610

Failed to show good clean up

Had recovered only ___ % of frac fluid

Mid Perfs

BH Press drop during Δ P opposite form after frac

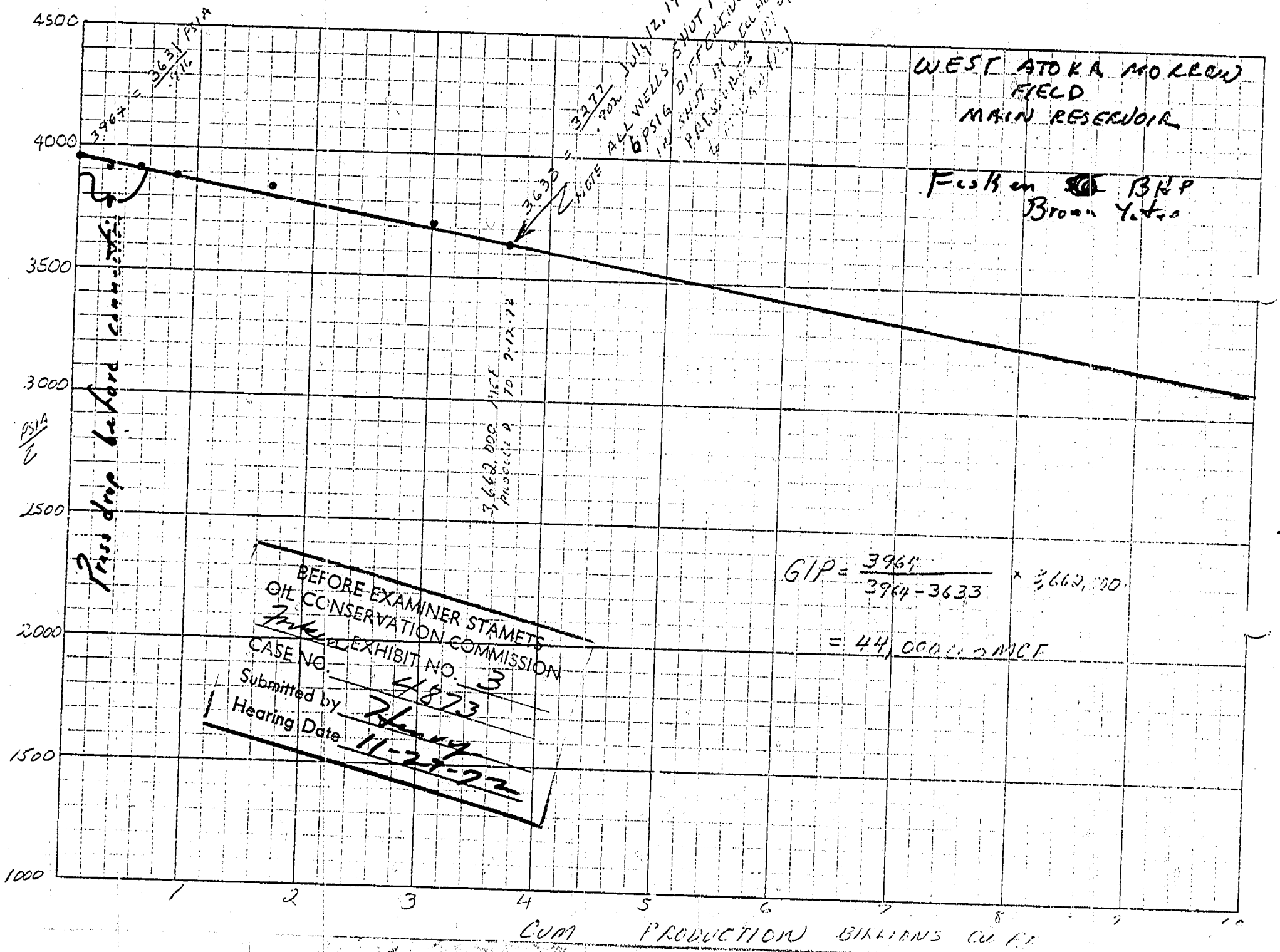
COMPARISON OF DST BUILD-UP ANALYSIS

	MOUNTAIN STATES PETROLEUM CORPORATION McCAW GAS UNIT NO. 1	DAVID FASKEN BROWN-YATES NO. 1
Extrapolated Static BHP, PSIA	3661	3,606 *smaller choke*
Flow Rate, MCF/Day	4500	3,250
Flowing Drill Pipe Pressure, PSIA	800	2,205
Flowing BHP, PSIA	1982	2,874
Net Pay Thickness (Microlog) Ft.	17	20
Natural Formation Flow Capacity Md-Ft.	146 *better*	95 *less good*
Skin Factor, S *SPE Monogram #1 Analysis Press Build-UP & Draw Down*	16 *much damage*	3 *small damage*
ΔP Skin, PSIA	1202 *pounds press drop to force prod thru skin*	223
J (ideal) cu. ft./PSIA *per day without skin factor*	9414	6,385
Flow Efficiency, %	28	69
Calculated Flow Rate @ Flowing BHP with Skin Removed, MCF/Day	15,830	4,680
C.A.O.F. BEFORE FRAC, MCF/Day	8,600	3,250

3'

With frac Treat you can reduce skin factor to neg. no.

BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
Fasken EXHIBIT NO. 2
CASE NO. 4873
Submitted by Henry
Hearing Date 11-29-72



SCHLUMBERGER

PROXIMITY MICROLOG

WELL BROWN YATES COM #1
COMPANY DAVID FASKEN

COMPANY DAVID FASKEN
WELL BROWN YATES COM #1
FIELD ATOKA - PENN
COUNTY EDDY STATE NEW MEXICO
LOCATION 1650' FSL & 990' FEL
Sec. 24 Twp. 18-S Rge. 25-E

Other Services: BHC, PHL

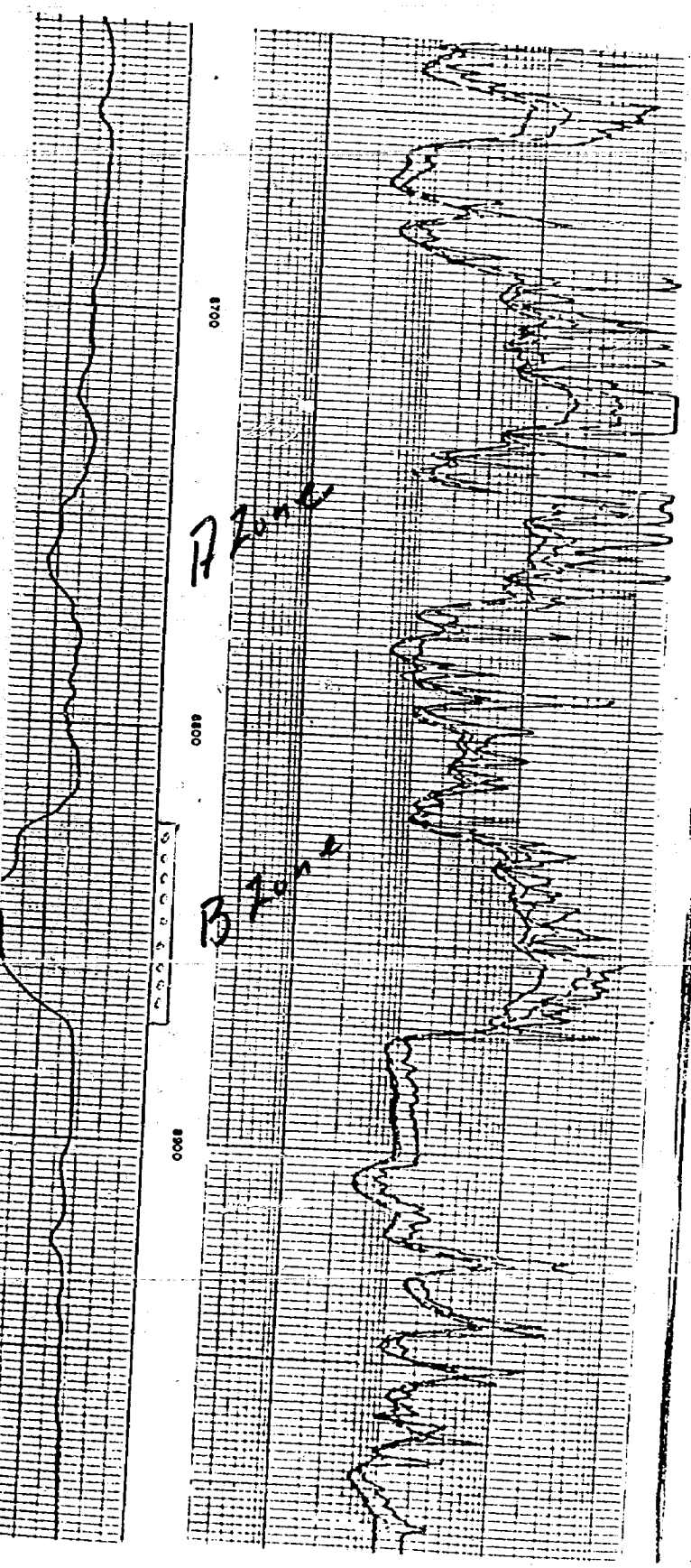
Elev.: K.B. 3472 D.F. G.L. 3451

Permanent Datum: G.L. Elev. 3451
Log Measured From K.B. 21 Ft. Above Perm. Datum
Drilling Measured From K.B.

Date	1-24-71			
Run No.	ONE			
Depth—Driller	9000			
Depth—Logger	8993			
Btm. Log Interval	8991			
Top Log Interval	5650			
Casing—Driller	8 5/8@ 1226	@	@	@
Casing—Logger	1226			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH MUD			
Dens. / Visc.	9 / 64			
pH / Fluid Loss	10 / 6.6 ml		ml	ml
Source of Sample	CIRC			
Rm @ Meas. Temp.	1.63@ 63°F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	1.25@ 58°F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	1.1 @ 63°F	@ °F	@ °F	@ °F
Source: Rmf / Rmc	M / C			
Rm @ BHT	.76 @ 135°F	@ °F	@ °F	@ °F
Time Since Circ.	10 HOURS			
Max. Rec. Temp.	135 °F		°F	°F
Equip. / Location	3720 / HOBBS			
Recorded By	OLSON			
Witnessed By	ANGEVINE & HENRY			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE



Welex

INDUCTION-ELECTRIC LOG

COMPANY MOUNTAIN STATES PETRO. CORPORATION

WELL # 1 McCAW GAS COM.

FIELD ATOKA (PENN GAS)

COUNTY EDDY STATE NEW MEXICO

Location: 1650' FNL & 1650' FWL

Sec. 19 Twp. 18-S Rge. 26-E

Other Services: S/N - N/L, Forxo

Permanent Datum: Ground Level Elev. 3435'

Log Measured From: K. B. - 12 Ft. Above Perm. Datum

Drilling Measured From: Kelly Bushing

Elev.: K.B. 3447' D.F. 3446' G.L. 3435'

Date	9/28/70			
Run No.	- One -			
Depth-Driller	9000			
Depth-Welex	8954			
Btm. Log Inter.	8949			
Top Log Inter.	1200			
Casing-Driller	8-5/8" @ 1200	@	@	@
Casing-Welex				
Bit Size	7-7/8"			
Type Fluid in Hole	Kud			
Dens. / Visc.	8.8 / 86	/	/	/
pH / Fluid Loss	11.0 / 7.8 ml	/ ml	/ ml	/ ml
Source of Sample	Circulated			
R_m @ Meas. Temp.	1.80 @ 77 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	0.75 @ 62 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source R_m R_{mf}	Measured	/	/	/
R_m @ BHT	1.10 @ 134 °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	134°F @ B.H.	°F @	°F @	°F @
Equip. / Location	8443 / Hobbs	/	/	/
Recorded By	J.S. Cauble			
Witnessed By	Mr. Havenor			

Welex

FORXO LOG

COMPANY MOUNTAIN STATES PETRO. CORPORATION

WELL # 1 McCAW GAS COM.

FIELD ATOKA (PENN GAS)

COUNTY EDDY STATE NEW MEXICO

Location: 1650' FNL & 1650' FWL

Sec. 19 Twp. 18-S Rge. 26-E

Other Services: S/N - N/L, Ind - El

Permanent Datum: Ground Level Elev. 3435'

Log Measured From: K. B. - 12 Ft. Above Perm. Datum

Drilling Measured From: Kelly Bushing

Elev.: K.B. 3447' D.F. 3446' G.L. 3435'

Date	9/28/70			
Run No.	- One -			
Depth-Driller	9000			
Depth-Welex	8954			
Btm. Log Inter.	8951			
Top Log Inter.	1600			
Casing-Driller	8-5/8" @ 1200	@	@	@
Casing-Welex				
Bit Size	7-7/8"			
Type Fluid in Hole	Kud			
Dens. / Visc.	8.8 / 86	/	/	/
pH / Fluid Loss	11.0 / 7.8 ml	/ ml	/ ml	/ ml
Source of Sample	Circulated			
R_m @ Meas. Temp.	1.80 @ 77 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	0.75 @ 62 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source R_m R_{mf}	Measured	/	/	/
R_m @ BHT	1.10 @ 134 °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	134°F @ B.H.	°F @	°F @	°F @
Equip. / Location	8443 / Hobbs	/	/	/
Recorded By	J.S. Cauble			
Witnessed By	Mr. Havenor			

(5)

Reproduced By

Electrical Log Services, Inc.

Midland, Texas 79701

REFERENCE W 4322R

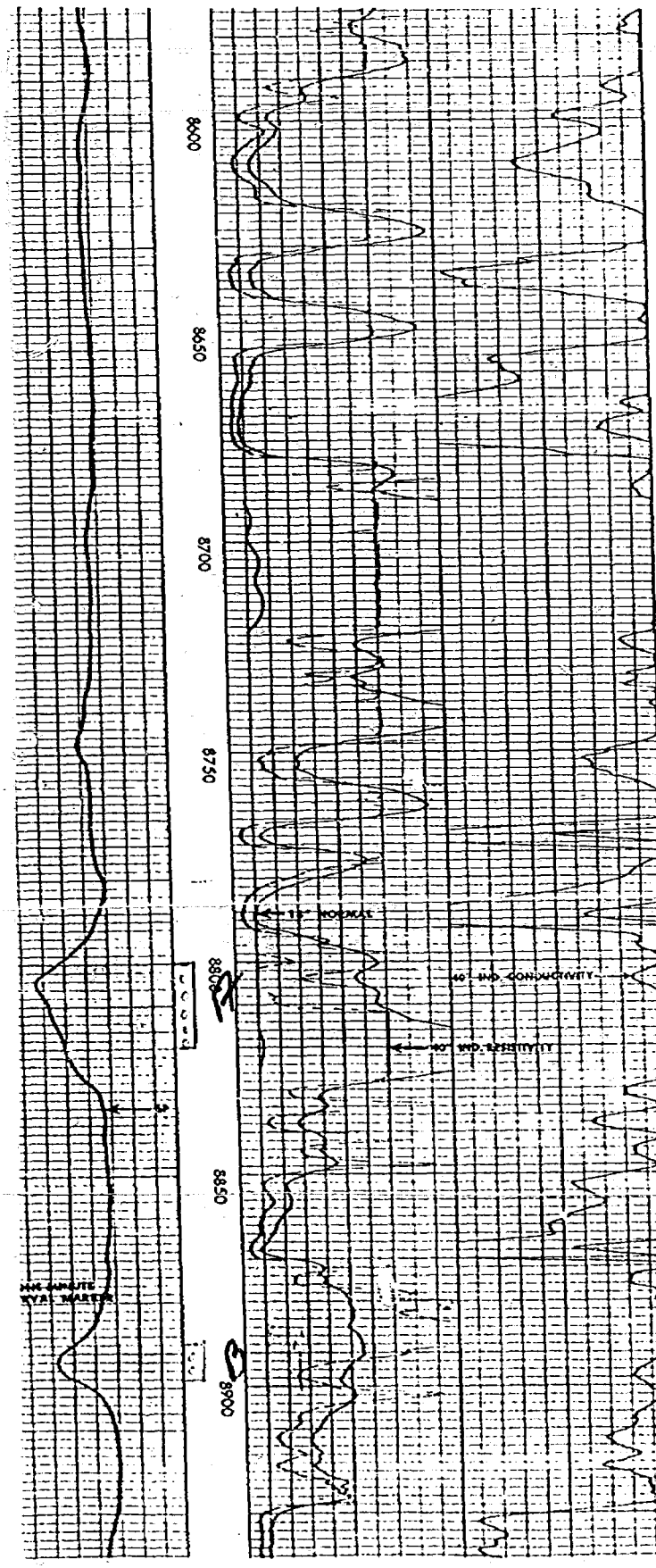
ELSI

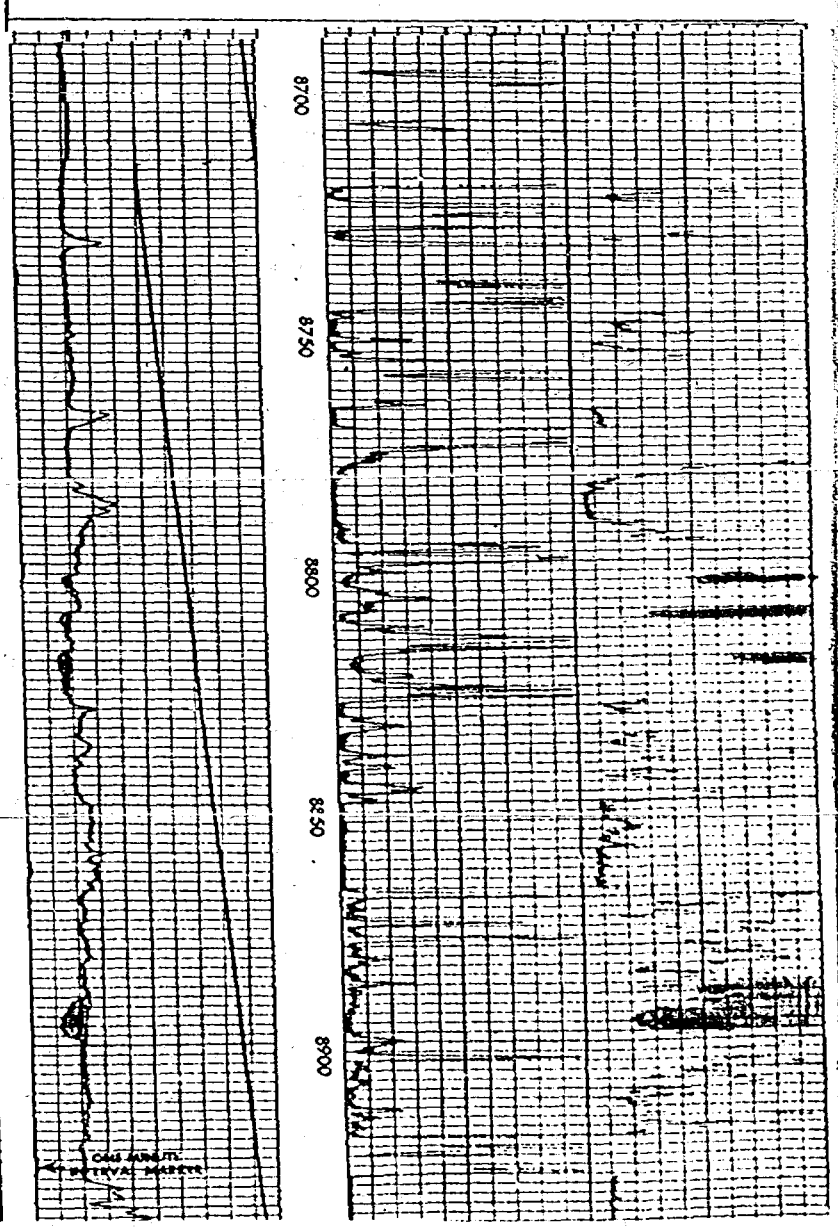
7 COMPLETION RECORD

SPUD DATE

COMP DATE

OST RECORD





LAW OFFICES OF
JENNINGS, CHRISTY & COPPLE
1012 SECURITY NATIONAL BANK BUILDING
P. O. BOX 1180
ROSWELL, NEW MEXICO 88201

JAMES T. JENNINGS
SIM B. CHRISTY IV
ROGER L. COPPLE
BRIAN W. COPPLE

TELEPHONE 622-8432
AREA CODE 505

Case 4813

November 17, 1972

Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Ida Rodriguez

RE: MOUNTAIN STATES PETROLEUM CORPORATION
APPLICATION FOR GAS PRORATION

Enclosed herewith you will find Mountain States Petroleum Corporation's Application for Gas Proration in the West Atoka-Morrow Gas Pool. I talked to Mr. Nutter one day last week and he said that this would be advertised for hearing on November 29.

I would appreciate it if you would send me a copy of Order R-1670 as amended. This Order is referred to in the Commission Rules and Regulations, but I have not been able to locate it in my copy of the Rules and Regulations.

Thank you very much.

James T. Jennings m.p.
JAMES T. JENNINGS

JTJ/mb

Encl.

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF MOUNTAIN STATES PETROLEUM CORPORATION FOR GAS PRORATION IN THE WEST ATOKA-MORROW GAS POOL, EDDY COUNTY, NEW MEXICO.

NO. 4873

Application of Mountain States Petroleum Corporation
For Gas Proration

Comes now the Applicant, Mountain States Petroleum Corporation, and hereby makes application for gas proration in the West Atoka-Morrow Gas Pool pursuant to the Rules and Regulations of the Oil Conservation Commission and in support thereof states:

1. Applicant is the operator of the Mountain States McCaw Gas Comm. Well No. 1 located in Unit F, Section 19, Township 18 South, Range 26 East, in the West Atoka-Morrow Gas Pool.

2. Applicant feels that in order to prevent waste, it is necessary that the Commission fix the allowable gas production of the Pool and allocate production among the gas wells located therein so that each operator shall have a reasonable opportunity to produce its fair share of the gas production from the Pool and so that correlative rights shall be protected.

WHEREFORE, Applicant requests the Commission set this matter down for hearing before an examiner at an early date, publish the Notice as required by law, and after hearing issue its Order (1) prorating gas production from the West Atoka-Morrow Gas Pool,

(2) fixing a proration formula, and (3) fixing the Pool allowable and allotting production to the various wells in the Pool.

Respectfully submitted,

MOUNTAIN STATES PETROLEUM CORPORATION

By _____
James T. Jennings, for
Jennings, Christy & Copple
Attorneys for Applicant
P. O. Box 1180
Roswell, New Mexico 88201

Application of Mountain
States Petroleum Corporation
for gas prorationing,
Eddy County, New Mexico

Applicant, in the above-styled cause,
seeks the institution of gas
prorationing in the W&N Atoka-
Morrow Gas Pool, Eddy County,
New Mexico.

DRAFT

RLS/dr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 4873

Order No. R-4959

APPLICATION OF MOUNTAIN STATES
PETROLEUM CORPORATION FOR GAS
PRORATIONING, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 29, 1972, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this _____ day of ~~December~~, 1972, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Mountain States Petroleum Corporation, is the owner-operator of the McCaw Gas Com Well No. 1, located 1650 feet from the North line and 1650 feet from the West line of Section 19, Township 18 South, Range 26 East, NMPM, West Atoka-Morrow Gas Pool, Eddy County, New Mexico.

(3) That there are four wells located in said pool, two of which are capable of only low ~~marginal~~ rates of production while the applicant's well and one other are capable of producing ~~substantial~~ relatively large ~~(non-marginal)~~ quantities of gas.

(4) That the applicant's well is not capable of producing at the same rate as the other ~~(non-marginal)~~ relatively large well in the pool without experiencing a substantial pressure drop.

(5) That the applicant has voluntarily reduced the producing rate of his well.

(6) That the applicant seeks the institution of gas prorationing in the subject pool to prevent waste caused by premature water encroachment and formation damage resulting from excessive rates of production and to protect correlative rights.

(7) That there is one pipeline serving said pool and that the transporter is capable of accepting all gas made available to it from the West Atoka-Morrow Gas Pool.

(8) That the preponderence of evidence presented indicates that there is no active water drive in the West Atoka-Morrow Gas Pool and that in the absence of such a water drive, current rates of production in the pool will not result in formation damage and that the applicant has the opportunity to improve the productivity of his well through mechanical stimulation.

(9) That the evidence indicates that the applicant's correlative rights are not being violated.

(10) That the application should be denied.

IT IS THEREFORE ORDERED:

(1) That the subject application is hereby denied.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

CASE 4874: Application of SKELLY FOR A DUAL COMPLETION AND WATER INJECTION WELL, EDDY COUNTY, N.M.