CASE 7491: HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO

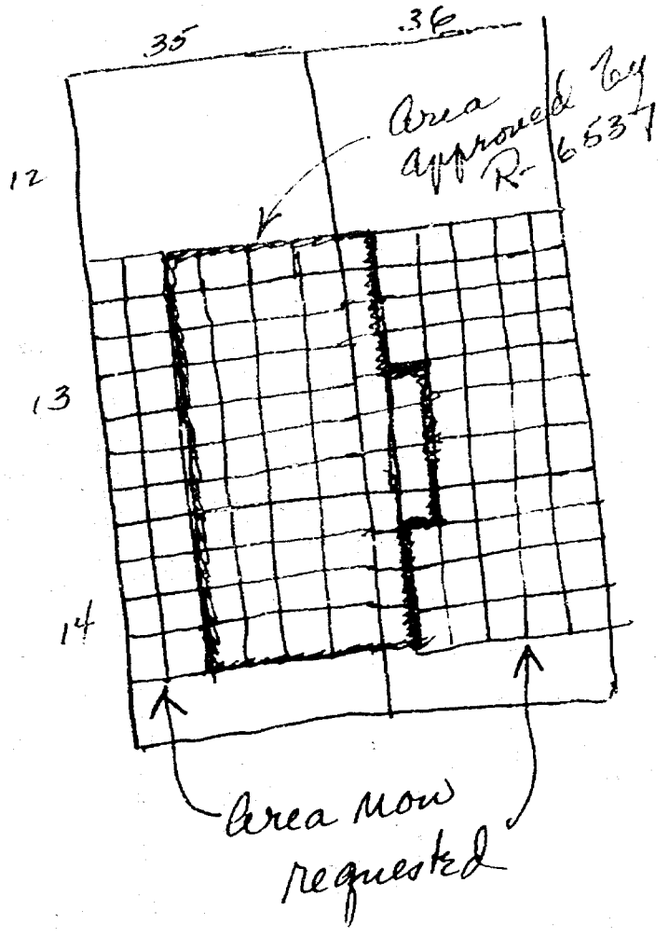
CASE NO.

7491

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS,

ETC.

Dan Nutter



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
17 February 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. CASE 7491

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Robert H. Strand, Esq.
HARVEY E. YATES COMPANY
Roswell, New Mexico

I N D E X

E X H I B I T S

MR. STAMETS: The hearing will please come to order.

We will call now Case 7491.

MR. PEARCE: Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico.

MR. STRAND: Mr. Examiner, Robert H. Strand, attorney from Roswell, representing the applicant in this case, and we have two witnesses, Mr. Groves is already sworn; we have one additional.

(Mr. Nokes sworn.)

MR. STRAND: Mr. Examiner, if I might make a very short opening statement on this matter.

The Division, by Order No. R-6537, entered on December 17th, 1980, in Case Number 7085, recommended to the Federal Energy Regulatory Commission that the Atoka formation underlying some 37,760 acres in Lea County be designated as a tight formation.

Subsequently, the FERC, in Order No. 138, so designated the Atoka underlying the applied for area as a tight formation.

And the purpose of the application by

Harvey E. Yates Company in this case, Number 7491, is to request the Division to recommend to the FERC an eastward and westward expansion of the previously designated formation.

As set out in the application here, we are requesting that an additional area of approximately 46,720 acres be recommended for designation, and if this is approved, or recommended and eventually designated, the total Atoka tight formation area would be some 84,480 acres.

Since this application covers extension of an existing designated tight formation, I would request that the evidence previously submitted in Case Number 7085 be made a part of the record in this case, primarily because our material we will present here today will be basically supplemental to that.

Mr. Examiner, I believe the exhibits are included in the book we've prepared, the exhibits from the prior hearing.

MR. STAMETS: In that case I see no problem with incorporating the record in Case 7085 in the case here today.

MR. STRAND: Thank you.

As to the status of the exhibits we are presenting today, Mr. Examiner, they were not submitted during -- or more than fifteen days prior to the hearing, but we re-

ceived leave from yourself and your attorney to submit them late.

Also, the USGS -- sorry, Minerals Management Service, in Albuquerque, also concurred in that and requested that we send them a transcript of the hearing, which we will do.

MR. STAMETS: Since this is not a Federal Energy Regulatory requirement, and since the primary reason for the requirement for the submittal was for the former Geological Survey, and since they concur, I see no problem with that slight variation in the approved procedures, and we should proceed today.

MR. STRAND: Thank you, Mr. Examiner.

ED GROVES

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your name.

A. Ed Groves.

Q. Where do you reside, Mr. Groves?

A. Midland, Texas.

Q. What is your position with the applicant, Harvey E. Yates Company?

A. Chief Geologist.

Q. Mr. Groves, have you previously testified before the Division or one of its Examiners?

A. Yes, I have.

Q. And are your qualifications a matter of record?

A. Yes, they are.

MR. STRAND: Mr. Examiner, is Mr. Groves considered qualified?

MR. STAMETS: He is.

Q. Mr. Groves, are you familiar with the application in Case Number 7491?

A. Yes, I am.

Q. Are you also familiar with and have you reviewed the evidence that we've previously presented in Case Number 7085?

A. Yes.

Q. And have you read Order No. R-6537, previously entered by the Division?

A. Yes.

Q. Mr. Groves, have you prepared certain exhibits for presentation at this hearing?

A. Yes, we have.

Q. Would you please briefly describe these exhibits and how they relate to this application?

A. All right. Exhibit Number One is a reference map showing the existing designated area and the two extensions.

The existing designated area is outlined with the dashed, two small dashes, and the extensions are shown kind of by the slanted, or hachured-type tape, so where you have the double lines of tape, those are the boundaries of the existing and the requested extensions.

One extension is on the east and one to the west.

Q. Mr. Groves, have you also designated on this Exhibit Number One the two cross sections which will be presented as Exhibits Two and Three?

A. Yes, I have. They're shown as A-A' and B-B'.

Q. Referring to Exhibit Number Two, which is cross section A-A', would you please describe that?

A. This cross section starts in the northwestern portion of the area, extends towards the southeast through the existing area, and goes through the previously designated type well, the one shown by a triangle, the

Betenbough, that was just about a mile northwest of the townsite of McDonald.

Q. Referring to Exhibit Number Three, which is cross section B-B', would you briefly describe that?

A. B-B' starts in the southwestern corner of the west extension, proceeds through a well to the north and then moves to the east through the existing area that is designated and the well in Section 20, then, the Adobe No. 1 Head State, is the first well outside of the existing one, and is part of the eastern extension being requested, and ends in the southeastern portion of the requested area.

Q. Mr. Groves, would you explain in some detail the Atoka formation as it's depicted on these cross sections?

A. The Atoka in this immediate area of the Tatum Basin ranges in thicknesses from about 375 feet, found in the extreme northwestern portion of the area, to a maximum of some 750 feet in thickness, and that is found down in the south central portion.

This formation consists of shales interbedded with limestones and sandstones. The sandstones range from fine to medium grain, somewhat silty in many places, and fairly low porosity in most cases.

These sands are discontinuous, very dif-

ficult to carry through a large area. For that reason we feel like we're dealing with possibly a fluviatile system, or at the best a very shallow water sedimentation.

The source of the Atoka sediment seems to be coming from the north through this area, and we are in the area where we feel like the most sands are to be found.

Q. Mr. Groves, would you characterize an Atoka formation as it exists in the expansion area as being similar to the formation characteristics in the originally designated area?

A. Yes, I do. We find very little changes as we move to either side of the existing area.

There are wells within the existing area that have no more sand than what we find on the outskirts of it, so we feel like that the Atoka does extend throughout this area, and you'll notice the sections of the Atoka in the logs on either end of the cross sections show a thickness where that the Atoka does extend throughout this entire area.

Q. Does the gross thickness of the formation remain fairly uniform over the whole area?

A. Farily uniform in a structural area, and the well on A-A', at "A", is one of these sitting on a structure, and that is the thinnest Atoka section in the area. That has some 375 feet of Atoka in it.

Q. And which well is that, for the record?

A. It's the Union Texas Petroleum Company No. 1 Sheli State in Section 6, 13 South, 35 East.

Q. Mr. Groves, in the previous hearing we designated the log from the Betenbough No. 1 Well as the type log for the Atoka formation which we were at that time proposing for designation.

Would you propose any different well at this time for the expanded area?

A. No, sir, I wouldn't. I feel like that it's still the best type log, or as good as we have, in the area. We have seen nothing to indicate that we should have another type log.

Q. Mr. Groves, what's the average depth from the surface to the top of the Atoka formation which is depicted on your logs, average over the entire area?

A. It's going to be approximately 12,200 feet.

Q. Mr. Groves, is it your opinion that the local formation, as we've described it, both the initially designated area and the expansion area, are at least potentially productive?

A. Yes.

Q. The testimony in the previous case, 7085,

indicated that there were two fresh water aquifers in the -- under the originally designated area, the Ogallala, at approximately 300 to 400 feet and the Santa Rosa at 900 to 1200 feet.

Do these aquifers also exist under the proposed expansion area?

A. Yes, they do. Probably the only change I would make in those would maybe specify a depth of some 250 feet as you move to the west, up to the northwest, so let's say that the Ogallala may occur between 250 and 400 feet.

Q. Mr. Groves, are you familiar with the rules and policies of the Oil Conservation Division, the Minerals Management Service, and other Federal and State agencies, relating to protection of fresh water aquifers?

A. Yes, I am.

Q. And do you feel that compliance with these rules and policies, as they relate to wells that would be drilled within this area, would adequately protect these fresh water aquifers?

A. Yes, I do.

Q. Mr. Groves, did you prepare Exhibits One through Three, or were they prepared under your supervision?

A. Yes.

MR. STRAND: That's all the questions I have on direct.

MR. STAMETS: Are there any questions of this witness at this time?

He may be excused at this time.

RAY NOKES

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. STRAND:

Q. Please state your name and residence.

A. Ray Nokes, Roswell, New Mexico.

Q. Mr. Nokes, what is your position with the applicant?

A. I'm a reservoir engineer for Harvey E. Yates.

Q. Have you testified before the Division previously?

A. Yes, sir.

Q. And are your qualifications as a reservoir engineer a matter of record?

A. Yes, sir.

MR. STRAND: Mr. Examiner, is Mr. Nokes considered qualified?

MR. STAMETS: He is.

Q. Mr. Nokes, are you familiar with the application of Harvey E. Yates Company in Case Number 7491?

A. Yes, sir, I am.

Q. Are you also familiar with the evidence previously submitted in Case Number 7085 and with the prior Order No. R-6537?

A. Yes, sir, I am.

Q. Have you prepared additional engineering exhibits relating to the engineering aspects of this application as they relate to the proposed expansion of your total tight formation?

A. Yes, sir, I have.

Q. Mr. Nokes, have these exhibits been bound in booklet form, which we will designate the entire booklet as Exhibit Number Four?

A. Yes, sir, I have. They are.

Q. With reference to Exhibit Number Four, Mr. Nokes, and your permeability calculations relating to this formula -- or to this area, I'm sorry -- please describe the permeability calculations and your methodology utilized

in performing these calculations.

A. The permeability calculations were based on log interpretation and compared to the Betenbough No. 1, which is northwest of the McDonald Unit No. 1.

The Betenbough No. 1 is in an approved area, previously approved area. The McDonald Unit No. 1 is in the proposed extension.

If you'll notice on Exhibit Number One, and I must apologize, that would have been attached to this packet but it's considered as Exhibit Number One, the Betenbough is identified by the triangle and the McDonald is northeast of it in Section 33, I believe.

MR. STAMETS: I believe that would be southeast.

A. I'm sorry, did I say -- southeast. I'm sorry.

MR. STAMETS: What is the -- was the McDonald Unit No. 1 Well drilled subsequent to the designation of the tight formation?

A. Previous?

MR. STAMETS: Previous tight formation?

A. Yes, sir.

MR. STAMETS: Okay, thank you.

A. In doing so it was a calculation based

on log interpretation of logs run by Dresser Atlas.

On this calculation I requested from Dresser Atlas to -- to prepare and run a tabular Prolog over the intervals that were considered in the Atoka formation, and that Prolog is included in there. It would have been one of the exhibits but it's not numbered, I'm sorry, but there is a Prolog presentation in there.

Okay. In that, I would like to explain that their calculations were run on a -- they were not run on the Archie -- I mean on the Humble equation, they were run on the Archie equation, which is a carbonate water saturation calculation, so therefor the exhibit which was prepared by me, there are the three areas of concern, which are calculated on a Humble equation, a sandstone equation, and also the Morris Biggs equation, which is also documented in the Dresser Atlas interpretative chart book for permeability calculations.

MR. STAMETS: Now you say you performed some calculations? Are those --

A. Yes, sir, they are attached.

MR. STAMETS: And attached to what?

A. In this package, I'm sorry. It would look similar to this.

MR. STAMETS: I'll have to have some

help finding some of these things here.

A. Yes, sir. I'm sorry, those would have been stamped. It will be --

MR. STAMETS: You've got them? Okay, Mike has them.

A. You do have them? Okay.

MR. STAMETS: You may proceed.

A. The materials, or the values that I did utilize from the Prolog were the resistivity readings on the RT and also the permeability -- I mean the porosity calculations throughout the pays.

Through this I did come up with an average permeability, which is indicated on the second page of my calculations. The average porosity would be 8.11 percent throughout the Atoka area.

The permeability calculation, there again is based on Morris Biggs equation, and in this equation it is a sandstone calculation of permeability, and in doing so for the entire interval it is zero -- it is .0418 millidarcy.

Q. Mr. Nokes, in performing these calculations what pay sections did you utilize within the gross Atoka formation?

A. The intervals that are listed on this

page where these calculations are presented, indicate the actual foot by foot pay that was considered as productive pay. There again, this is an overall view, which I would like to indicate that it is the most detrimental permeability calculation, or the highest permeability calculation that could have been reflected over this formation.

If we consider what we have looked at on logs as our target zone it would be, on the second page of this calculation, from a depth of 12,733 to 12,784, inclusive, a 52-foot net pay that we -- we are considering as the -- the target zone.

Throughout that pay zone the average porosity is 8.42 percent and the average water saturation is 21.67 percent, and the permeability calculation for that area is .0 -- I'm sorry -- is .048562 -- no, I'm sorry, excuse me. That was considering both the upper and the lower zone that was indicated on this page. This was what was perforated in the Betenbough. I'm sorry.

The actual permeability for the lower zone, which is our target zone, is .04095 millidarcy, and that was with an average permeability -- or porosity of 8.32 percent and a 22.768 percent water saturation.

I did this calculation based over the entire interval so that it would reflect the entire Atoka

zone, which reflects the highest permeability calculation. Utilizing the target zone, it is a lower permeability, but there again, I wanted to show the higher permeability, that it was well underneath the prescribed limit.

Q. Mr. Nokes, which wells, for the record, did you utilize data from in performing these calculations?

A. Okay, it was the McDonald Unit No. 1, which is in the proposed area, in the eastern area of the extension.

Also the Betenbough, the HEYCO Betenbough No. 1, which is already an approved Atoka tight formation. The calculations on this as far as the permeability is reflected to have a higher permeability, a slightly higher permeability than the Betenbough, which was indicated in the -- on the record and in the exhibits of previous testimony, of a .025 millidarcy.

Q. Mr. Nokes, based on the logs that form a part of the cross sections, Exhibits Two and Three, would you expect that the average permeability characteristics would be any different in the westward expansion area and the balance of the eastward expansion area?

A. No, sir. As a matter of fact, looking at the wells on the western boundary, or the western extension, I would expect it to be in an area of possibly 10 per-

cent less than the permeability that is calculated on this, based on the thinner pay, as such.

The area around the McDonald Unit I would consider to be the same.

Q. Mr. Nokes, then considering the geological testimony of Mr. Groves and your permeability analysis, is it your opinion that the Atoka formation underlying the proposed expansion area would be expected to have an estimated average in situ gas permeability of less than .1 millidarcy --

A. Yes, sir.

Q. -- throughout the pay section?

A. Yes, sir, I do.

Q. Mr. Groves, going on with Exhibit Number Four, would you describe your analysis and calculations relating to expected production against atmospheric pressure of wells drilled to the Atoka formation?

A. The production that I utilized, there again, is based on the production that was presented in the Betenbough application, and there again, that is attached in that exhibit Number Four, and gives the actual production rates and actual suggested maximum production in the discussion that was submitted in the previous approved tight gas application.

From that calculation, to be quite honest,

I feel that the maximum calculated production that could be expected in the existing or in the proposed area would not be more than 563, I believe it is, Mcf.

That is based -- correction, I'm sorry -- 973.816 Mcf. That is based on a ratio evaluation of the permeability in the Betenbough No. 1 and the McDonald Unit No. 1, in regards to the ratio of permeability that is expressed in both of these wells.

The Betenbough No. 1 was characterized by not to exceed 403 Mcf per day, and in a calculation of a factor of 1.67 greater permeability than the Betenbough, there is -- that is how I came about with the 673 maximum Mcf per day, and that is natural completion.

Q. Mr. Nokes, what is the current production status of the Betenbough No. 1 Well?

A. The current status of the production should be your last page of Exhibit Number Four. That production is depicted, and I broke this down on a day to day production.

Also, immediately below that it shows a cumulative production, but there again, you will notice that no time during the period in which production was recorded on the C-115's for the Commission, that it never exceeded more than the 1.6 magnitude on the regulations. And

there again, this is stimulated production. This is not an actual completion. This is stimulated production.

Q. Do you have the average production per day?

A. Yes, sir, it is indicated per day on a month-to-month basis. I did not average it as such for the complete period since the well has come on.

But the maximum daily production indicated since the well has come on by C-115 production records, is 795 Mcf per day and approximately 46 barrels of oil, is the maximum-- or condensate, excuse me, condensate production.

Q. What is the production figure for the last month you have on a per day basis?

A. Production based on December, '81 production was 177 Mcf per day with 9 barrels of condensate and 6 barrels of water.

Q. Mr. Nokes, then the only actual production figures you have are from the Betenbough No. 1 Well after it was stimulated?

A. Yes, sir. As such there is in the previous exhibits production based on drill stem test at 102 Mcf per day. There again, if you take that as a natural completion production, I did that just to see what it would come up with, based on natural completion it would not be

expected to be more than 170 Mcf per day, based on the drill stem test.

All subsequent production was stimulated production.

Q. Mr. Nokes, based on your analysis of this data, as you've testified to, is it your opinion that the stabilized production rate against atomospheric pressure of wells which might be completed for production in the Atoka formation underlying the proposed expansion area without any type of stimulation would not be expected to exceed 1215 Mcf per day?

A. No, sir, it would not.

Q. Mr. Nokes, again referring to Exhibit Number Four, would you describe the characteristics of the liquid hydrocarbons which might be expected to be produced from both the expansion area and the originally designated area?

A. In the original designated area, which, there again is the Betenbough, HEYCO Betenbough Unit No. 1, that well produced a condensate production of a 46 gravity condensate, clear to a straw colored clear condensate.

PBT analysis indicates a slope, dramatic slope change at approximately 3560 to 3570 psi, which considering this change, dramatic change, you'd have a dewpoint

somewhere in the neighborhood of 3500 to 3600 psi. Therefor, it is assumed that -- or expected that any production coming from this well would be assumed to have been in a single state -- a single phase status at reservoir conditions.

Q. It would be in a gas state in the reservoir?

A. Yes, it would be a gas state.

Q. And again, Mr. Nokes, these -- this is based on the liquids produced from the Betenbough No. 1, is that correct?

A. Yes, sir. This would be, actually, a representation of retrograde condensate phenomenon.

Q. Would you expect the liquid hydrocarbons produced anywhere else from the Atoka formation underlying this area to have any different characteristics?

A. No, sir.

Q. Would it then be correct to say that you would expect that there would be no crude oil produced --

A. No, sir.

Q. -- from the Atoka formation?

A. There would be no crude oil.

Q. Mr. Nokes, are you familiar with the rules and policies of the Oil Conservation Division and Minerals Management Service, and other governmental agencies,

relating to casing and cementing programs which would be utilized in drilling wells to the Atoka formation?

A. Yes, sir, I am.

Q. In your opinion would these -- or compliance with these rules and policies adequately protect the fresh water aquifers that Mr. Groves testified to?

A. Yes, sir. It was -- if you'll notice in the Exhibit Four, there again, this is a well description of every well that has been penetrated in the -- or that has penetrated the Atoka formation. It is a detail description of it, and the surface casing throughout this -- this area, the surface casing, the shallowest depth at which it was set was 319 foot, and the shallowest depth of intermediate casing was at 4300 foot.

Q. Mr. Nokes, with regard to various types of treatment programs which might be employed for wells completed in the Atoka formation, in your opinion will any of these types of programs have any adverse effect on the fresh water aquifers?

A. No, sir. If the casing is cemented properly, which is required by the State Commission, there would be no contamination.

Q. Mr. Nokes, for identification purposes for the Federal Energy Regulatory Commission, what is the

closest city or town to this proposed area?

A. McDonald, which is one-quarter of a mile west of the McDonald Unit No. 1.

Q. Mr. Nokes, were the materials that make up Exhibit Number Four prepared by you or under your supervision?

A. Yes, sir, I prepared them.

MR. STRAND: Mr. Examiner, I'd move the admission of Exhibits One through Four.

MR. STAMETS: These exhibits will be admitted.

MR. STRAND: And that's all I have on direct.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Nokes, can you identify the wells which have been drilled to the Atoka --

A. Yes, -- I'm sorry.

Q. -- since the original hearing for the first tight formation designation?

A. Mr. Stamets, indicated on the well description of all the wells in this area, and there again, I requested that the Betenbough be designated as a triangle

on this area map, and all wells that have penetrated the Atoka formation be circled, which there are nineteen outlying wells in the proposed acreage on the east and west boundaries.

In this presentation, Exhibit Four, there again I refer back to the well-by-well description, and in this I not only give the description of when the well was drilled but also if it was commercial and there again, there's only one well, and that is the Betenbough, which I utilized in there, but I apologize, I did not indicate it as a reference well in the existing area.

That's on page two, or the second page there, the HEYCO Betenbough No. 1 in column three. That is the tie-in well in the existing tight -- tight gas area.

But the dates on which these wells were spudded are, and I mean also their date of completion, or plugged and abandoned.

Q. Okay, that's very interesting. Now, let's go back --

A. Okay.

Q. -- and answer the question.

Would you tell me which wells on this map have been drilled subsequent to the original hearing?

A. Okay, the original hearing, there again, the original hearing date -- to be quite honest, I'm not sure

of the original date of the hearing, as such.

MR. PEARCE: November the 12th, 1980, according to the --

A. Okay, November 12th of 1980, there are -- and you're regarding spudding as such, is that correct?

Q. Yes.

A. Okay. The HEYCO Betenbough No. 1 was in the previous area and it was spud in March the 6th of 1980.

The McDonald Unit No. 1 was spud in 6-13-81, which is subsequent to that period of time.

That would be it, sir.

Q. So all the rest of these wells existed at the time of the original hearing.

A. Yes, sir.

Q. In your conversations with HEYCO personnel, were you able to ascertain why the original area was not proposed to include this entire area to begin with?

A. At the time, it would be my understanding that this information -- that the boundary that was set was considered all that was pertinent, and at this point we are trying to expand so that it will be to the benefit of those that are drilling either to or through the Atoka for an attempt that it would be profitable to drill this, commercially

posed area, is that correct?

Q. That's right.

A. Okay, these are all Mississippian completions. These wells that are producing wells are Mississippian completions and, from my understanding, are being produced under a tight gas formation as it is right now.

Q. Do you know if any of these wells were tested in the Atoka interval, and if that information is somewhere in this --

A. Yes. There again, back to the well history on each individual well, the only one that I am aware of that did test the -- or I believe there's two, were the Austin Monteith, which was DST'd at 12,608 to 882, and --

Q. What page is that on?

A. I'm sorry. It is on page three of the well history presentation.

Q. Fine, I think we have that one now.

A. And it does show bottom hole temperature and shut-in pressure for that interval.

Also, on the Adobe Oil and Gas to the right of that, the next to the last column, is the State 16 No. 2, and they DST'd the Atoka, and there again, showing a shut-in pressure of 193. I do not know, but I anticipate that there was a packer problem on that.

There were other attempts that were indicated but also they indicated a problem with packers.

Q. In that area the only two tests that you show are -- they just simply recovered drilling mud.

A. Yes, sir. There might -- there is one additional that I failed to point out. It's the Head State, and that is in Section 20 that you were referring to.

They did have a DST and also they did have a reflective shut-in pressure of 4000, which is indicative of what was in the Betenbough, and also in the McDonald.

There again, there was no production as such from the DST reflected.

MR. STAMETS: Are there other questions of this witness or the previous witness?

QUESTIONS BY MR. STOGNER:

Q. I guess there was no cores?

A. No, sir.

(There followed a discussion off the record.)

Q. In your permeability calculations on your Morris Biggs equation.

A. Morris Biggs, yes, sir.

Q. Your "C" factor.

A. Yes, sir.

Q. What did you use for that?

A. I'm sorry, did I not indicate that on that?

There is a constant that -- yes, sir. Below that there's a constant that is used of a factor of 250 for oil and 80 for gas; just below the formula on the second page of the permeability calculations; that is utilized by Dresser Atlas and is well known in a sand permeability calculation.

Q. Which one did they use?

A. It was the 80 for gas. It was the coefficient of 80 indicative of gas permeability.

Q. However, you show no production of gas or oil in that test. Why did you use the 80 for gas?

A. To reflect the -- there again, we're showing a comparison to the Betenbough on structure and production that is reflected in the lower zone of the Betenbough, and also it is reflected in the area behind pipe in the McDonald Unit No. 1. The production that is in the Betenbough is gas and therefor the calculation was based for a gas permeability calculation, due to the fact that this is

a gas, tight gas application request.

Q. Do -- I'm not all that familiar with the formations yet -- I mean with the calculation yet, but do they account for possible GOR or water influx in that calculation, or do --

A. The water calculation is in the formula itself.

MR. STAMETS: Any other questions of either of the two witnesses? Mr. Nokes may be excused.

Do you have anything further?

MR. STRAND: Nothing further, Mr. Examiner.

MR. STAMETS: We'll take the case under advisement.

If there is nothing further, the hearing is adjourned.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7496 heard by me on 2-17 19.82

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

United States Department of the Interior

OFFICE OF THE SECRETARY

Minerals Management Service
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

APR 2 1982

Mr. W. Perry Pearce
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Pearce:

This jurisdictional agency concurs in the recommendation of the State of New Mexico, Case No. 7491, Order No. R-6537-A, dated April 9, 1982, that the Atoka Formation underlying the described lands in subject order in Lea County, New Mexico, be designated as a Section 107 tight formation.

It is requested that this concurrence be included with the recommendation submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

James W. Shelton

For Gene F. Daniel
Deputy Minerals Manager
Oil and Gas

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

April 9, 1982

Mr. Robert H. Strand
Attorney at Law
P. O. Box 2226
Roswell, New Mexico 88201

Re: CASE NO. 7491
ORDER NO. R-6537-A

Applicant:

Harvey E. Yates Company

Dear Sir:

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

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7491
Order No. R-6537-A

APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 17, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 9th day of April, 1982, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the Division on December 17, 1980, entered its Order No. R-6537, recommending to the Federal Energy Regulatory Commission that the Atoka formation, underlying the following described lands situated in Lea County, New Mexico, be designated as a tight formation pursuant to Section 107 of the Natural Gas Policy Act of 1978 and 18 CFR, Section 271.701-709:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 6 and 7: All
Sections 18 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 24: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 5 through 7: All
Sections 18 and 19: All

Containing a total of 37,760 acres, more or less.

(3) That the Federal Energy Regulatory Commission by its Order No. 138, as designated the Atoka formation underlying the above described lands as a tight formation.

(4) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 CFR §271.701-705, recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying the following lands situated in Lea County, New Mexico, which are contiguous to the previously designated lands, hereinafter referred to as the Atoka formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

WESTERN CONTIGUOUS AREA

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 31 and 32: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 5 through 8: All
Sections 17 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 34 EAST, NMPM
Sections 5 through 8: All
Sections 17 through 20: All

EASTERN CONTIGUOUS AREA

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Sections 32 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 1 through 5: All
Sections 8 through 17: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 1 through 4: All
Sections 8 through 17: All
Sections 20 through 24: All

The entire area to be added containing a total of 46,720 acres, more or less.

(5) That the Atoka formation underlies all of the above described lands; that the formation consists of shales interspersed with thin lime and sand sections; that the top of such formation is found at an average depth of 12,200 feet below the surface of the area set out in Finding No. (4) above; and that the thickness of such formation is from 375 to 750 feet within said area.

(6) That the type section for the Atoka formation for the proposed tight formation designation is found at a depth of from approximately 12,230 feet to 12,970 feet on the Gamma Ray-Neutron log dated May 18, 1980, from the Harvey E. Yates Company Botenbough Well No. 1 located in Unit C of Section 32, Township 13 South, Range 36 East, Lea County, New Mexico.

(7) That the following wells produce or have produced natural gas from the Atoka formation within the proposed area:

Harvey E. Yates Company Botenbough #1	660 feet from North line and 1980 feet from West line of Section 32, Township 13 South, Range 36 East, NMPM, Lea County, New Mexico.

(8) That the Atoka formation underlying the above described lands has been penetrated by several other wells, none of which produced natural gas in commercial quantities from the Atoka formation.

(9) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the

following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 CFR §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(10) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Atoka formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 CFR §271.703(c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(11) That within the proposed area there are two recognized water aquifers being the Ogallala, found at depths of from 250 feet to 400 feet, and the Santa Rosa, found at depths of from 900 feet to 1200 feet.

(12) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Atoka formation will not adversely affect said water zones.

(13) That the Atoka formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 CFR §271.703(b)(6) of the regulations.

(14) That the Atoka formation within the proposed area, described under Finding (4) above, should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 CFR §271.701-705 of the regulations that the Atoka formation tight gas formation area recommended by Division Order No. R-6537 and approved by FERC Order No. 138 effective March 30, 1981, be extended, by designation, to include the following contiguous areas:

WESTERN CONTIGUOUS AREA

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 31 and 32: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 5 through 8: All
Sections 17 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 34 EAST, NMPM
Sections 5 through 8: All
Sections 17 through 20: All

EASTERN CONTIGUOUS AREA

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Sections 32 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 1 through 5: All
Sections 8 through 17: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 1 through 4: All
Sections 8 through 17: All
Sections 20 through 24: All

The entire area to be added containing a total of 46,720 acres, more or less.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

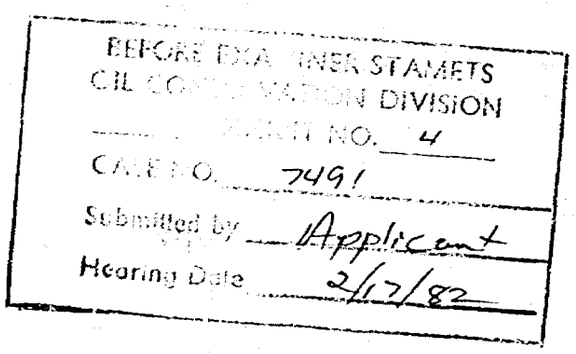
S E A L

fd/

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

DOCKET NO. _____



Prepared by:

Harvey E. Yates Company
Security National Bank, Ste. 300
P. O. Box 1933
Roswell, New Mexico 88201

Atoka Gas Sand Pool Extension

The purpose of this report is to present evidence which will demonstrate that the Atoka Gas Reservoir, under the Section described in the Tight Formation Application of January 27, 1982, in Townships 12, 13 and 14 of Ranges 35 and 36, N.M.P.M., Lea County, New Mexico, qualifies as an extension to the existing "Atoka Tight Formation" area.

The gas permeability in the Atoka Zone of the Harvey E. Yates Company operated McDonald Unit #1, were calculated from electric logs. The result of this analysis indicated an average in-situ gas permeability of .0418 millidarcies and is not expected to exceed 0.1 millidarcies. The Humble Equation and the Morris and Biggs Equation were used in calculating the Atoka sandstone permeability in the attached exhibits.

The stabilized production rate, at atmospheric pressure, for the Atoka Formation is not expected to exceed a maximum of 673.816 MCFGPD without stimulation. Attached is a production summary extracted from C-115 Monthly Operators Reports for the Heyco-Betenbough #1.

A comparison of the similarities in the Atoka Formation in-situ pressures, between the Heyco-Betenbough #1 and the McDonald Unit #1, indicates that the retrograde condensation phenomena which occurred in the Betenbough #1, would also occur in the McDonald Unit #1. The liquid hydrocarbons production expected from the Atoka Formation would have existed in a gas state at reservoir conditions; and therefore, would not exceed five barrels of crude oil per day.

Submitted with this report is a detailed description of each well which has penetrated the Atoka Formation and tests, is recorded.

Ray F. Nokes
Reservoir Engineer
Harvey E. Yates Company
February 1, 1982

Robert H. Strand, P.A.

Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201

Please Reply To: P.O. Box 2226

January 27, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Richard Stamets

Re: Application of Harvey E. Yates
Designation of Tight Formation
Lea County, New Mexico

Dear Mr. Stamets:

Enclosed for filing is an original and two copies of the Application of Harvey E. Yates Company in the above referenced matter. This case has previously been set for hearing on the February 17, 1982 Docket.

Sincerely yours,

Robert H. Strand

RHS/bjt
encls

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION LEA COUNTY, NEW MEXICO : Case No. _____

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states:

1. Applicant is the owner of an interest in the Atoka Formation underlying the following described lands situated in Lea County, New Mexico:

Township 12 South, Range 35 East, NMPM
Sections 31 and 32

Township 13 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20

Township 12 South, Range 36 East, NMPM
Sections 32, 33, 34, 35, 36

Township 13 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24

Containing a total of 46, 720 acres, more or less.

2. The Atoka formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703 (c)(2)(B).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka formation underlying the above described lands be designated a tight formation.

DATED this 25th day of January, 1982.

HARVEY E. YATES COMPANY

By: _____
Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bjt

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

DOCKET NO.

PREPARED FOR:

HARVEY E. YATES COMPANY
SUITE 300
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO 88201

TABLE OF CONTENTS

ATOKA GAS SAND POOL

In the matter of the determination of the Atoka formation underlying certain lands in Lea County, New Mexico, as a "Tight Formation" pursuant to regulations of the Federal Energy Commission, Section 107(b) of the Natural Gas Policy Act of 1978 (15 USC 3317) and regulations thereunder, the certain exhibits will be evidence presented which demonstrates that the Atoka gas reservoir beneath lands located in Townships 12, 13 and 14 South and Ranges 35 and 36 East, N.M.P.M., Lea County, New Mexico, qualifies as a "Tight Formation".

The producing Atoka zone is primarily a sand zone. The matrix is characterized as being very fine-grained with porosities ranging from 5% to 11%. The formation is highly cemented and the producing interval is encountered at an average depth of 12,600 feet.

The operator in the Bettenbough Atoka Zone gas well has conducted both drill stem tests and reservoir buildup pressure surveys on his wells. The results of the pressure surveys show the average in-situ gas permeability throughout the Atoka section averages 0.037 millidarcies and is not expected to exceed 0.1 millidarcy. The results of the pressure surveys together with all pertinent data are summarized on Exhibit No. 1. The individual Horner calculations, data and buildup curves are included as sub-parts to Exhibit No. 1.

The stabilized production rates, against atmospheric pressure of wells completed for production in the Atoka zone at 12,600 feet without stimulation, are not expected to exceed a maximum of 403 MCF of gas per day; and after stimulation with acid, the maximum flow rate of gas is not expected to exceed 1215 MCFD.

Exhibit No. 2 is a summary of gas production of the Bettenbough Atoka (Gas) Pool. Individual graphic presentation of the production history is not included.

The liquid hydrocarbons produced at the surface do not exist as liquid in the Atoka gas reservoir. A recombination of the separator fluids was not conducted to verify the Dew-Point pressure; however, an analysis of the produced gas and the Horner pressure buildup surveys in the Bettenbough No. 1 Well suggest that above a reservoir pressure of 3560 psig all fluids exist in a single gas phase. As the reservoir pressure declines, a reduction in gas production rates occurs as the retrograde condensation phenomena occurs when the reservoir pressure passes through the Dew-Point pressure. At some future date a form of artificial lift will probably be required to remove the retrograde liquids from the well bore and tubing to have sustained gas production.

Exhibit 3 is a Well Data Table and includes all pertinent well information. The casing design of the wells drilled and completed indicates that the fresh water aquifers in the area as required by rules and regulations of the New Mexico Conservation Commission have been fully protected.

Ogallala
~~Santa Rosa~~ - 310-400

Ogallala - 900-1200
~~Santa Rosa~~

$13\frac{3}{8}$ — 369 cemented w/ 400 SKs
$9\frac{5}{8}$ - 4000 " " 3400 SKs

EXHIBIT 1
ATOKA GAS SAND POOL
LEA COUNTY, NEW MEXICO
SUMMARY OF RESERVOIR BUILDUP SURVEYS
PRODUCTION TEST DATA, FORMATION RESERVOIR FLUID
CHARACTERISTICS, PERMEABILITIES, RADIUS OF INVESTIGATION,
DAMAGE RATIOS AND CALCULATED FLOW RATES TO ATMOSPHERE
USING SURVEY TEST DATA AND RESULTS
Ralph H. Vinay & Associates, Inc.
Engineering Consultants

Owner-Operator Lease Name Well Number	Harvey E. Yates Company Hayoo Balenbough Well No. 1		Harvey E. Yates Company Superior "15" State Well No. 1
Location: Section, Township and Range	Sec. 32, T-13-S, R-35-E		Sec. 19, T-14-S, R-35-E
Productive Atoka Formation Interval Measured Depth - Feet	12,156' to 12,343' 73'		12,552' to 12,785' 233'
Test Data	Drill Stem Test	Reservoir Buildup	Drill Stem Test
Date of Flow Tests and Reservoir Buildup Survey	4-30-1980	5-15-1980	9-17-1979
Flowing Tubing Pressure - psig	14	289	25
Flowing Bottom Hole Pressure (P_{wf}) - psig	557	957	289
Choke Size - Inches	32/64	32/64	3/8
Gas Gathering Line Operating Pressure - psig	NA		NA
Production Data			
Gas Production on Test - MCFD	102	835	305
Condensate Production - Barrels	NA	55	NA
Water Production - Barrels	NA	NA	NA
Cumulative Gas Production at Test Date - MCF	6.5	14,700	18.9
Formation, Reservoir and Physical Characteristics Data			
Net Atoka Zone Thickness - Feet	72	72	62
Porosity (Φ) % of Bulk Volume	11	11	5.6
Interstitial Water (S_w) % of Pore Space	25	25	25
Reservoir Temperature °F/°R	183/643	183/643	184/644
Specific Gravity of Gas (SG) Air = 1.00	0.733	0.733	0.733
Gas Viscosity (μ_g) at Average Reservoir Pressure During Test - Centipoises	0.0176	0.0176	0.0176 0.0114
Critical Pressure (Pc) - psia	655	655	655
Critical Temperature (Tc) - °R	389	389	395
Gas Compressibility (Cg) - psi^{-1}	4.02×10^{-4}	4.02×10^{-4}	4.02×10^{-4}
Water Compressibility (Cw) - psi^{-1}	3.00×10^{-6}	3.00×10^{-6}	3.03×10^{-6}
Rock Compressibility (Cf) - psi^{-1}	4.90×10^{-6}	4.90×10^{-6}	4.90×10^{-6}
Total Compressibility (Ct) - psi^{-1}	3.07×10^{-4}	3.07×10^{-4}	3.07×10^{-4}
Gas Deviation Factor (Z) @ Flowing Bottom Hole Pressure	0.98	0.98	0.93
Average Reservoir Pressure	0.82	0.82	0.17
Boundary Reservoir Pressure	0.86	0.89	0.80
Gas Formation Volume Factor (Bg) - Cubic Feet/SCF	7.35×10^{-3}	6.237×10^{-3}	5.816×10^{-3}
Well Bore Radius (r_w) - Feet	0.333	0.333	0.333
Equivalent Liquid Rate of Test Gas Production (Q_{RBPD}) - Barrels	133	926.1	338
Pseudo Flow Time at Test Date (T_o) - Hours	1.48	423	1.483
Shut In Time of Reservoir Buildup Test (Δt) - Hours	4.1	240	4.066
Slope of Buildup Curve (Horner Technique)(m) psi/cycle	709	480	1304
Reservoir Boundary Pressure from Buildup (P_e) - psig	4062	6279	2491
Transmissibility $(Kh/\mu) = \frac{162.6 \times Q_{RBPD}}{M}$ = Md - Ft/Cps	103.22	313.54	42.27
Productive Capacity $(Kh/\mu)(\mu) = (kh)$ = Md.Ft.	1.817	5.52	0.74
Permeability (kh/h) = K - Md.	0.025	0.0767	0.018
Radius of Investigation During Buildup Pressure Surveys $r_i = \sqrt{\frac{kT}{37,806\ \Phi\ \mu c}}$ = Feet Where T is shut in time in minutes T = (ΔT)(60 minutes) Van Poolen Equation	13.6	172.6	11
Estimated Damage Ratio (EDR) $EDR = \frac{P_e - P_{wf}}{m(\log T + 3.85)}$	3.635	0.981	1.178
Calculated Flow to Atmospheric Pressure For Various Drainage Radii - MCFD			
Using Darcy Radial Flow Equation for Gas $qac = \frac{0.703\ kh\ (Pe^2 - P_{wf}^2)^n}{\mu T Z \ln (re/rw)}$	ri	403	1215	516
	r @ 80 acres	183	946	143
	r @ 160 acres	176	909	138
	r @ 320 acres	170	874	133
	r @ 640 acres	163	840	127

Where

P_e is Reservoir pressure at drainage boundary

P_w is flowing pressure at well bore

Setting P_{wf} = 0 represents maximum flow that formation matrix would deliver into well bore.

EXHIBIT 1 A
YATES BETENBOUGH NO. 1
DRILL STEM TEST APRIL 30, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FEET, FI	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1 - 2	2.	5993.3	0.00	0.02	141.0	3282.	6479.
2- 3	2.	4821.1	0.00	0.02	134.4	3775.	5854.
3- 4	2.	1863.2	0.00	0.02	82.9	3902.	4578.
4- 5	3.	611.3	0.01	0.03	36.0	3953.	4126.
6-15	9.	148.4	0.03	0.03	11.3	3975.	3993.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	2205.	2205.	0.37	5.167	5.167
2	3282.	3282.	0.63	3.416	3.416
3	3775.	3775.	0.90	2.699	2.699
4	3902.	3902.	1.17	2.307	2.307
5	3938.	3938.	1.43	2.070	2.070
6	3953.	3953.	1.70	1.900	1.900
7	3955.	3955.	1.97	1.776	1.776
8	3959.	3959.	2.23	1.686	1.686
9	3962.	3962.	2.50	1.612	1.612
10	3964.	3964.	2.77	1.552	1.552
11	3966.	3966.	3.03	1.505	1.505
12	3968.	3968.	3.30	1.463	1.463
13	3970.	3970.	3.57	1.428	1.428
14	3970.	3970.	3.83	1.399	1.399
15	3975.	3975.	4.10	1.373	1.373

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION

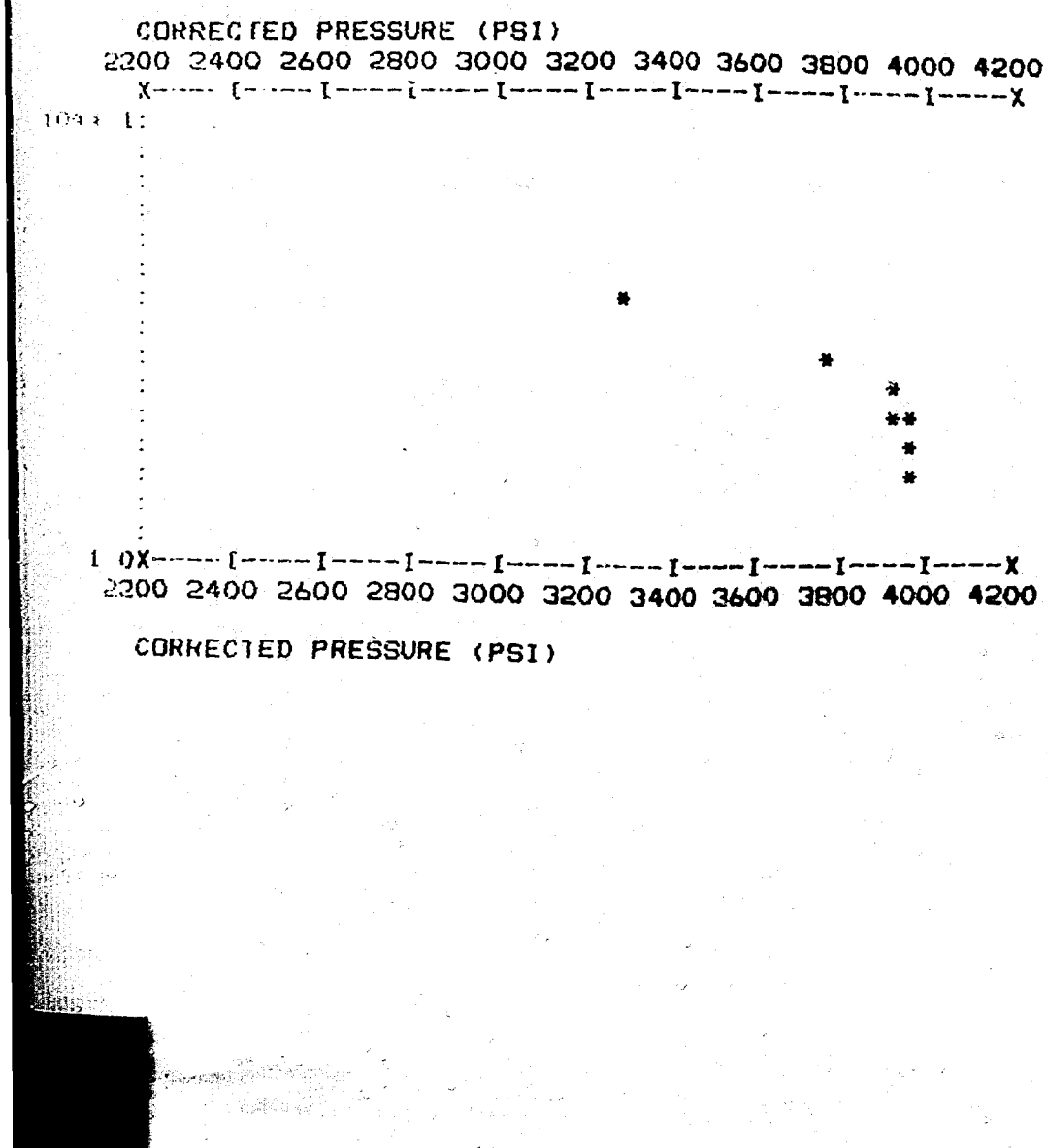

CORRECTED PRESSURE (PSI)
2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200
1.0
1.0
2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200
CORRECTED PRESSURE (PSI)

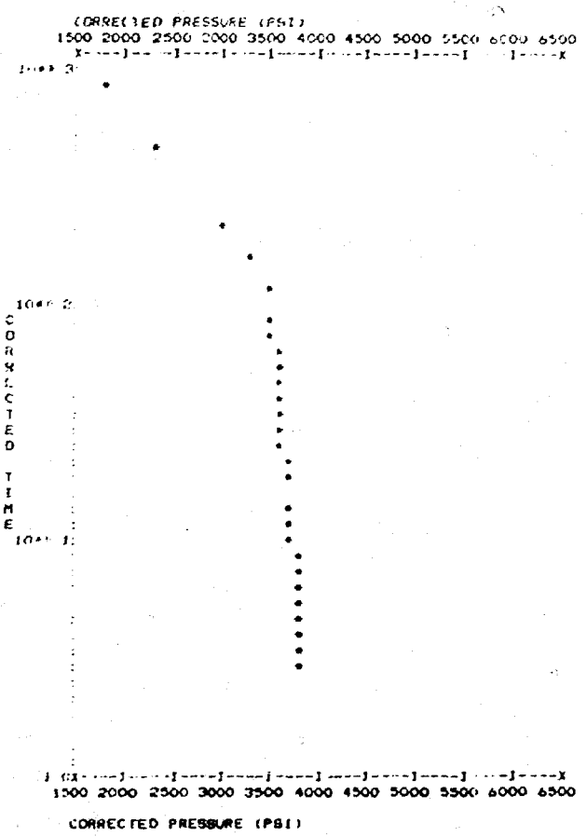
EXHIBIT 1 A

EXHIBIT 1 B
YATES SETENBOUGH NO. 1
RESERVOIR BUILDUP AUGUST 15-25, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FEET-FT	SLOPE PSI/CYC	X (MDS)	P I MD/D/PSI	COMPL EFF., %	SIBHP PSIG	AVG P PSIG
1 - 1	8	1939.7	0.02	0.13	148.9	2339.	7436.
2 - 2	11	2351.6	0.01	0.11	152.9	3044.	6518.
3 - 3	13	1673.1	0.02	0.14	141.2	3337.	6939.
4 - 9	19.	1071.4	0.03	0.18	119.4	3470.	5643.
5 - 9	24	408.9	0.08	0.25	67.8	3570.	4303.
5 - 19	33	197.7	0.17	0.26	39.0	3600	3923.
7 - 33	52	131.1	0.26	0.29	27.6	3626	3813.
7 - 22	126	229.4	0.15	0.28	44.2	3784	3959
23 - 38	208.	118.1	0.28	0.29	24.6	3810	3861.
24 - 39	291	1035.7	0.03	0.25	162.9	3822	4279.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	1647.	1756.	0.50	848.347	848.346
2	2198.	2339.	1.00	424.673	424.673
3	2927.	3044.	2.00	212.837	212.837
4	3252.	3337.	3.00	142.224	142.224
5	3404.	3470.	4.00	106.918	106.918
6	3461.	3519.	5.00	85.735	85.735
7	3489.	3542.	6.00	71.612	71.612
8	3521	3570	7.00	61.525	61.525
9	3532.	3580.	8.00	53.959	53.959
10	3556.	3600	10.00	43.367	43.367
11	3562.	3605.	12.00	36.306	36.306
12	3573.	3615.	14.00	31.262	31.262
13	3587.	3626.	16.00	27.480	27.480
14	3603.	3640.	18.00	24.537	24.537
15	3639.	3670.	24.00	18.653	18.653
16	3655.	3684.	28.00	16.131	16.131
17	3681.	3705	36.00	12.769	12.769
18	3703.	3724.	44.00	10.629	10.629
19	3722.	3739.	52.00	9.148	9.148
20	3736.	3751.	60.00	8.061	8.061
21	3743	3761.	68.00	7.230	7.230
22	3751	3764.	70.00	7.052	7.052
23	3755.	3767.	80.00	6.296	6.296
24	3760.	3771.	90.00	5.707	5.707
25	3767.	3777.	100.00	5.237	5.237
26	3770.	3779.	110.00	4.852	4.852
27	3776.	3784.	120.00	4.531	4.531
28	3780.	3787.	130.00	4.259	4.259
29	3782.	3789.	140.00	4.026	4.026
30	3785.	3792.	150.00	3.824	3.824
31	3788.	3794.	160.00	3.648	3.648
32	3791.	3797.	170.00	3.492	3.492
33	3794.	3799.	180.00	3.354	3.354
34	3797.	3801.	190.00	3.230	3.230
35	3798.	3802	200.00	3.118	3.118
36	3802	3806.	210.00	3.017	3.017
37	3804.	3807.	220.00	2.926	2.926
38	3807.	3810.	230.00	2.842	2.842
39	3822.	3822.	240.00	2.765	2.765



@ CORRECTED FOR AFTERFLOW

@@ CORRECTED FOR SUPERPOSITION

EXHIBIT 1 C
HEYCO SUPERIOR 19 NO. 1
DRILL STEM TEST SEPTEMBER 17, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FELT, FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1- 4	7.	390.1	0.04	0.16	57.3	2102.	2239.
4- 9	9.	759.1	0.02	0.15	93.7	2224.	2376.
9-15	11.	1303.9	0.01	0.14	138.6	2316.	2491.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	1953.	1953.	0.33	5.545	5.545
2	2019.	2019.	0.60	3.500	3.500
3	2066.	2066.	0.87	2.731	2.731
4	2102.	2102.	1.13	2.324	2.324
5	2133.	2133.	1.40	2.071	2.071
6	2161.	2161.	1.67	1.900	1.900
7	2183.	2183.	1.93	1.776	1.776
8	2205.	2205.	2.20	1.682	1.682
9	2224.	2224.	2.47	1.608	1.608
10	2244.	2244.	2.73	1.549	1.549
11	2260.	2260.	3.00	1.500	1.500
12	2277.	2277.	3.27	1.459	1.459
13	2288.	2288.	3.53	1.425	1.425
14	2305.	2305.	3.80	1.395	1.395
15	2316.	2316.	4.07	1.369	1.369

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION

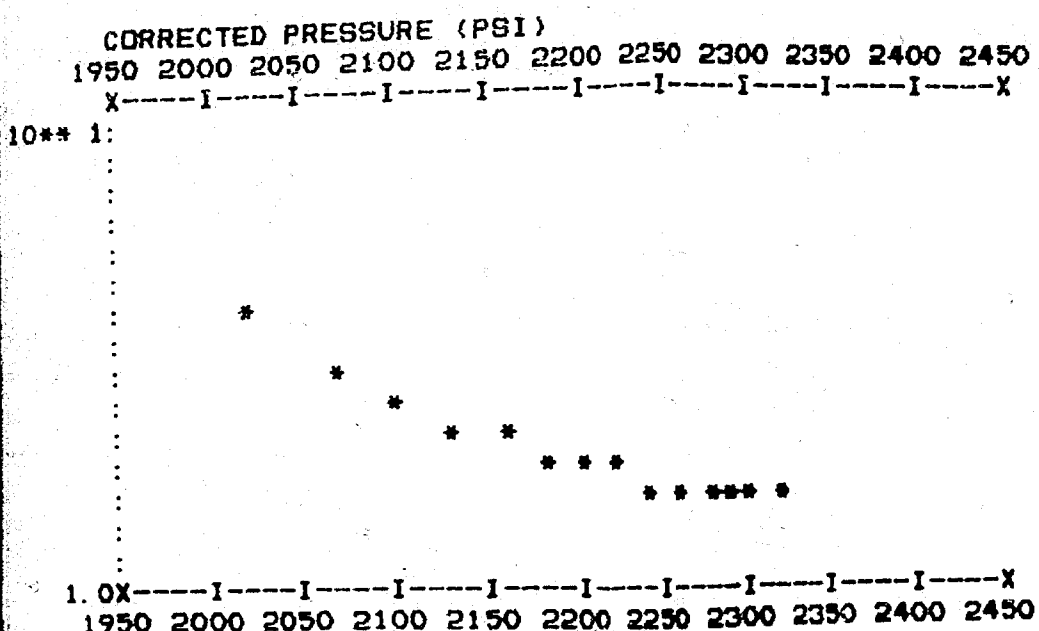

CORRECTED PRESSURE (PSI)
1950 2000 2050 2100 2150 2200 2250 2300 2350 2400 2450
10** 1:
1.0
1950 2000 2050 2100 2150 2200 2250 2300 2350 2400 2450
CORRECTED PRESSURE (PSI)

EXHIBIT 1-C

EXHIBIT 2
PRODUCTION SUMMARY
BETTENBOUGH NO. 1 WELL (ATOKA ZONE)
LEA COUNTY, NEW MEXICO

Date	Choke Size	Gas-MCFD	Condensate Barrels	Water Barrels	Flowing Tubing Pressure psig	Line Pressure psig
7-30-1980	32/64"	765	29	34	350	110
7-31-1980	32/64"	765	29	25	350	100
8- 1-1980	32/64"	765	29	25	350	100
8- 2-1980	32/64"	765	33	16	350	100
8- 3-1980	32/64"	765	39	25	350	100
8- 4-1980	32/64"	765	46	20	350	100
8- 5-1980	32/64"	765	23	16	350	100
8- 6-1980	32/64"	765	30	25	350	100
8- 7-1980	32/64"	803	30	26	325	100
8- 8-1980	32/64"	803	39	16	325	100
8- 9-1980	32/64"	803	39	20	300	100
8-10-1980	32/64"	803	39	21	300	100
8-11-1980	32/64"	803	39	20	300	100
8-12-1980	32/64"	819	39	18	350	100
8-13-1980	32/64"	826	63	16	350	100
8-14-1980	32/64"	834	40	20	350	100
8-15-1980	32/64"	856	36	12	350	100
8-27-1980	19/64"	765	53	6	900	110
8-28-1980	20/64"	872	54	15	800	100
8-29-1980	22/64"	903	43	13	650	100
8-30-1980	23/64"	918	51	16	600	100
8-31-1980	25/64"	898	46	15	500	100
9- 1-1980	24/64"	913	44	15	550	100
9- 2-1980	24/64"	918	44	14	500	100
9- 3-1980	24/64"	918	44	13	500	100

EXHIBIT 2

Field Operator	County Lease Name and Well Number	Legal Description
Wildcat	Lea County	
Harvey E. Yates Company	Betenbough #1	Unit C, 660' FNL, 1980' FWL, Sec.32 T-13-S, R-36-E

Date	Choke Size	Test Interval	Gas MCFD
6-18-1980	1/2"	24 Hours	832

EXHIBIT 3
WELL DATA
ATOKA GAS SAND GAS POOL
LEA COUNTY, NEW MEXICO
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Elevation	Date of Completion	Total Depth and Plug Back	Casing Record Size	Depth	Cement	Producing Zone	Perforated Interval	Well Stimulation
3975' GL	6-19-80	14,000' 13,478'	13-3/8" 9-5/8" 5-1/2"	369' 4,609' 13,150'	400 Sx 3400 Sx 2100 Sx	Atoka	12,315-331'(68 Holes) 12,539-553'(64 Holes) 12,637-642'(24 Holes) 12,855-860'(24 Holes) 12,873-900'(112 Holes)	12855-12900' Acidized w/1000 gal 7½% Ms. 12539-12642' Acidized w/1000 gal 7½% Ms. 12315-12331' Acidized w/1000 gal 7½% MS. 12315-12900' Acidized w/7500 gas 7½% Ms, 3 stages 60/40 block; 1000 SCF N_2/bbl. DST(Atoka)12275'-347' open 1 hr 29 min rec. 102 MCF, HP 5799-5813# FP 127.6-172.3# 1.5 hr, FSIP 3974.5#, BHT 174°

Initial Potential Test Data

Condensate BOPD	Gas-Oil Ratio	Water BWPD	Flowing Pressure Tubing Pressure	Bottom Hole Pressure	Casing Pressure	Gas Air = 1	Condensate API
2	-	28	120	-	Pkr.	0.733	45.3

SOUTHWESTERN LABORATORIES
1703 West Industrial — P. O. Box 2150
MIDLAND, TEXAS 79701
(915) 683-3348

FRACTIONAL ANALYSIS REPORT

DATE RECEIVED _____

SAMPLE MARKED Heyco Beteniocough #1 Gas Sales Line — FILE NO. C-1950-G

100 psig @ 70° F. — LAB. NO. 44425

SAMPLE FROM Harvey C. Yates Co., Inc. — DATE SECURED 8-15-80

DATE OF RUN 8-18-80 — SECURED BY Tefteller

COMPONENT	MOL. %	G. P. M.	LIQUID VOL. %
Oxygen			
Nitrogen	3.61		
Carbon Dioxide	0.60		
Methane	77.26		
Ethane	9.59	2.557	
Propane	5.19	1.424	
Butane	0.92	0.300	
i-Butane	1.73	0.544	
Pentane	0.47	0.172	
i-Pentane	0.42	0.152	
Hexanes	0.04	0.016	
Heptanes & Heavier	0.17	0.078	
Hydrogen Sulfide	*None Det.		
Helium			
Hydrogen			
Carbon Monoxide			
TOTALS	100.00	5.243	

CONDENSATE VALUES, G.P.M.

Propane	
Butane	
Gasoline	

HEATING VALVE, B.T.U. Per Cu. Ft.*

Calculated from % Composition	1214
Calculated water saturated	1193

SULPHUR CONTENT, Grains Per 100 Cu. Ft.*

Hydrogen Sulfide	
Mercaptans	

SPECIFIC GRAVITY*

Calculated from % Composition	0.733

*14.696 lbs./sq. in., 60° F

REMARKS

Propane + GPM — 2.686

*Determined on laboratory sample.

COPIES: 3cc Harvey E. Yates Co., Inc.
1cc Tefteller, Inc.

Gary M. Bunch
SOUTHWESTERN LABORATORIES

EXHIBIT 4

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7089
Order No. R-6537

APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 12, 1980, at Santa Fe, New Mexico, before Examiner Richard L. Stamets

NOW, on this 17th day of December, 1980, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.703 recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying the following lands situated in Lea County, New Mexico, hereinafter referred to as the Atoka formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

(6) That the Atoka formation underlying the above described lands has been penetrated by several other wells, none of which produced natural gas in commercial quantities from the Atoka formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Atoka formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.703 (c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(9) That within the proposed area there are two recognized aquifers being the Ogallala, found at depths of from 300 feet to 400 feet, and the Santa Rosa, found at depths of from 900 feet to 1200 feet or approximately 11,000 feet above the Atoka formation.

(10) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Atoka formation will not adversely affect said aquifers.

(11) That the Atoka formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 C.F.R. §271.703(b)(6) of the regulations.

(12) That the Atoka formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Atoka formation underlying the following described lands in Lea County, New Mexico, be designated as a tight formation:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 6 and 7: All
Sections 18 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 24: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 5 through 7: All
Sections 18 and 19: All

Containing a total of 37,760 acres, more or less.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

ATOKA PENETRATION IN PROPOSED TIGHT GAS CLASSIFICATION AREA

Lea County, New Mexico

Prepared by Ray F. Nokes, Reservoir Engineer
Harvey E. Yates Company

February 1, 1982

WELL NAME	Shell State #1	Seth Alston #1	Estacado Unit #1	State H "A" Com #1	State "4" #1
Operator:	Union Texas Petro.	Sharples Oil Corp.	Union Oil of CA	Amerada Hess	Adobe Oil & Gas
Spudded:	3-8-71	11-13-50	9-12-74	4-19-69	8-1-79
Completed or P & A	6-11-71/P & A	8-2-51/P & A	11-7-74/P & A	7-17-69/P & A	9-27-79/P & A
Location:	1980' FNL & 660' FWL Sec 6, T-13S, R-35 E Lea Co., NM	560' FSL & 660' FWL Sec 17, T-13S, R-35E Lea Co., NM	1980' FSL & 660' FWL Sec 8, T-14S, R-35E Lea Co., NM	660' FNL & 1980' FEL Sec 19, T-14S, R-35E Lea Co., NM	1980' FNL & 660' FWL Sec 4, T-13S, R-36E Lea Co., NM
Total Depth:	13,252'	14,440'	13,500'	15,038'	13,476'
PBTD:	13,210'	11,831'	NA	NA	NA
Top of Pay:	13,156'	P & A	NA	NA	NA
Perf's:	13,156-204' Devonian	P & A	NA	NA	NA
Casing:	11-3/4" to 405' w/400 sx 8-5/8" to 4300' w/500 sx 5-1/2" to 13,525' w/750 "	13-3/8" to 319' w/280 sx 8-5/8" to 4409' w/2600 sx 5-1/2" to 11,830' w/350 "	11-3/4" to 400' w/325 sx 8-5/8" to 4520' w/600 sx	13-3/8" to 384' w/425 sx 9-5/8" to 4530' w/1100 sx	13-3/8" to 380' w/420 sx 8-5/8" to 4589' w/1900 sx
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka @ 11,363'	T/Atoka NR	T/Atoka @ 12,456'	T/Atoka @ 12,390'	T/Atoka @ 12,072'
Elevation:	4115' GL	4113' GL	4057' GL	4056' GL & 4075' KB	3997' GL
Tsts:	No tsts rec'd in Atoka	DST fr 11,521-580'; op 3 hrs. GTS in 1 hr, 38 mins.	No tsts rec'd in Atoka	DST fr 12,478-653'; op 1 hr, 15 mins. 1500' WB, rec WB + 3 gal DM; FP 695-705#; ISIP 1115#/30 mins; FSIP 1376#/2 hrs, 15 mins.	No tsts rec'd in Atoka

WELL NAME	State #1	Heyco Betenbough #1	McDonald Unit #1	Renshaw #1	Danglade #1
Operator:	Freeport Oil	Harvey E. Yates Co.	Harvey E. Yates Co.	Moran Oil *	Zapata, Petrol, et al
Spudded:	3-39-69	3-6-80	6-13-81	7-23-52	8-12-57
Completed or P & A:	6-9-69 P & A	6-18-80 Comp.	NA	Re-en 11-12-65; P & A 1-28-66	12-31-57 P & A
Location:	1650' FSL & 2310' FEL Sec 11, T-13S, R-36E Lea Co., NM	660' FNL & 1980' FWL Sec 32, T-13S, R-36E Lea Co., NM	660' FSL & 990' FEL Sec 33, T-13S, R-36E Lea Co., NM	660' FN & WL Sec 2, T-14S, R-36E Lea Co., NM	2310' FNL & 330' FEL Sec 3, T-14S, R-36E Lea Co., NM
Total Depth:	14,560'	14,780'	14,618'	13,047'	15,115'
PBTD:	NA	13,050'	14,415'	10,875' CIBP	NA
Top of Pay:	NA	12,315'	NA	NA	NA
Perf's:	NA	12,315-900' Atoka	NA	NA	NA
Casing:	12-3/4" to 406' w/400 sx 8-5/8" to 4525' w/325 "	13-3/8" to 369' w/350 sx 9-5/8" to 4600' w/3400 " 5-1/2" to 13,150' w/2100	13-3/8" to 367' w/400 sx 8-5/8" to 4611' w/2150 " 5-1/2" to 14,587' w/1405	13-3/8" to 339' w/300 sx 9-5/8" to 4614' w/1500 " 5-1/2" to 11,106' w/450	13" to 388' w/350 sx 9" to 4668' w/3700 "
Tubing:	NA	2-3/8" to 12,257'	NA	NA	NA
Formation:	T/Atoka @ 12,093'	T/Atoka @ 12,274'	T/Atoka @ 12,204' Appr.	T/Atoka NA	T/Atoka NA
Elevation:	3962' GL	3992' GL	3945' GL	3944' GL	3951' DF
Tests:	No tsts rec'd in Atoka	IPF (Atoka): 832 MCFGPD, GR .733, GOR 416,000, 120#. DST (Atoka): 12,275-346'. Op 90 min, rec 558' GCDF w/tr dist. (Smplr: .6 CFTG + 400 cc DF w/tr dist @ 100#) 90 min ISIP 3878#, FP 110-989#, 120 min FSIP 3943#, HP 5799-5799#. BHT 174 Deg F. DST (Atoka): 12,744-922'. Op 105 min, rec 900' GCM (Smplr: 1.2 CFTG + 1000 cc GCM @ 400=) 100 min ISIP 4009#, FP 2267-484#, 3 hr FSIP 4009=, HP 6368-6368#.	Form tstr (Atoka): See Dresser Atlas Rep.	No tsts rec'd in Atoka *Orig operated by Sinclair Oil & Gas	No tsts rec'd in Atoka

WELL NAME	Austin-Morteith #1	Austin-Monteith #2	State "16" #1	State "16" #2	Hannah #1
Operator:	Harvey E. Yates Co.	Harvey E. Yates Co.	Adobe Oil & Gas	Adobe Oil & Gas	Adobe Oil & Gas
Spudded:	3-17-79	4-29-80	2-18-78	6-1-79	1-10-79
Completed or P & A:	7-20-79 Comp.	6-28-80 P & A	4-29-78 Comp.	9-11-79 Comp.	3-26-79 Comp.
Location:	1650' FSL & 1980' FWL Sec 8, T-14S, R-36E Lea Co., NM	1980' FSL & 660' FEL Sec 8, T-14S, R-36E Lea Co., NM	990' FSL & 660' FWL Sec 16, T-14S, R-36E Lea Co., NM	1980' FN & WL Sec 16, T-14S, R-36E Lea Co., NM	1980' FNL & 660' FEL Sec 17, T-14S, R-36E Lea Co., NM
Total Depth:	14,000'	13,670'	13,770'	13,875'	13,832'
PBTD:	13,478'	NA	13,687'	13,400'	13,520'
Top of Pay:	13,360'	NA	13,199'	13,288'	13,397'
Perf's:	13,360-391' Miss.	NA	13,199-261' Miss	13,288-373' Miss	13,397-460' Miss
Casing:	13-3/8" to 398' w/400 sx 8-5/8" to 4608' w/1630 " 5-1/2" to 14,000' w/1750	13-3/8" to 395' w/400 sx 8-5/8" to 4600' w/1830 "	13-3/8" to 368' w/450 sx 9-5/8" to 4661' w/1600 " 5-1/2" to 13,770' w/1600	13-3/8" to 389' w/425 sx 8-5/8" to 4675' w/2200 " 5-1/2" to 13,876' w/1750	13-3/8" to 371' w/450 sx 8-5/8" to 4640' w/1880 " 5-1/2" to 13,831' w/1300
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka @ 12,328'	T/Atoka @ 12,326'	T/Atoka @ 12,310'	T/Atoka @ 12,333'	T/Atoka @ 12,306'
Elevation:	3966' GL	3959' GL	3944' GL	3945' GL	3954' GL
Tests:	DST: 12,608-882'. Op 3 Hrs, rec 120' M. FP 2795-872#, 4 hr FSIP 2617#, HP 5976-5976#. BHT 190 Deg F.	No tsts rec'd in Atoka	No tsts rec'd in Atoka	DST (Atoka): 12,516-600'. Op 90 mins, rec 120' DF 60 min ISIP 116#, FP 93-93#, 120 min FSIP 139#, HP 6082-5961#.	DST (Atoka): 12,764-850'. Pkr failed.

WELL NAME	Austin Unit #1	State "17" #1	Head State #1	Terry, et al #1	Phillips State #1
Operator:	Phillips Pet.	Southern Union Explor.	Adobe Oil & Gas	Wm. K. Young	Hilliard Oil & Gas
Spudded:	11-12-56	2-13-80	10-17-80	2-17-79	9-29-77
Completed or P & A:	7-22-57 Comp.	4-16-80 Comp.	1-12-81 P & A	5-7-79 P & A	12-5-77 P & A
Location:	660' FS & WL Sec 17, T-14S, R-36E Lea Co., NM	1980' FN & WL Sec 17, T-14S, R-36E Lea Co., NM	1980' FN & EL Sec 20, T-14S, R-36E Lea Co., NM	660' FSL & 1980' FEL Sec 22, T-14S, R-36E Lea Co., NM	600' FNL & 990' FEL Sec 35, T-12S, R-36E Lea Co., NM
Total Depth:	14,796'	13,830'	13,550'	15,100'	14,081'
PBTD:	13,290'	NA	NA	NA	NA
Top of Pay:	13,194'	13,228'	NA	NA	NA
Perf's:	13,194-286' Miss	13,228-258' Miss	NA	NA	NA
Casing:	13-3/8" to 392' w/375 sx 9-5/8" to 4650' w/710 " 7" to 13,425' w/590 "	13-3/8" to 395' w/400 sx 8-5/8" to 4630' w/2700 " 5-1/2" to 13,830' w/1200 "	13-3/8" to 383' w/450 sx 8-5/8" to 4650' w/2500 " 4-1/2" to 13,160' w/575 "	13-3/8" to 389' w/400 sx 9-5/8" to 4772' w/2664 "	13-3/8" to 435' w/425 sx 8-5/8" to 4600' w/2050 "
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka NA	T/Atoka @ 12,320'	T/Atoka @ 12,538'	T/Atoka NA	T/Atoka @ 12,050'
Elevation:	3979' DF	3962' GL	3954' GL	3923' GL	3967' GL
Tests:	No tsts rec'd in Atoka	No tsts rec'd in Atoka	DST (Atoka): 12,724-877'. Op 77 mins, rec 4200' wtr cushion + 568' mud w/NS. 60 min ISIP 4000#, FP 2014-2212#, 215 min FSIP 4047#, HP 6262-6262#. Perf (Atoka): 12,782-786' w/4 jspf. A w/2000 gals, swb load, PB to 12,700'.	No tsts rec'd in Atoka	No tsts rec'd in Atoka

Permeability Calculation for the McDonald Unit #1

660' FSL & 990' FEL, Sec 33, T-13S, R-36E
Lea Co., NM

Prepared by Ray F. Nokes, Reservoir Engineer

HARVEY E. YATES COMPANY

February 1, 1982

Formation: Atoka
Lithology: Sandstone
S_w calculated by Humble Equation
K calculated by Morris-Biggs Equation

R_w = .133 @ 74 Deg F for the REYCO Betenbough #1
R_w = .059 @ 174 Deg F Corrected

Depth	RT ohms	Crossplot Ø in %	S_w in %
12,198'	174.2	9.7	17.79
12,199'	337.0	7.9	15.95
12,200'	762.9	5.9	14.51
12,201'	1305.2	5.5	11.96
12,202'	1911.6	4.6	11.98
12,203'	1636.4	4.9	12.10
12,204'	1108.6	5.9	12.04
12,205'	1176.6	4.1	17.28
12,206'	756.1	4.6	19.05
12,207'	119.1	8.1	26.12
12,208'	39.8	13.5	26.10
12,209'	29.3	14.9	27.35
12,210'	40.6	13.5	25.84
12,211'	88.0	11.2	21.36
12,212'	165.5	18.9	8.9
12,588'	177.3	9.3	18.46
12,589'	273.1	6.2	23.00
12,590'	261.5	5.7	25.72
12,591'	311.0	5.9	22.73
12,592'	342.7	6.6	19.19
12,593'	333.6	7.0	18.26
12,594'	319.4	7.7	16.85
12,595'	351.0	5.3	24.00
12,596'	548.7	4.3	24.04
12,597'	635.5	5.8	16.19
12,598'	408.9	6.7	17.29
12,599'	337.2	7.3	17.36
12,600'	323.3	9.4	13.51
12,601'	311.6	9.3	13.92
12,602'	370.9	9.4	12.61
12,603'	284.1	11.1	12.05
12,604'	119.9	11.6	17.70
12,605'	104.4	7.1	32.15
12,606'	242.1	4.9	31.45
12,607'	806.6	4.6	18.44
12,608'	526.0	7.4	13.70
12,609'	403.6	7.9	14.58
12,610'	434.3	6.8	16.51
12,611'	677.1	6.9	13.02
12,612'	1001.2	7.0	10.54

Depth	RT ohms	Crossplot Ø in %	S_w in %
12,733'	47.1	8.5	39.44
12,734'	180.6	6.4	27.33
12,735'	179.8	6.4	21.96
12,736'	225.3	6.4	24.47
12,737'	261.9	5.4	27.24
12,738'	240.9	7.0	21.49
12,739'	130.4	8.5	23.71
12,740'	110.5	8.8	24.81
12,741'	143.5	8.0	24.12
12,742'	153.0	7.4	25.40
12,743'	137.0	8.3	23.73
12,744'	159.6	8.6	21.16
12,745'	168.9	7.8	22.85
12,746'	144.2	8.6	22.26
12,747'	146.9	10.8	17.27
12,748'	173.8	11.3	15.12
12,749'	230.7	10.0	14.97
12,750'	297.4	8.7	15.31
12,751'	239.1	10.7	13.67
12,752'	167.9	9.6	18.33
12,753'	160.2	8.8	20.60
12,754'	212.0	6.2	26.10
12,755'	253.9	7.5	19.44
12,756'	224.1	6.9	22.63
12,757'	238.2	7.8	19.24
12,758'	266.4	6.4	22.50
12,759'	279.1	4.8	29.95
12,760'	298.3	4.9	28.34
12,761'	242.0	7.3	20.49
12,762'	185.3	8.7	19.40
12,763'	163.1	8.8	20.42
12,764'	145.5	8.7	21.89
12,765'	129.8	9.4	21.32
12,766'	130.3	8.1	24.98
12,767'	133.6	7.6	26.41
12,768'	132.2	7.9	25.47
12,769'	143.5	9.3	20.52
12,770'	213.1	7.3	21.84
12,771'	333.9	5.8	22.34
12,772'	199.1	9.0	18.04
12,773'	108.4	11.6	18.61
12,774'	95.9	9.5	24.53
12,775'	112.7	6.8	32.41
12,776'	132.7	7.7	26.13
12,777'	129.8	9.0	22.34
12,778'	113.5	8.9	24.18
12,779'	109.4	10.9	19.81
12,780'	112.5	11.5	18.44
12,781'	118.4	11.0	18.86
12,782'	128.8	9.4	21.41
12,783'	90.8	9.1	26.40
12,784'	43.5	9.3	37.26

Atoka Pay: 12,198' to 12,784'

Average Porosity = 8.11%

Average S_w = 20.85%

Average Permeability = .0418 md

Equations: Humble

$$S_w = \sqrt{\frac{\frac{.62}{\phi^{2.15}}(R_w)}{RT}}$$

Morris-Biggs $\left(\frac{C\,\phi^3}{S_{wi}}\right)^2$

C = 250 for Oil
80 for Gas

HALLIBURTON DIVISION LABORATORY
HALLIBURTON SERVICES
MIDLAND DIVISION
HOBBS, NEW MEXICO 88240

LABORATORY WATER ANALYSIS

No. W82-082

To Harvey E. Yates

Box 1933

Roswell, New Mexico

Date 1-21-82

Submitted by: Date Rec. 1-21-82

Well No. Botenbaugh #1 Depth Formation Atoka

County Lea Field McDonald Source

Resistivity	0.133 @ 74°F.
Specific Gravity	1.041
pH	5.6
Calcium (Ca)	3,150
Magnesium (Mg)	511
Chlorides (Cl)	32,000
Sulfates (SO_4)	1,400
Bicarbonates (HCO_3)	425
Soluble Iron (Fe)	80

Remarks:

*Milligrams per liter

RECEIVED [illegible] 1982

Respectfully submitted,

Analyst: Brewer

HALLIBURTON COMPANY

cc:

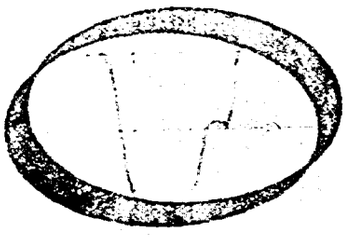
By W. L. Brewer
CHEMIST

NOTICE

THIS REPORT IS LIMITED TO THE DESCRIBED SAMPLE TESTED. ANY USER OF THIS REPORT AGREES THAT HALLIBURTON SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER IT BE TO ACT OR OMISSION, RESULTING FROM SUCH REPORT OR ITS USE.

1050

Formation Testing Service Report



HALLIBURTON SERVICES

FLUID SAMPLE DATA		Date	5-8-80	Ticket Number	716095
Sampler Pressure	400 P.S.I.G. at Surface	Kind of DST	OPEN HOLE	Halliburton Location	HOBBS
Recovery: Cu. Ft. Gas	1.2	Tester	W. FLETCHER	Witness	C. HUBER
cc. Oil		Drilling Contractor	MORANCO RIG # 9		SM
cc. Water					
cc. Mud	1000 gas cut mud				
Tot. Liquid cc					

EQUIPMENT & HOLE DATA	
Formation Tested	–
Elevation	3975' Ft.
Net Productive Interval	– Ft.
All Depths Measured From	Kelly bushing
Total Depth	12922' Ft.
Main Hole/Casing Size	8 3/4"
Drill Collar Length	491' I.D. 2.25"
Drill Pipe Length	12207' I.D. 3.826"
Packer Depth(s)	12732-12744' Ft.
Depth Tester Valve	12700' Ft.

Gravity ____ °API @ ____ °F

Gas/Oil Ratio ____ cu. ft. per bbl.

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	@ °F	ppm
Recovery Mud	@ °F	ppm
Recovery Mud Filtrate	@ °F	ppm
Mud Pit Sample	@ °F	ppm
Mud Pit Sample Filtrate	@ °F	ppm

Mud Weight 9.3 vis 36 sec

Cushion TYPE Nitrogen AMOUNT 1500 PSI (estimated) Ft. Depth Back Pres. Valve ____ Surface Choke 1" Adj Bottom Choke .75"

Recovered 900 Feet of gas cut mud

Recovered ____ Feet of

Recovered ____ Feet of

Recovered ____ Feet of

Recovered ____ Feet of

Meas. From Tester Valve

Remarks SEE PRODUCTION TEST DATA SHEET

TEMPERATURE	Gauge No. 7653	Depth 12722 Ft.	Gauge No. 7652	Depth 12918 Ft.	Gauge No.	Depth Ft.	TIME (00.00-24:00 hrs.)	
	24 Hour Clock		24 Hour Clock		Hour Clock		Tool	
Est. °F.	Blanked Off no		Blanked Off yes		Blanked Off		Opened 0735	
Actual 178 °F.	Pressures		Pressures		Pressures		Opened Bypass 1430	
	Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic	6363.9	6380.7	6367.7	6410.6				
First Period Flow Initial	2353.1	2318.8	2266.9	2386.8			—	—
First Period Flow Final	1274.9	1255.4	1184	1327.6			45	48
First Period Closed in	4112.9	4072.0	4008.8	4131.6			100	95
Second Period Flow Initial	340.5	435.7	307.7	678.8			—	—
Second Period Flow Final	552.2	527.4	483.6	574.9			90	93
Second Period Closed in	4112.6	4062.3	4008.8	4112.5			180	179
Third Period Flow Initial							—	—
Third Period Flow Final								
Third Period Closed in								
Final Hydrostatic	6363.9	Unable to read	6367.7	6365.9			—	—

FORMATION TEST DATA

BEATIN BAUGH
Lease Name

32 13S 36E
Legal Location Sec. - Twp. - Rng.

1
Well No.

4
Test No.

NC DONALD
Field Area

12744 - 12922'
Tested Interval

LEA
County

HARVEY E. YATES COMPANY
Lease Owner/Company Name

NEW MEXICO
State

B

Gauge No. 7653				Depth 12722'			Clock No. 6115			24 hour	Ticket No. 716095			
First Flow Period		First Closed In Pressure			Second Flow Period		Second Closed In Pressure			Third Flow Period		Third Closed In Pressure		
Time Delt. .000"	PSIG Temp. Corr.	Time Delt. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Delt. .000"	PSIG Temp. Corr.	Time Delt. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Delt. .000"	PSIG Temp. Corr.	Time Delt. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0 .0000	2318.8	.0000		1255.4	.0000	485.7	.0000		527.4					
1 .0250	2316.7	.0376*		2522.7	(.0300-M	320.8	.0369*		1521.6					
2 .0250-OAS	2316.7	.0582		3006.5	.0569**	351.6	.0771		2455.5					
3 .0500	2184.3	.0787		3360.2	.1043	404.3	.1173		3163.7					
4 .0750	2043.3	.0992		3596.0	.1517	439.5	.1575		3598.2					
5 .0760-C	2043.3	.1198		3755.4	.1992	470.3	.1977		3812.2					
6 .1000	1735.9	.1403		3864.6	.2466	501.0	.2379		3921.3					
7 .1250	1467.5	.1608		3934.4	.2940	527.4	.2781		3969.4					
8 .1500	1255.4	.1813		3984.7			.3183		3997.8					
9		.2019		4013.1			.3585		4015.2					
10		.2224		4032.7			.3987		4030.5					
11		.2429		4043.6			.4389		4039.3					
12		.2635		4054.5			.4791		4048.0					
13		.2840		4061.1			.5193		4052.4					
14		.3045		4067.6			.5595		4056.7					
15		.3250		4072.0			.6000		4063.3					

Gauge No. 7652				Depth 12918'			Clock No. 5677			24 hour				
0 .0000	2386.8	.0000		1327.6	.0000	678.7	.0000		574.4					
1 .0263	2384.7	.0367*		2585.6	(.0380-M	365.9	.0366*		1521.5					
2 .0290-OAS	2386.8	.0567		3091.2	.0598**	382.9	.0766		2564.4					
3 .0527	2264.2	.0767		3433.1	.1096	453.2	.1165		3254.7					
4 .0790	2120.5	.0968		3658.1	.1594	487.2	.1565		3673.0					
5 .0800-C	2116.2	.1168		3828.0	.2092	517.0	.1965		3878.9					
6 .1053	1801.2	.1368		3934.1	.2590	548.9	.2364		3970.2					
7 .1317	1543.3	.1568		4002.1	.3090	574.4	.2764		4019.0					
8 .1580	1327.6	.1768		4044.5			.3163		4044.5					
9		.1969		4074.2			.3563		4061.5					
10		.2169		4093.3			.3963		4076.4					
11		.2369		4106.1			.4362		4087.0					
12		.2569		4116.7			.4762		4091.2					
13		.2769		4120.9			.5161		4101.8					
14		.2970		4127.3			.5561		4106.1					
15		.3170		4131.6			.5960		4112.5					
Reading Interval	8	6			15		12							Minutes

REMARKS *First interval is equal to 11 minutes. ** = 18 minutes. OAS = open at surface C = choke change
M = minimum flow pressure

SPECIAL PRESSURE DATA

NOMENCLATURE

b	= Approximate Radius of Investigation	Feet
b_1	= Approximate Radius of Investigation (Net Pay Zone h)	Feet
D.R.	= Damage Ratio	-----
El	= Elevation	Feet
GD	= B.T. Gauge Depth (From Surface Reference)	Feet
h	= Interval Tested	Feet
h_1	= Net Pay Thickness	Feet
K	= Permeability	md
K_1	= Permeability (From Net Pay Zone h)	md
m	= Slope Extrapolated Pressure Plot (Psi²/cycle Gas)	psi/cycle
OF_1	= Maximum Indicated Flow Rate	MCF/D
OF_2	= Minimum Indicated Flow Rate	MCF/D
OF_3	= Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF_4	= Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P_s	= Extrapolated Static Pressure	Psig.
P_f	= Final Flow Pressure	Psig.
P_{ot}	= Potentiometric Surface (Fresh Water *)	Feet
Q	= Average Adjusted Production Rate During Test	bbls/day
Q_1	= Theoretical Production w/Damage Removed	bbls/day
Q_g	= Measured Gas Production Rate	MCF/D
R	= Corrected Recovery	bbls
r_w	= Radius of Well Bore	Feet
t	= Flow Time	Minutes
t_o	= Total Flow Time	Minutes
T	= Temperature Rankine	°R
Z	= Compressibility Factor	——
μ	= Viscosity Gas or Liquid	CP
Log	= Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected [illegible] F

ATOKA TIGHT GAS SANDS PRODUCTION

Bettenbough #1

Prepared by Ray F. Nokes, Reservoir Engineer

HARVEY E. YATES COMPANY

February 1, 1982

Potential test 6-18-80: 832 MCF/2 BO/28 BW on 1/2" ck in 24 hrs.

Average Daily Production
(Sales)

Month	BO	MCF	BW
7-80	31	420	30
8-80	43	795	12
9-80	46	754	9
10-80	38	682	8
11-80	30	574	8
12-80	27	539	7
1-81	33	744	9
2-81	17	291	6
3-81	15	380	5
4-81	10	324	4
5-81	10	311	4
6-81	11	288	4
7-81	10	247	4
8-81	8	197	3
9-81	9	233	3
10-81	8	197	5
11-81	7	203	5
12-81	9	177	6

Cumulative Production: 9024 BO/188277 MCF/2841 BW

Note: Production reflects effects of stimulation of the Atoka Formation.

Docket No. 6-82

Dockets Nos. 7-82 and 8-82 are tentatively set for March 3 and March 17, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 17, 1982

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

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for March, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for March, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

(3) Consideration of purchaser's nominations for the one year period beginning April 1, 1982, for both of the above areas.

CASE 7445: (Continued from December 16, 1981, Examiner Hearing)
(THIS CASE WILL BE CONTINUED TO THE EXAMINER HEARING ON MARCH 17, 1982)

Application of Harvey E. Yates Company for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the San Andres formation for its Fulton Collier Well No. 1 in Unit G of Section 1, Township 18 South, Range 28 East.

CASE 7479: Application of Northwest Pipeline Corporation for amendment of Order No. R-2046, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the Amendment of Division Order No. R-2046, which authorized approval of six non-standard proration units, Basin-Dakota Gas Pool.

The amendment sought is for the creation of the following non-standard proration units to be drilled at standard locations thereon: Township 31 North, Range 6 West, Section 25: N/2 (272.16 acres) and S/2 (273.3 acres); Section 36: N/2 (272.56 acres) and S/2 (272.89 acres); Township 30 North, Range 6 West; Section 1: N/2 (272.81 acres) and S/2 (273.49 acres).

CASE 7480: Application of Arco Oil & Gas Company for pool creation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Upper Devonian gas pool for its Custer Well No. 1 located 1810 feet from the North line and 2164 feet from the West line of Section 6, Township 25 South, Range 37 East, Custer Field.

CASE 7481: Application of Arco Oil & Gas Company for amendment of Order No. R-6792, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Division Order No. R-6792, which authorized the directional drilling of applicant's Custer Wells Well No. 1 to an unorthodox location in the Devonian and Ellenburger formations and imposed a penalty in the Devonian. By stipulation applicant and the offset operator have agreed that the subject well is not affecting the offsetting property and applicant herein seeks removal of the penalty imposed for so long as the well produces only from the present perforated interval in the Upper Devonian.

CASE 7459: (Continued from January 20, 1982, Examiner Hearing)

Application of Red Mountain Associates for the Amendment of Order No. R-6538, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6538, which authorized applicant to conduct waterflood operations in the Chaco Wash-Mesa Verde Oil Pool. Applicant seeks approval for the injection of water through various other wells than those originally approved, seeks deletion of the requirement for packers in injection wells, and seeks an increase in the previously authorized 68-pound limitation on injection pressure.

CASE 7410: (Continued from January 20, 1982, Examiner Hearing)

Application of B.O.A. Oil & Gas Company for two unorthodox oil well locations, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 2035 feet from the South line and 2455 feet from the East line and one to be drilled 2455 feet from the North line and 1944 feet from the East line, both in Section 31, Township 31 North, Range 15 West, Verde-Gallup Oil Pool, the NW/4 SE/4 and SW/4 NE/4, respectively, of said Section 31 to be dedicated to said wells.

CASE 7457: (Continued from January 20, 1982, Examiner Hearing)

Application of E. T. Ross for nine non-standard gas proration units, Harding County, New Mexico. Applicant, in the above-styled cause, seeks approval for nine 40-acre non-standard gas proration units in the Bravo Dome Carbon Dioxide Area. In Township 19 North, Range 30 East: Section 12, the NW/4 NW/4 and NE/4 NW/4; Section 14, the NW/4 NE/4, SW/4 NE/4, and SE/4 NE/4. In Township 20 North, Range 30 East: Section 11, the NE/4 SW/4, SW/4 SE/4, SE/4 SW/4, and NW/4 SE/4.

CASE 7482: Application of Wiser Oil Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 1295 feet from the South line and 1345 feet from the West line of Section 32, Township 21 South, Range 37 East, Penrose-Skelly Pool.

CASE 7483: Application of Adams Exploration Company for salt water disposal, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from 4176 feet to 4293 feet in its Griffin Well No. 4 located in Unit A, of Section 10, Township 8 South, Range 32 East, Chaveroo-San Andres Pool.

CASE 7462: (Continued from February 3, 1982, Examiner Hearing)

Application of Marathon Oil Company for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of the Drinkard and Blinebry production in the wellbore of its C. J. Saunders Well No. 3, located in Unit C of Section 1, Township 22 South, Range 36 East.

CASE 7474: (Continued from February 3, 1982, Examiner Hearing)

Application of Union Oil Company of California for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Strawn, Atoka and Morrow formations underlying the E/2 of Section 25, Township 19 South, Range 33 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7484: Application of Anadarko Production Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Atoka and Morrow formations underlying the E/2 of Section 1, Township 19 South, Range 25 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the the well, and a charge for risk involved in drilling said well.

CASE 7485: Application of Berge Exploration for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying two 160-acre proration units, the first being the NW/4 and the second being the SW/4 of Section 27, Township 7 South, Range 26 East, each to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells.

CASE 7486: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation underlying the NE/4 NE/4 of Section 6, Township 20 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7487: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation underlying the SE/4 SE/4 of Section 31, Township 19 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7488: Application of Burkhart Petroleum Company for compulsory pooling, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the SW/4 NW/4 of Section 13, Township 8 South, Range 37 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7073: (Reopened and Readvertised)

In the matter of Case 7073 being reopened pursuant to the provisions of Order No. R-6558, which order promulgated special rules for the South Elkins-Fusselman Pool in Chaves County including provisions for 80-acre spacing units and a limiting gas-oil ratio of 3000 to one. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units with a limiting gas-oil ratio of 2000 to one.

CASE 7074: (Reopened and Readvertised)

In the matter of Case 7074 being reopened pursuant to the provisions of Orders Nos. R-6565 and R-6565-B, which created the South Elkins-Fusselman Gas Pool in Chaves County. All interested parties may appear and present evidence as to the exact nature of the reservoir, and more particularly, as to the proper rate of withdrawal from the reservoir if it is determined that said pool is producing from a retrograde gas condensate reservoir.

CASE 6373: (Reopened and Readvertised)

In the matter of Case 6373 being reopened pursuant to the provisions of Orders Nos. R-5875 and R-5875-A, which created the East High Hope - Abo Gas pool in Eddy County, and promulgated special rules therefor, including a provision for 320-acre spacing units. All interested parties may appear and show cause why said pool should not be developed on 160-acre spacing units.

CASE 7489: Application of Curtis J. Little for designation of a tight formation, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Chacra formation underlying portions of Township 25 North, Range 6 West, containing 6,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7490: Application of Harvey E. Yates Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Atoka-Morrow formation, underlying the N/2 of Section 19, Township 8 South, Range 30 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7491: Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka formation underlying portions of Townships 12, 13, and 14 South, Ranges 35 and 36 East, containing 46,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705, said area being an eastward and westward extension of previously approved tight formation area.

CASE 7492: Application of Harvey E. Yates Company for designation of a tight formation, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka-Morrow formation underlying all or portions of Townships 7, 8, and 9 South, Ranges 29,30, and 31 East, containing 115,200 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7493: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico.

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the East Bootleg Ridge-Morrow Gas Pool. The discovery well is Getty Oil Company Getty 15 Federal Well No. 1 located in Unit J of Section 15, Township 22 South, Range 33 East, NMPM. Said Pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 33 EAST, NMPM
Section 15: S/2

CASE 7488: Application of Burkhart Petroleum Company for compulsory pooling, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the SW/4 NW/4 of Section 13, Township 8 South, Range 37 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7073: (Reopened and Readvertised)

In the matter of Case 7073 being reopened pursuant to the provisions of Order No. R-6558, which order promulgated special rules for the South Elkins-Fusselman Pool in Chaves County including provisions for 80-acre spacing units and a limiting gas-oil ratio of 3000 to one. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units with a limiting gas-oil ratio of 2000 to one.

CASE 7074: (Reopened and Readvertised)

In the matter of Case 7074 being reopened pursuant to the provisions of Orders Nos. R-6565 and R-6565-B, which created the South Elkins-Fusselman Gas Pool in Chaves County. All interested parties may appear and present evidence as to the exact nature of the reservoir, and more particularly, as to the proper rate of withdrawal from the reservoir if it is determined that said pool is producing from a retrograde gas condensate reservoir.

CASE 6373: (Reopened and Readvertised)

In the matter of Case 6373 being reopened pursuant to the provisions of Orders Nos. R-5875 and R-5875-A, which created the East High Hope - Abo Gas pool in Eddy County, and promulgated special rules therefor, including a provision for 320-acre spacing units. All interested parties may appear and show cause why said pool should not be developed on 160-acre spacing units.

CASE 7489: Application of Curtis J. Little for designation of a tight formation, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Chacra formation underlying portions of Township 25 North, Range 6 West, containing 6,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7490: Application of Harvey E. Yates Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Atoka-Morrow formation, underlying the N/2 of Section 19, Township 8 South, Range 30 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7491: Application of Harvey E. Yates Company for designation of a tight formation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka formation underlying portions of Townships 12, 13, and 14 South, Ranges 35 and 36 East, containing 46,720 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705, said area being an eastward and westward extension of previously approved tight formation area.

CASE 7492: Application of Harvey E. Yates Company for designation of a tight formation, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka-Morrow formation underlying all or portions of Townships 7, 8, and 9 South, Ranges 29,30, and 31 East, containing 115,200 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7493: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico.

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the East Bootleg Ridge-Morrow Gas Pool. The discovery well is Getty Oil Company Getty 15 Federal Well No. 1 located in Unit J of Section 15, Township 22 South, Range 33 East, NMPM. Said Pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 33 EAST, NMPM
Section 15: S/2

(b) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Devonian production and designated as the North King-Devonian Pool. The discovery well is Samedan Oil Corporation Speight Well No. 1 located in Unit B of Section 3, Township 13 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 13 SOUTH, RANGE 37 EAST, NMPM
Section 3: NE/4

(c) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the North Loving-Atoka Gas Pool. The discovery well is Gulf Oil Corporation Eddy GR State Well No. 1 located in Unit E of Section 16, Township 23 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 27 EAST, NMPM
Section 12: N/2

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 4: S/2
Section 7: All
Section 8: All
Section 9: All
Section 16: All
Section 17: All
Section 18: E/2

(d) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Drinkard production and designated as the Teague - Drinkard Pool. The discovery well is Alpha Twenty-One Production Company Lea Well No. 1 located in Unit B of Section 17, Township 23 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 37 EAST, NMPM
Section 17: NE/4

(e) EXTEND the West Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 23: All
Section 24: W/2

(f) EXTEND the Atoka-Pennsylvanian Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
Section 16: W/2

(g) EXTEND the Avalon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 26 EAST, NMPM
Section 2: Lots 1 through 8

(h) EXTEND the Brunson-Fusselman Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 5: SE/4

(i) EXTEND the Brushy Draw-Delaware Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 26 SOUTH, RANGE 29 EAST, NMPM
Section 26: E/2

(j) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 27 EAST, NMPM
Section 23: All
Section 26: All

(k) EXTEND the Cary-Montoya Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 4: W/2 SW/4
Section 5: SE/4
Section 9: W/2 W/2

(l) EXTEND the Crow Flats-Morrow Gas Pool in Eddy County, New Mexico to include therein:

TOWNSHIP 16 SOUTH, RANGE 27 EAST, NMPM
Section 35: E/2
Section 36: W/2

(m) EXTEND the South Culebra Bluff-Bone Spring Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 25: S/2 SW/4
Section 27: SW/4

(n) EXTEND the Elkins-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 28 EAST, NMPM
Section 21: NE/4

(o) EXTEND the Empire-Abo Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM
Section 19: S/2 SW/4

(p) EXTEND the Henshaw-Queen Grayburg-San Andres Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM
Section 19: NE/4 NW/4

(q) EXTEND the Indian Flats-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Section 26: W/2

(r) EXTEND the West Nadine-Blinebry Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 8: NW/4

(s) EXTEND the Peterson-Mississippian Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 28: NW/4

(t) EXTEND the Race Track-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 28 EAST, NMPM
Section 7: S/2 SW/4
Section 18: NW/4 and N/2 SW/4 and SW/4 SW/4

(u) EXTEND the Railroad Mountain-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 2: NE/4 and E/2 SW/4

(v) EXTEND the Red Lake-Queen-Grayburg-San Andres Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 7: S/2
Section 8: SW/4
Section 18: E/2 NW/4

(w) EXTEND THE West Sawyer-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 37 EAST, NMPM
Section 5: SW/4

(x) EXTEND the Turkey Track-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 15: All

(y) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 13: SE/4
Section 24: NE/4

TOWNSHIP 9 SOUTH, RANGE 28 EAST, NMPM
Section 12: S/2 NE/4

TOWNSHIP 9 SOUTH, RANGE 29 EAST, NMPM
Section 7: S/2
Section 8: NW/4

PHONE (505) 623-6601

HEYCO HARVEY E. YATES COMPANY

PETROLEUM PRODUCERS P.O. BOX 1933 SECURITY NATIONAL BANK BUILDING ROSWELL, NEW MEXICO 88201

February 5, 1982

Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Attn: Mr. Richard Stamets

Re: Application of Harvey E. Yates Company
Designation of Atoka Tight Formation
Lea County, New Mexico

Dear Mr. Stamets:

Please find enclosed three sets of exhibits for the captioned application. Mr. Bob Strand indicated that the attached exhibits should have been submitted to your office at least fifteen days preceding the hearing.

Please accept my sincere apology for the delay. Our geological department in Midland, Texas is forwarding their exhibits to your office.

Very truly yours,

HARVEY E. YATES COMPANY

Ray F. Nokes
Reservoir Engineer

RFN:dy

Enclosures

cc: Allen Buckingham
c/o Mineral Management Service
P. O. Box 26124
Albuquerque, NM 87125

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

DOCKET NO. _____

Prepared by:

Harvey E. Yates Company
Security National Bank, Ste. 300
P. O. Box 1933
Roswell, New Mexico 88201

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Atoka Gas Sand Pool Extension

The purpose of this report is to present evidence which will demonstrate that the Atoka Gas Reservoir, under the Section described in the Tight Formation Application of January 27, 1982, in Townships 12, 13 and 14 of Ranges 35 and 36, N.M.P.M., Lea County, New Mexico, qualifies as an extension to the existing "Atoka Tight Formation" area.

The gas permeability in the Atoka Zone of the Harvey E. Yates Company operated McDonald Unit #1, were calculated from electric logs. The result of this analysis indicated an average in-situ gas permeability of .0418 millidarcies and is not expected to exceed 0.1 millidarcies. The Humble Equation and the Morris and Biggs Equation were used in calculating the Atoka sandstone permeability in the attached exhibits.

The stabilized production rate, at atmospheric pressure, for the Atoka Formation is not expected to exceed a maximum of 673.816 MCFGPD without stimulation. Attached is a production summary extracted from C-115 Monthly Operators Reports for the Heyco-Betenbough #1.

A comparison of the similarities in the Atoka Formation in-situ pressures, between the Heyco-Betenbough #1 and the McDonald Unit #1, indicates that the retrograde condensation phenomena which occurred in the Betenbough #1, would also occur in the McDonald Unit #1. The liquid hydrocarbons production expected from the Atoka Formation would have existed in a gas state at reservoir conditions; and therefore, would not exceed five barrels of crude oil per day.

Submitted with this report is a detailed description of each well which has penetrated the Atoka Formation and tests, is recorded.

Ray L. Hokes
Reservoir Engineer
Harvey E. Yates Company
February 1, 1982

Robert H. Strand, P.A.

Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201

Please Reply To: P.O. Box 2226

January 27, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

ATTN: Mr. Richard Stamets

Re: Application of Harvey E. Yates
Designation of Tight Formation
Lea County, New Mexico

Dear Mr. Stamets:

Enclosed for filing is an original and two copies of the Application of Harvey E. Yates Company in the above referenced matter. This case has previously been set for hearing on the February 17, 1982 Docket.

Sincerely yours,

Robert H. Strand

RHS/bjt
encls

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION LEA COUNTY, NEW MEXICO : Case No. _____

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states;

1. Applicant is the owner of an interest in the Atoka Formation underlying the following described lands situated in Lea County, New Mexico:

Township 12 South, Range 35 East, NMPM
Sections 31 and 32

Township 13 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20

Township 12 South, Range 36 East, NMPM
Sections 32, 33, 34, 35, 36

Township 13 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24

Containing a total of 46, 720 acres, more or less.

2. The Atoka formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703 (c)(2)(3).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka formation underlying the above described lands be designated a tight formation.

DATED this 27th day of January, 1982.

HARVEY E. YATES COMPANY

By: _____
Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bit

NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

DOCKET NO.

PREPARED FOR:

HARVEY E. YATES COMPANY
SUITE 300
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO 88201

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ATOKA GAS SAND POOL

In the matter of the determination of the Atoka formation underlying certain lands in Lea County, New Mexico, as a "Tight Formation" pursuant to regulations of the Federal Energy Commission, Section 107(b) of the Natural Gas Policy Act of 1978 (15 USC 3317) and regulations thereunder, the certain exhibits will be evidence presented which demonstrates that the Atoka gas reservoir beneath lands located in Townships 12, 13 and 14 South and Ranges 35 and 36 East, N.M.P.M., Lea County, New Mexico, qualifies as a "Tight Formation".

The producing Atoka zone is primarily a sand zone. The matrix is characterized as being very fine-grained with porosities ranging from 5% to 11%. The formation is highly cemented and the producing interval is encountered at an average depth of 12,600 feet.

The operator in the Bettenbough Atoka Zone gas well has conducted both drill stem tests and reservoir buildup pressure surveys on his wells. The results of the pressure surveys show the average in-situ gas permeability throughout the Atoka section averages 0.037 millidarcies and is not expected to exceed 0.1 millidarcy. The results of the pressure surveys together with all pertinent data are summarized on Exhibit No. 1. The individual Horner calculations, data and buildup curves are included as sub-parts to Exhibit No. 1.

The stabilized production rates, against atmospheric pressure of wells completed for production in the Atoka zone at 12,600 feet without stimulation, are not expected to exceed a maximum of 403 MCF of gas per day; and after stimulation with acid, the maximum flow rate of gas is not expected to exceed 1215 MCFD.

Exhibit No. 2 is a summary of gas production of the Bettenbough Atoka (Gas) Pool. Individual graphic presentation of the production history is not included.

The liquid hydrocarbons produced at the surface do not exist as liquid in the Atoka gas reservoir. A recombination of the separator fluids was not conducted to verify the Dew-Point pressure; however, an analysis of the produced gas and the Horner pressure buildup surveys in the Bettenbough No. 1 Well suggest that above a reservoir pressure of 3560 psig all fluids exist in a single gas phase. As the reservoir pressure declines, a reduction in gas production rates occurs as the retrograde condensation phenomena occurs when the reservoir pressure passes through the Dew-Point pressure. At some future date a form of artificial lift will probably be required to remove the retrograde liquids from the well bore and tubing to have sustained gas production.

Exhibit 3 is a Well Data Table and includes all pertinent well information. The casing design of the wells drilled and completed indicates that the fresh water aquifers in the area as required by rules and regulations of the New Mexico Conservation Commission have been fully protected.

Santa Rosa - 310-400
Ogallala - 900-1200

13 3/8 — 369' cemented w/ 400 SKs
9 5/8 — 4000' " w/ 3400 SKs

EXHIBIT 1
ATOKA GAS SAND POOL
LEA COUNTY, NEW MEXICO
SUMMARY OF RESERVOIR BUILDUP SURVEYS
PRODUCTION TEST DATA, FORMATION RESERVOIR FLUID
CHARACTERISTICS, PERMEABILITIES, RADIUS OF INVESTIGATION,
DAMAGE RATIOS AND CALCULATED FLOW RATES TO ATMOSPHERE
USING SURVEY TEST DATA AND RESULTS
Ralph H. Vbay & Associates, Inc.
Engineering Consultants

Operator Lease Name Well Number	Harvey E. Yates Company Hayco Fetenbough Well No. 1		Harvey E. Yates Company Superior "19" State Well No. 1
Location - Section, Township and Range	Sec. 31, T-15-S, R-36-E		Sec. 19, T 16-S, R-35-E
Productive Atoka Formation Interval Measured Depth - Feet	11,275' to 11,347' 72'		12,551' to 12,785' 243'
Test Data	Drill Stem Test	Reservoir Buildup	Drill Stem Test
Date of Flow Tests and Reservoir Buildup Survey	4-30-1982	8-15-1983	9-27-1983
Flowing Tubing Pressure - psig	16	283	35
Flowing Bottom Hole Pressure (P_{wf}) - psig	857	857	249
Choke Size - Inches	32/64	33/64	3/8
Gas Gathering Line Operating Pressure - psig	NA		NA
Production Data			
Gas Production on Test - MCFD	112	833	335
Condensate Production - Barrels	NA	55	NA
Water Production - Barrels	NA	NA	NA
Cumulative Gas Production at Test Date - MCF	7.5	14,700	19.2
Formation Reservoir and Physical Characteristics Data			
Net Atoka Zone Thickness - Feet	72	72	62
Porosity (Ø) % of Bulk Volume	11	11	5.0
Interstitial Water (S_w) % of Pore Space	25	25	25
Reservoir Temperature °F/°R	183/643	183/643	198/658
Specific Gravity of Gas (Std Air = 1.00)	0.733	0.733	0.733
Gas Viscosity (μ_g) at Average Reservoir Pressure	0.0178	0.0178	0.0174
Flowing Test - Centipoises	0.0176	0.0178	0.0124
Critical Pressure (Pc) - psia	655	655	655
Critical Temperature (Tc) - °R	389	389	389
Gas Compressibility (Cg) - psi^{-1}	4.02×10^{-4}	4.02×10^{-4}	4.02×10^{-4}
Water Compressibility (Cw) - psi^{-1}	3.00×10^{-6}	3.00×10^{-6}	3.00×10^{-6}
Rock Compressibility (Cf) - psi^{-1}	4.90×10^{-6}	4.90×10^{-6}	4.90×10^{-6}
Total Compressibility (Ct) - psi^{-1}	3.07×10^{-4}	3.07×10^{-4}	3.07×10^{-4}
Gas Deviation Factor (Z) @			
Flowing Bottom Hole Pressure	0.88	0.88	0.93
Average Reservoir Pressure	0.82	0.82	0.77
Boundary Reservoir Pressure	0.85	0.89	0.80
Gas Formation Volume Factor (Bg) - Cubic Feet/SCF	7.35×10^{-3}	6.237×10^{-3}	5.816×10^{-3}
Well Bore Radius (r_w) - Feet	0.333	0.333	0.333
Equivalent Liquid Rate of Test Gas Production (q_{REPD}) - Barrels	159	926.1	339
Pseudo Flow Time at Test Date (T_p) - Hours	2.48	423	1.483
Shut In Time of Reservoir Buildup Test (Δt) - Hours	4.1	245	4.066
Slope of Buildup Curve (Horner Technique)(m) psi/cycle	209	480	2304
Reservoir Boundary Pressure from Buildup (P_e) - psig	4007	4179	3491
Transmissibility			
$(Kh/\mu) = \frac{162.6 \times q_{REPD}}{m}$ - Md - Ft/Cps	103.23	313.54	42.27
Productive Capacity $(Kh/\mu_g \mu)$ × (u/s) = Md Ft.	1.837	5.52	0.74
Permeability (kh/h) = k - Md	0.025	0.0767	0.010
Radius of Investigation During Buildup Pressure Surveys			
$r_i = \sqrt{\frac{kT}{57600\, Ø \mu c}}$ - Feet	33.4	179.6	11
Where T is shut in time in minutes T = (ΔT)(60 minutes) Van Poolen Equation			
Estimated Damage Ratio (EDR)			
$EDR = \frac{P_e - P_{wf}}{m(\log T + 2.83)}$	3.535	0.881	1.178
Calculated Flow to Atmospheric Pressure For Various Drainage Radii - MCFD			
Using Darcy Radial Flow Equation for Gas			
$Qm = \frac{0.703\, kh\, (Pe^2 - P_{wf}^2)^n}{\mu T Z\, \ln(re/rw)}$ re	403	1313	316
r @ 80 acres	185	964	143
r @ 160 acres	176	909	138
r @ 320 acres	175	874	132
r @ 640 acres	183	840	127

Where

P_e is Reservoir pressure at drainage boundary

P_w is flowing pressure at well bore

Setting P_{wf} = 0 represents maximum flow that formation matrix would deliver into well bore

EXHIBIT 1 A
YATES PETENBOUGH NO. 1
DRILL STEM TEST APRIL 30, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FEET/FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1- 2	2.	5993.3	0.00	0.02	141.0	3282.	6479.
2- 3	2.	4821.1	0.00	0.02	134.4	3775.	5854.
3- 4	2.	1663.2	0.00	0.02	82.9	3902.	4578.
4- 5	2.	611.3	0.01	0.03	36.0	3953.	4126.
6-15	9.	148.4	0.03	0.03	11.3	3975.	3993.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	2205.	2205.	0.37	5.167	5.167
2	3282.	3282.	0.63	3.416	3.416
3	3775.	3775.	0.90	2.699	2.699
4	3902.	3902.	1.17	2.307	2.307
5	3938.	3938.	1.43	2.070	2.070
6	3953.	3953.	1.70	1.900	1.900
7	3955.	3955.	1.97	1.776	1.776
8	3959.	3959.	2.23	1.686	1.686
9	3962.	3962.	2.50	1.612	1.612
10	3964.	3964.	2.77	1.552	1.552
11	3966.	3966.	3.03	1.505	1.505
12	3968.	3968.	3.30	1.463	1.463
13	3970.	3970.	3.57	1.428	1.428
14	3970.	3970.	3.83	1.399	1.399
15	3975.	3975.	4.10	1.373	1.373

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION

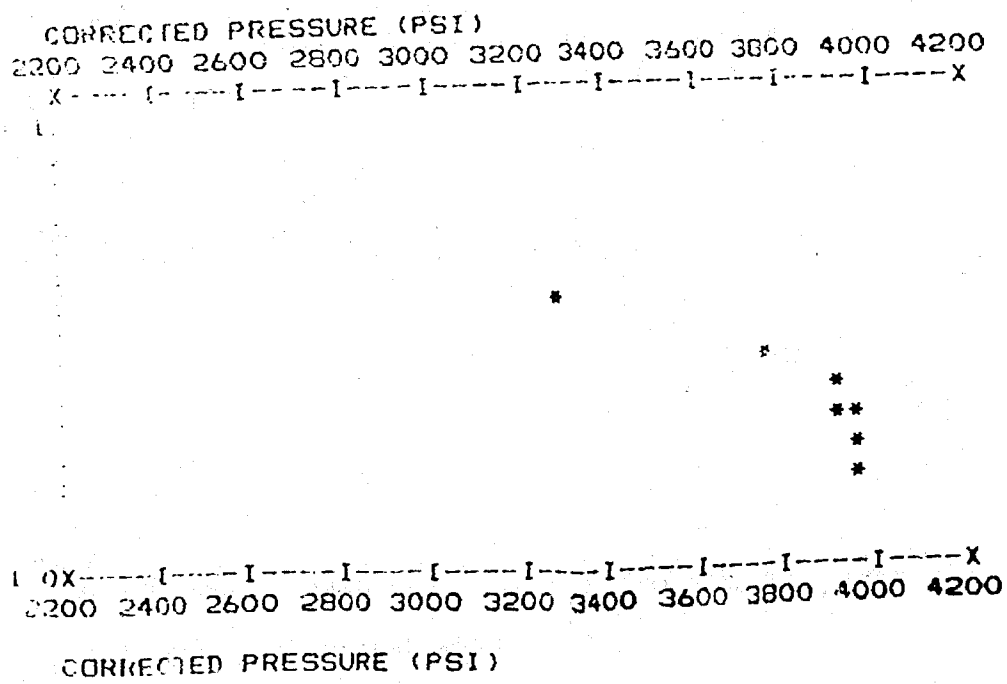

CORRECTED PRESSURE (PSI)
2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200
2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200
CORRECTED PRESSURE (PSI)

EXHIBIT 1 A

EXHIBIT I-B
YATES BETENBOUSH NO. 1
RESERVOIR BUILDUP AUGUST 15-25, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FEET,FT	SLOPE PSI/CYC	K (MDS)	P 1 HR/PSI	COMPL EFF , %	BIBIP PSIG	AVG P PSIG
4	0	1939 7	0 02	0 13	148 9	2339	7436
5	11	2051 6	0 01	0 11	152 9	3044	8518
6	13	1673 1	0 02	0 14	141 2	3357	6939
7	16	1071 4	0 03	0 10	119 4	3476	5643
8	24	409 9	0 00	0 25	67 8	3570	4303
9	30	197 7	0 17	0 30	39 0	3600	3923
10	32	131 1	0 26	0 27	27 4	3626	3813
11	35	227 4	0 15	0 28	44 9	3784	3959
12	38	118 1	0 28	0 29	24 6	3810.	3861
13	39	1035 7	0 03	0 25	162 9	3822	4279

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	1647	1736	0 50	848 347	848 346
2	2190	2339	1 00	424 673	424 673
3	2927	3044	2 00	212 837	212 837
4	3252	3337	3 00	142 224	142 224
5	3404	3470	4 00	106 918	106 918
6	3461	3519	5 00	85 735	85 735
7	3483	3542	6 00	71 612	71 612
8	3503	3570	7 00	61 525	61 525
9	3532	3590	8 00	53 959	53 959
10	3556	3600	10 00	43 367	43 367
11	3582	3603	12 00	36 306	36 306
12	3593	3615	14 00	31 262	31 262
13	3607	3626	16 00	27 480	27 480
14	3603	3640	18 00	24 537	24 537
15	3609	3670	24 00	18 653	18 653
16	3655	3694	28 00	16 131	16 131
17	3681	3705	36 00	12 769	12 769
18	3703	3724	44 00	10 629	10 629
19	3722	3739	52 00	9 148	9 148
20	3736.	3751	60. 00	8. 061	8. 061
21	3748	3761	68. 00	7 230	7. 230
22	3751	3764.	70. 00	7 052	7. 052
23	3755	3767	80 00	6 296	6. 296
24	3760	3771	90 00	5 707	5. 707
25	3767	3777	100. 00	5 237	5. 237
26	3770	3779	110 00	4 852	4. 852
27	3776	3784.	120 00	4 531	4. 531
28	3780	3787	130. 00	4 259	4. 259
29	3782	3789	140. 00	4. 026	4. 026
30	3785	3792	150. 00	3. 824	3. 824
31	3788	3794	160. 00	3. 648	3. 648
32	3791	3797	170. 00	3. 492	3. 492
33	3794	3799	180 00	3. 354	3. 354
34	3797.	3801	190. 00	3. 230	3. 230
35	3798	3802.	200. 00	3. 118	3. 118
36	3802	3806	210. 00	3. 017	3. 017
37	3804	3807	220. 00	2. 926	2. 926
38	3807	3810	230 00	2 842	2 842
39	3822	3822	240 00	2 765	2 765

@ CORRECTED FOR AFTERFLOW

@@ CORRECTED FOR SUPERPOSITION

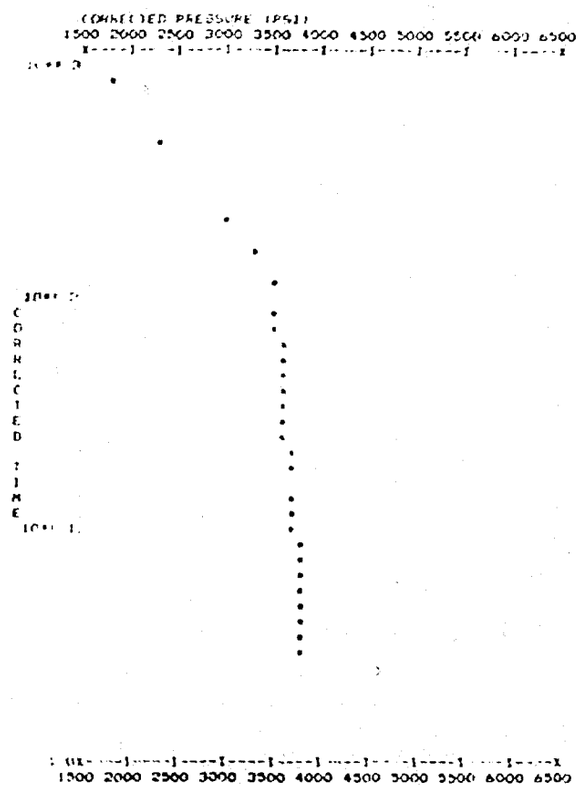


EXHIBIT I-B

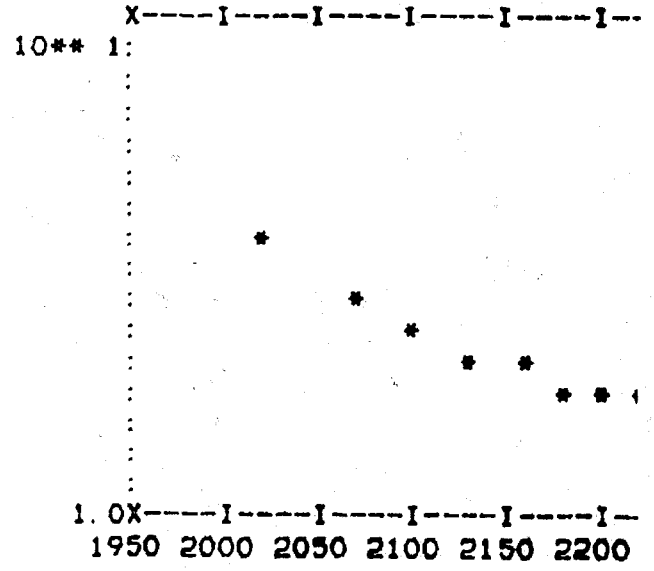
EXHIBIT 1 C
HEYCO SUPERIOR 19 NO. 1
DRILL STEM TEST SEPTEMBER 17, 1980
LEA COUNTY, NEW MEXICO

PRESSURE BUILD-UP ANALYSIS

POINTS USED	RADIUS FELT, FT	SLOPE PSI/CYC	K (MDS)	P.I. M/D/PSI	COMPL. EFF., %	SIBHP PSIG	AVG. P PSIG
1- 4	7.	390.1	0.04	0.16	57.3	2102.	2239.
4- 9	9.	759.1	0.02	0.15	93.7	2224.	2376.
9-15	11.	1303.9	0.01	0.14	138.6	2316.	2491.

POINT	PRESSURE	CORRECTED PRESSURE@	DT (HOURS)	(T+DT)/DT	CORRECTED (T+DT)/DT@@
1	1953.	1953.	0.33	5.545	5.545
2	2019.	2019.	0.60	3.500	3.500
3	2066.	2066.	0.87	2.731	2.731
4	2102.	2102.	1.13	2.324	2.324
5	2133.	2133.	1.40	2.071	2.071
6	2161.	2161.	1.67	1.900	1.900
7	2183.	2183.	1.93	1.776	1.776
8	2205.	2205.	2.20	1.682	1.682
9	2224.	2224.	2.47	1.608	1.608
10	2244.	2244.	2.73	1.549	1.549
11	2260.	2260.	3.00	1.500	1.500
12	2277.	2277.	3.27	1.459	1.459
13	2288.	2288.	3.53	1.425	1.425
14	2305.	2305.	3.80	1.395	1.395
15	2316.	2316.	4.07	1.369	1.369

@ CORRECTED FOR AFTERFLOW
@@ CORRECTED FOR SUPERPOSITION



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2250 2300 2350 2400 2450
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---I----I----I----I----X
2250 2300 2350 2400 2450
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EXHIBIT 2
PRODUCTION SUMMARY
BETTENBOUGH NO. 1 WELL (ATOKA ZONE)
LEA COUNTY, NEW MEXICO

Date	Choke Size	Gas-MCFD	Condensate Barrels	Water Barrels	Flowing Tubing Pressure psig	Line Pressure psig
7-30-1980	32/64"	765	29	34	350	110
7-31-1980	32/64"	765	29	25	350	100
8- 1-1980	32/64"	765	29	25	350	100
8- 2-1980	32/64"	765	33	16	350	100
8- 3-1980	32/64"	765	39	25	350	100
8- 4-1980	32/64"	765	46	20	350	100
8- 5-1980	32/64"	765	23	16	350	100
8- 6-1980	32/64"	765	30	25	350	100
8- 7-1980	32/64"	803	30	26	325	100
8- 8-1980	32/64"	803	39	16	325	100
8- 9-1980	32/64"	803	39	20	300	100
8-10-1980	32/64"	803	39	21	300	100
8-11-1980	32/64"	803	39	20	300	100
8-12-1980	32/64"	819	39	18	350	100
8-13-1980	32/64"	826	63	16	350	100
8-14-1980	32/64"	834	40	20	350	100
8-15-1980	32/64"	856	36	12	350	100
8-27-1980	19/64"	765	53	6	900	110
8-28-1980	20/64"	872	54	15	800	100
8-29-1980	22/64"	903	43	13	650	100
8-30-1980	23/64"	918	51	16	600	100
8-31-1980	25/64"	898	46	15	500	100
9- 1-1980	24/64"	913	44	15	550	100
9- 2-1980	24/64"	918	44	14	500	100
9- 3-1980	24/64"	918	44	13	500	100

EXHIBIT 2

EXHIBIT 3
WELL DATA
ATOKA GAS SAND GAS POOL
LEA COUNTY, NEW MEXICO
Ralph H. Viney & Associates, Inc.
Engineering Consultants

Field Operator	County Lease Name and Well Number	Legal Description	Elevation	Date of Completion	Total Depth and Plug Back	Casing Record Size	 Depth	 Cement	Producing Zone	P
Wildcat	Lea County									
Harvey E. Yates Company	Betenbough #1	Unit C, 660' FNL, 1980' FWL, Sec.32 T-13-S, R-36-E	3975' GL	6-19-80	14,000' 13,479'	13-3/8" 9-5/8" 5-1/2"	369' 4,600' 13,150'	400 Sx 3400 Sx 2100 Sx	Atoka	12 12 12 12 12 12

	Initial Potential Test Data									
							Flowing Pressure			
Date	Choke Size	Test Interval	Gas MCFD	Condensate BOPD	Gas-Oil Ratio	Water BWPD	Tubing Pressure	Bottom Hole Pressure	Casing Pressure	A
6-18-1980	1/2"	24 Hours	832	2	-	28	120	-	Pkr.	0.

A
GAS POOL
W MEXICO
ociates, Inc.
sultants

epth

ack	Casing Record Size	Depth	Cement	Producing Zone	Perforated Interval	Well Stimulation
0'	13-3/8"	369'	400 Sx	Atoka	12,315-331'(68 Holes)	12855-12900' Acidized w/1000 gal 7½% Ms.
9'	9-5/8"	4,600'	3400 Sx		12,539-553'(64 Holes)	12539-12642' Acidized w/1000 gal 7½% Ms.
	5-1/2"	13,150'	2100 Sx		12,637-642'(24 Holes)	12315-12331' Acidized w/1000 gal 7½% MS.
					12,855-860'(24 Holes)	12315-12900' Acidized w/7500 gas 7½% Ms, 3 stages 60/40 block; 1000 SCF N_2/bbl.
					12,873-900'(112 Holes)	DST(Atoka)12275'-347' open 1 hr 29 min rec. 102 MCF, HP 5799-5813# FP 127.6-172.3# 1.5 hr, FSIP 3974.5#, BHT 174°

ntial Test Data

ter WPD	Flowing Pressure Tubing Pressure	Bottom Hole Pressure	Casing Pressure	Gas Air = 1	Condensate API
28	120	-	Pkr.	0.733	45.3

SOUTHWESTERN LABORATORIES
1703 West Industrial — P. O. Box 2150
MIDLAND, TEXAS 79701
(915) 683-3348

FRACTIONAL ANALYSIS REPORT

DATE RECEIVED _____

SAMPLE MARKED Hayco Betenbough #1 Gas Sales Line

100 psig @ 70° F.

FILE NO. C-1950-G

LAB. NO. 44425

SAMPLE FROM Harvey C, Yates Co., Inc.

DATE SECURED 8-15-80

DATE OF RUN 8-18-80

SECURED BY Tefteller

COMPONENT	MOL. %	G. P. M.	LIQUID VOL. %
Oxygen			
Nitrogen	3.61		
Carbon Dioxide	0.60		
Methane	77.26		
Ethane	9.59	2.557	
Propane	5.19	1.424	
Butane	0.92	0.300	
i-Butane	1.73	0.544	
Pentane	0.47	0.172	
i-Pentane	0.42	0.152	
Hexanes	0.04	0.016	
Heptanes & Heavier	0.17	0.078	
Hydrogen Sulfide	*None Det.		
Helium			
Hydrogen			
Carbon Monoxide			
TOTALS	100.00	5.243	

CONDENSATE VALUES, G.P.M.

Propane _____

Butane _____

Gasoline _____

HEATING VALUE, B.T.U. Per Cu. Ft.*

Calculated from % Composition 1214

Calculated water saturated 1193

SULPHUR CONTENT, Grains Per 100 Cu. Ft.*

Hydrogen Sulfide _____

Mercaptans _____

SPECIFIC GRAVITY*

Calculated from % Composition 0.733

*14.696 lbs./sq. in., 60° F

REMARKS

Propane + GPM — 2.686

*Determined on laboratory sample.

COPIES: 3cc Harvey E. Yates Co., Inc.
1cc Tefteller, Inc.

Gary M. Burch
SOUTHWESTERN LABORATORIES

EXHIBIT 4

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7085
Order No. R-6537

APPLICATION OF HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 12, 1980, at Santa Fe, New Mexico, before Examiner Richard L. Stamets

NOW, on this 17th day of December, 1980, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.703 recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying the following lands situated in Lea County, New Mexico, hereinafter referred to as the Atoka formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 6 and 7: All
Sections 18 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 24: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 5 through 7: All
Sections 18 and 19: All

Containing a total of 37,760 acres, more or less.

(3) That the Atoka formation underlies all of the above described lands; that the formation consists of shales interspersed with thin lime and sand sections; that the top of such formation is found at an average depth of 12,200 feet below the surface of the area set out in Finding No. (2) above; and that the thickness of such formation is from 700 to 900 feet within said area.

(4) That the type section for the Atoka formation for the proposed tight formation designation is found at a depth of from approximately 12,230 feet to 12,970 feet on the Gamma Ray-Neutron log dated May 18, 1980, from the Harvey E. Yates Company Betenbough No. 1 Well located in Unit C of Section 32, Township 13 South, Range 36 East, Lea County, New Mexico.

(5) That the following described well produces natural gas from the Atoka formation within the proposed area:

Harvey E. Yates Company
Betenbough #1 — 660 feet from North line and 1980 feet from West line of Section 32, Township 13 South, Range 36 East, N.M.P.M., Lea County, New Mexico.

(6) That the Atoka formation underlying the above described lands has been penetrated by several other wells, none of which produced natural gas in commercial quantities from the Atoka formation.

(7) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average *in situ* gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(8) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average *in situ* gas permeability throughout the pay section of the Atoka formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 C.F.R. §271.703 (c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(9) That within the proposed area there are two recognized aquifers being the Ogallala, found at depths of from 300 feet to 400 feet, and the Santa Rosa, found at depths of from 900 feet to 1200 feet or approximately 11,000 feet above the Atoka formation.

(10) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Atoka formation will not adversely affect said aquifers.

(11) That the Atoka formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 C.F.R. §271.703(b)(6) of the regulations.

(12) That the Atoka formation within the proposed area should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Atoka formation underlying the following described lands in Lea County, New Mexico, be designated as a tight formation:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 6 and 7: All
Sections 18 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 24: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 5 through 7: All
Sections 18 and 19: All

Containing a total of 37,760 acres, more or less.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

ATOKA PENETRATION IN PROPOSED TIGHT GAS CLASSIFICATION AREA

Lea County, New Mexico

Prepared by Ray F. Nokes, Reservoir Engineer

Harvey E. Yates Company

February 1, 1982

WELL NAME	Shell State #1	Seth Alston #1	Estacado Unit #1	State H "A" Com #1	State "4" #1
Operator:	Union Texas Petro.	Sharples Oil Corp.	Union Oil of CA	Amerada Hess	Adobe Oil & Gas
Spudded:	3-8-71	11-13-50	9-12-74	4-19-69	8-1-79
Completed or P & A	6-11-71/P & A	8-2-51/P & A	11-7-74/P & A	7-17-69/P & A	9-27-79/P & A
Location:	1980' FNL & 660' FWL Sec 6, T-13S, R-35 E Lea Co., NM	560' FSL & 660' FWL Sec 17, T-13S, R-35E Lea Co., NM	1980' FSL & 660' FWL Sec 8, T-14S, R-35E Lea Co., NM	660' FNL & 1980' FEL Sec 19, T-14S, R-35E Lea Co., NM	1980' FNL & 660' FWL Sec 4, T-13S, R-36E Lea Co., NM
Total Depth:	13,552'	14,440'	13,500'	15,038'	13,476'
PBTD:	13,210'	11,831'	NA	NA	NA
Top of Pay:	13,156'	P & A	NA	NA	NA
Perf's:	13,156-204' Devonian	P & A	NA	NA	NA
Casing:	11-3/4" to 405' w/400 sx 8-5/8" to 4300' w/500 sx 5-1/2" to 13,525' w/750 "	13-3/8" to 319' w/280 sx 8-5/8" to 4409' w/2600 sx 5-1/2" to 11,830' w/350 "	11-3/4" to 400' w/325 sx 8-5/8" to 4520' w/600 sx	13-3/8" to 384' w/425 sx 9-5/8" to 4530' w/1100 sx	13-3/8" to 380' w/420 sx 8-5/8" to 4589' w/1900 sx
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka @ 11,563'	T/Atoka NR	T/Atoka @ 12,456'	T/Atoka @ 12,390'	T/Atoka @ 12,072'
Elevation:	4115' GL	4113' GL	4057' GL	4056' GL & 4075' KB	3997' GL
Tsts:	No tsts rec'd in Atoka	DST fr 11,521-580'; op 3 hrs. GTS in 1 hr, 38 mins.	No tsts rec'd in Atoka	DST fr 12,478-653'; op 1 hr, 15 mins. 1500' WB, rec WB + 3 gal DM; FP 695-705#; ISIP 1115#/30 mins; FSIP 1376#/2 hrs, 15 mins.	No tsts rec'd in Atoka

WELL NAME	State #1	Hoyle Rotenbough #1	McDonald Unit #1	Renshaw #1	Danglade #1
Operator:	Freeport Oil	Harvey E. Yates Co.	Harvey E. Yates Co.	Moran Oil *	Zapata, Petrol, et al
Spudded:	3-29-69	3-6-80	6-13-81	7-23-52	8-12-57
Completed or P & A:	6-9-69 P & A	6-18-80 Comp.	NA	Re-en 11-12-65; P & A 1-28-66	12-31-57 P & A
Location:	1650' FSL & 2310' FEL Sec 11, T-13S, R-36E Lea Co., NM	660' FNL & 1980' FWL Sec 32, T-13S, R-36E Lea Co., NM	660' FSL & 990' FEL Sec 33, T-13S, R-36E Lea Co., NM	660' FN & WL Sec 2, T-14S, R-36E Lea Co., NM	2310' FNL & 330' FEL Sec 3, T-14S, R-36E Lea Co., NM
Total Depth:	14,500'	14,780'	14,618'	13,047'	15,115'
PBTD:	NA	13,050'	14,415'	10,875' CIBP	NA
Top of Pay:	NA	12,315'	NA	NA	NA
Perf's:	NA	12,315-900' Atoka	NA	NA	NA
Casing:	12-3/4" to 406' w/400 sx 8-5/8" to 4525' w/325 "	13-3/8" to 369' w/350 sx 9-5/8" to 4600' w/3400 " 5-1/2" to 13,150' w/2100	13-3/8" to 367' w/400 sx 8-5/8" to 4611' w/2150 " 5-1/2" to 14,587' w/1405	13-3/8" to 339' w/300 sx 9-5/8" to 4614' w/1500 " 5-1/2" to 11,106' w/450	13" to 388' w/350 sx 9" to 4668' w/3700 "
Tubing:	NA	2-3/8" to 12,257'	NA	NA	NA
Formation:	T/Atoka @ 12,093'	T/Atoka @ 12,274'	T/Atoka @ 12,204' Appr.	T/Atoka NA	T/Atoka NA
Elevation:	3962' GL	3992' GL	3945' GL	3944' GL	3951' DF
Tests:	No tsts rec'd in Atoka	IPF (Atoka): 832 MCFGPD, GR .733, GOR 416,000, 120#. DST (Atoka): 12,275-346'. Op 90 min, rec 558' GCDF w/tr dist. (Smplr: .6 CFTG + 400 cc DF w/tr dist @ 100#) 90 min ISIP 3878#, FP 110-989#, 120 min FSIP 3943#, HP 5799-5799#. BHT 174 Deg F. DST (Atoka): 12,744-922'. Op 105 min, rec 900' GCM (Smplr: 1.2 CFTG + 1000 cc GCM @ 400#) 100 min ISIP 4009#, FP 2267-484#, 3 hr FSIP 4009#, HP 6368-6368#.	Form tstr (Atoka): See Dresser Atlas Rep.	No tsts rec'd in Atoka *Orig operated by Sinclair Oil & Gas	No tsts rec'd in Atoka

WELL NAME	Austin-Monteith #1	Austin-Monteith #2	State "16" #1	State "16" #2	Hannah #1
Operator:	Harvey E. Yates Co.	Harvey E. Yates Co.	Adobe Oil & Gas	Adobe Oil & Gas	Adobe Oil & Gas
Spudded:	3-17-79	4-29-80	2-18-78	6-1-79	1-10-79
Completed or P & A:	7-20-79 Comp.	6-28-80 P & A	4-29-78 Comp.	9-11-79 Comp.	3-26-79 Comp.
Location:	1650' FSL & 1980' FWL Sec 8, T-14S, R-36E Lea Co., NM	1980' FSL & 660' FEL Sec 8, T-14S, R-36E Lea Co., NM	990' FSL & 660' FWL Sec 16, T-14S, R-36E Lea Co., NM	1980' FN & WL Sec 16, T-14S, R-36E Lea Co., NM	1980' FNL & 660' FEL Sec 17, T-14S, R-36E Lea Co., NM
Total Depth:	14,000'	13,670'	13,770'	13,875'	13,832'
PBTD:	13,478'	NA	13,687'	13,400'	13,520'
Top of Pay:	13,360'	NA	13,199'	13,288'	13,397'
Perf's:	13,360-391' Miss.	NA	13,199-261' Miss	13,288-373' Miss	13,397-460' Miss
Casing:	13-3/8" to 389' w/400 sx 8-5/8" to 4608' w/1630 " 5-1/2" to 14,000' w/1750	13-3/8" to 395' w/400 sx 8-5/8" to 4600' w/1630 "	13-3/8" to 368' w/450 sx 9-5/8" to 4661' w/1600 " 5-1/2" to 13,770' w/1600	13-3/8" to 389' w/425 sx 8-5/8" to 4675' w/2200 " 5-1/2" to 13,876' w/1750	13-3/8" to 371' w/450 sx 8-5/8" to 4640' w/1880 " 5-1/2" to 13,831' w/1300
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka @ 12,328'	T/Atoka @ 12,326'	T/Atoka @ 12,310'	T/Atoka @ 12,333'	T/Atoka @ 12,306'
Elevation:	3966' GL	3959' GL	3944' GL	3945' GL	3954' GL
Tests:	DST: 13,608-882'. Op 3 hrs, rec 120' M. FP 2795-872#, 4 hr FSIP 2617#, HP 5976-5976#. BHT 190 Deg F.	No tsts rec'd in Atoka	No tsts rec'd in Atoka	DST (Atoka): 12,516-600'. Op 90 mins, rec 120' DP 60 min ISIP 116#, FP 93-93#, 120 min FSIP 139#, HP 6082-5961#.	DST (Atoka): 12,764-850'. Pkr failed.

WELL NAME	Austin Unit #1	State "17" #1	Head State #1	Terry, et al #1	Phillips State #1
Operator:	Phillips Pet.	Southern Union Explor.	Adobe Oil & Gas	Wm. K. Young	Hilliard Oil & Gas
Spudded:	11-11-56	2-13-80	10-17-80	2-17-79	9-29-77
Completed or P & A:	7-21-57 Comp.	4-16-80 Comp.	1-12-81 P & A	5-7-79 P & A	12-5-77 P & A
Location:	660' FS & WL Sec 17, T-14S, R-36E Lea Co., NM	1980' FN & WL Sec 17, T-14S, R-36E Lea Co., NM	1980' FN & EL Sec 20, T-14S, R-36E Lea Co., NM	660' FSL & 1980' FEL Sec 22, T-14S, R-36E Lea Co., NM	600' FNL & 990' FEL Sec 35, T-12S, R-36E Lea Co., NM
Total Depth:	14,796'	13,830'	13,550'	15,100'	14,081'
PBTD:	13,290'	NA	NA	NA	NA
Top of Pay:	13,194'	13,228'	NA	NA	NA
Perf's:	13,194-286' Miss	13,228-258' Miss	NA	NA	NA
Casing:	13-3/8" to 392' w/375 sx 9-5/8" to 4650' w/710 " 7" to 13,425' w/590 "	13-3/8" to 395' w/400 sx 8-5/8" to 4630' w/2700 " 5-1/2" to 13,830' w/1200 "	13-3/8" to 383' w/450 sx 8-5/8" to 4650' w/2500 " 4-1/2" to 13,160' w/575 "	13-3/8" to 389' w/400 sx 9-5/8" to 4772' w/2664 "	13-3/8" to 435' w/425 sx 8-5/8" to 4600' w/2050 "
Tubing:	NA	NA	NA	NA	NA
Formation:	T/Atoka NA	T/Atoka @ 12,320'	T/Atoka @ 12,538'	T/Atoka NA	T/Atoka @ 12,050'
Elevation:	3979' DF	3962' GL	3954' GL	3923' GL	3967' GL
Tests:	No tsts rec'd in Atoka	No tsts rec'd in Atoka	DST (Atoka): 12,724-877'. Op 77 mins, rec 4200' wtr cushion + 568' mud w/NS. 60 min ISIP 4000#, FP 2014-2212#, 215 min FSIP 4047#, HP 6262-6262#. Perf (Atoka): 12,782-786' w/4 jspf. A w/2000 gals, swb load, PB to 12,700'.	No tsts rec'd in Atoka	No tsts rec'd in Atoka

Permeability Calculation for the McDonald Unit #1

660' FSL & 990' FEL, Sec 33, T-13S, R-36E
Lea Co., NM

Prepared by Ray F. Nokes, Reservoir Engineer

HARVEY E. YATES COMPANY

February 1, 1982

Formation: Atoka
Lithology: Sandstone
S_W calculated by Humble Equation
K calculated by Morris-Biggs Equation

R_W = .133 @ 74 Deg F for the HEYCO Betenbough #1
R_W = .059 @ 174 Deg F Corrected

Depth	RT ohms	Crossplot Ø in %	S_W in %
12,198'	174.2	9.7	17.79
12,199'	337.0	7.9	15.95
12,200'	762.9	5.9	14.51
12,201'	1305.2	5.5	11.96
12,202'	1911.6	4.6	11.98
12,203'	1636.4	4.9	12.10
12,204'	1108.6	5.9	12.04
12,205'	1176.6	4.1	17.28
12,206'	756.1	4.6	19.05
12,207'	119.1	8.1	26.12
12,208'	39.8	13.5	26.10
12,209'	29.3	14.9	27.35
12,210'	40.6	13.5	25.84
12,211'	88.0	11.2	21.36
12,212'	165.5	18.9	8.9
12,588'	177.3	9.3	18.46
12,589'	273.1	6.2	23.00
12,590'	261.5	5.7	25.72
12,591'	311.0	5.9	22.73
12,592'	342.7	6.6	19.19
12,593'	333.6	7.0	18.26
12,594'	319.4	7.7	16.85
12,595'	351.0	5.3	24.00
12,596'	548.7	4.3	24.04
12,597'	635.5	5.8	16.19
12,598'	408.9	6.7	17.29
12,599'	337.2	7.3	17.36
12,600'	323.3	9.4	13.51
12,601'	311.6	9.3	13.92
12,602'	370.9	9.4	12.61
12,603'	284.1	11.1	12.05
12,604'	119.9	11.6	17.70
12,605'	104.4	7.1	32.15
12,606'	242.1	4.9	31.45
12,607'	806.6	4.6	18.44
12,608'	526.0	7.4	13.70
12,609'	403.6	7.9	14.58
12,610'	434.3	6.8	16.51
12,611'	677.1	6.9	13.02
12,612'	1001.2	7.0	10.54

Depth	RT ohms	Crossplot Ø in %	S_w in %
12,733'	47.1	8.5	39.44
12,734'	180.6	6.4	27.33
12,735'	179.8	6.4	21.96
12,736'	225.3	6.4	24.47
12,737'	261.9	5.4	27.24
12,738'	240.9	7.0	21.49
12,739'	130.4	8.5	23.71
12,740'	110.5	8.8	24.81
12,741'	143.5	8.0	24.12
12,742'	153.0	7.4	25.40
12,743'	137.0	8.3	23.73
12,744'	159.6	8.6	21.16
12,745'	168.9	7.8	22.85
12,746'	144.2	8.6	22.26
12,747'	146.9	10.8	17.27
12,748'	173.8	11.3	15.12
12,749'	230.7	10.0	14.97
12,750'	297.4	8.7	15.31
12,751'	239.1	10.7	13.67
12,752'	167.9	9.6	18.33
12,753'	160.2	8.8	20.60
12,754'	212.0	6.2	26.10
12,755'	253.9	7.5	19.44
12,756'	224.1	6.9	22.63
12,757'	238.2	7.8	19.24
12,758'	266.4	6.4	22.50
12,759'	279.1	4.8	29.95
12,760'	298.3	4.9	28.34
12,761'	242.0	7.3	20.49
12,762'	185.3	8.7	19.40
12,763'	163.1	8.8	20.42
12,764'	145.5	8.7	21.89
12,765'	129.8	9.4	21.32
12,766'	130.3	8.1	24.98
12,767'	133.6	7.6	26.41
12,768'	132.2	7.9	25.47
12,769'	143.5	9.3	20.52
12,770'	213.1	7.3	21.84
12,771'	333.9	5.8	22.34
12,772'	199.1	9.0	18.04
12,773'	108.4	11.6	18.61
12,774'	95.9	9.5	24.53
12,775'	112.7	6.8	32.41
12,776'	132.7	7.7	26.13
12,777'	129.8	9.0	22.34
12,778'	113.5	8.9	24.18
12,779'	109.4	10.9	19.81
12,780'	112.5	11.5	18.44
12,781'	118.4	11.0	18.86
12,782'	128.8	9.4	21.41
12,783'	90.8	9.1	26.40
12,784'	43.5	9.3	37.26

Atoka Pay: 12,198' to 12,784'

Average Porosity = 8.11%

Average S_w = 20.85%

Average Permeability = .0418 md

Equations: Humble

$$S_w = \sqrt{\frac{\frac{.62}{\phi^{2.15}}(R_w)}{RT}}$$

Morris-Biggs $\left(\frac{C\,\phi^3}{S_{wi}}\right)^2$

C= 250 for Oil
80 for Gas

HALLIBURTON DIVISION LABORATORY
HALLIBURTON SERVICES
MIDLAND DIVISION
HOBBS, NEW MEXICO 88240

LABORATORY WATER ANALYSIS

No. W82-082

To Harvey E. Yates

Box 1933

Roswell, New Mexico

Date 1-21-82

Submitted by

Date Rec. 1-21-82

Well No. Betenbaugh #1 Depth Formation Atoka

County Lea Field McDonald Source

Resistivity	0.133 @ 74°F.	
Specific Gravity	1.011	
pH	6.6	
Calcium (Ca)	3,150	*MPL
Magnesium (Mg)	Nil	
Chlorides (Cl)	32,000	
Sulfates (SO_4)	1,400	
Bicarbonates (HCO_3)	425	
Soluble Iron (Fe)	80	

Remarks:

*Milligrams per liter

RECEIVED JAN 25 1982

Respectfully submitted,

Analyst: Brewer

HALLIBURTON COMPANY

cc:

By W. L. Brewer
CHEMIST

NOTICE

THIS REPORT IS LIMITED TO THE DESCRIBED SAMPLE TESTED. ANY USER OF THIS REPORT AGREES THAT HALLIBURTON SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER IT BE TO ACT OR OMISSION, RESULTING FROM SUCH REPORT OR ITS USE.

9035

Formation Testing Service Report

HALLIBURTON SERVICES

DUNCAN, OKLAHOMA

FLUID SAMPLE DATA

Sampler Pressure	400 PSIG at Surface
Recovery: Cu. Ft. Gas	1.2
cc. Oil	
cc. Water	
cc. Mud	1000 gas cut mud
Total Liquid cc	
Gravity	°API @ °F
Gas Oil Ratio	cu. ft./bbl.

	Resistivity	Chloride Content
Recovery Water	°F	ppm
Recovery Mud	°F	ppm
Recovery Mud Filtrate	°F	ppm
Mud Pit Sample	°F	ppm
Mud Pit Sample Filtrate	°F	ppm
Mud Weight	9.3	36 sec

Date	6-8-80
Ticket Number	716095
Kind of D.S.T.	OPEN HOLE
Halliburton Location	HOBBS
Tester	W. FLETCHER
Witness	C. HUBER
Drilling Contractor	MORANCO RIG # 9
	SM

EQUIPMENT & HOLE DATA

Formation Tested	
Elevation	3975' Ft.
Net Productive Interval	Ft.
All Depths Measured From	Kelly bushing
Total Depth	12922' Ft.
Main Hole/Casing Size	8.3/4"
Drill Collar Length	491' I.D. 2.25"
Drill Pipe Length	12207' I.D. 3.826"
Packer Depth(s)	12738-12744' Ft.
Depth Tester Valve	12700' Ft.

Cushion: Type Nitrogen, Amount 1500 PSI (estimated), Ft., Depth Back Pres. Valve, Surface Choke 1" Adj, Bottom Choke .75"

Recovered 900 Feet of gas cut mud

Recovered Feet of

Recovered Feet of

Recovered Feet of

Recovered Feet of

Remarks: SEE PRODUCTION TEST DATA SHEET

TEMPERATURE	Gauge No. 7653	Gauge No. 7652	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth 12722 Ft.	Depth 12912 Ft.	Depth Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 0735
Est. °F.	Blanked Off no	Blanked Off yes	Blanked Off	
Actual 178 °F.	Pressures	Pressures	Pressures	Opened Bypass 1430

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		6363.9	6380.7	6367.7	6410.6				
First Period	Flow Initial	2353.1	2318.8	2266.9	2386.8			—	—
	Flow Final	1274.9	1255.4	1184	1327.6			45	48
	Closed in	4112.9	4072.0	4008.8	4131.6			100	95
Second Period	Flow Initial	340.5	485.7	307.7	678.3			—	—
	Flow Final	553.2	527.4	483.6	574.9			90	93
	Closed in	4112.6	4063.3	4008.8	4112.5			180	179
Third Period	Flow Initial							—	—
	Flow Final								
	Closed in								
Final Hydrostatic		6363.9	Unable to read	6367.7	6365.9			—	—

FORMATION TEST DATA

BEATIE BOUGH (Lease Name) 22 13S 36E (Well No.) 1 (Test No.) 4 MC DONALD 12744 - 12922' (Tested Interval) HARVEY E. YATES COMPANY (Lease Owner/Company Name) LEA NEW MEXICO

B

Gauge No.	7653	Depth	12722'	Clock No.	6115	24 hour	Ticket No.	716095

	First Flow Period		First Closed In Pressure			Second Flow Period			Second Closed In Pressure			Third Flow Period			Third Closed In Pressure		
	Time Defl. 000"	PSIG Temp. Corr.	Time Defl. 000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. 000"	PSIG Temp. Corr.		Time Defl. 000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. 000"	PSIG Temp. Corr.		Time Defl. 000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.0000	2318.8	.0000		1255.4	.0000	485.7		.0000		527.4						
1	.0250	2316.7	.0376*		2522.7	(.0300-M	320.8)		.0369*		1521.6						
(	.0250-OAS	2316.7)	.0582		3006.5	.0569**	351.6		.0771		2455.5						
3	.0500	2184.3	.0787		3360.2	.1043	404.3		.1173		3163.7						
4	.0750	2043.3	.0992		3606.0	.1517	439.5		.1575		3598.2						
(	.0760-C	2043.3)	.1198		3755.4	.1992	470.3		.1977		3812.2						
6	.1000	1735.9	.1403		3864.6	.2466	501.0		.2379		3921.3						
7	.1250	1467.5	.1608		3934.4	.2940	527.4		.2781		3969.4						
8	.1500	1255.4	.1813		3984.7				.3183		3997.8						
9			.2019		4013.1				.3585		4015.2						
10			.2224		4032.7				.3987		4030.5						
11			.2429		4043.6				.4389		4039.3						
12			.2635		4054.5				.4791		4048.0						
13			.2840		4061.1				.5193		4052.4						
14			.3045		4067.6				.5595		4056.7						
15			.3250		4072.0				.6000		4063.3						

Gauge No.	7652	Depth	12918'	Clock No.	5677	24 hour

0	.0000	2386.8	.0000		1327.6	.0000	678.7		.0000		574.4						
1	.0263	2384.7	.0367*		2585.6	(.0380-M	365.9)		.0366*		1621.5						
(	.0290-OAS	2386.8)	.0567		3091.2	.0598**	382.9		.0766		2564.4						
3	.0527	2264.2	.0767		3433.1	.1096	453.2		.1165		3254.7						
4	.0790	2120.5	.0968		3658.1	.1594	487.2		.1565		3673.0						
(	.0800-C	2116.2)	.1168		3828.0	.2092	517.0		.1965		3878.9						
6	.1053	1801.2	.1368		3934.1	.2590	548.9		.2364		3970.2						
7	.1317	1543.3	.1568		4002.1	.3090	574.4		.2764		4019.0						
8	.1580	1327.6	.1768		4044.5				.3163		4044.5						
9			.1969		4074.2				.3563		4061.5						
10			.2169		4093.3				.3963		4076.4						
11			.2369		4106.1				.4362		4087.0						
12			.2569		4116.7				.4762		4091.2						
13			.2769		4120.9				.5161		4101.8						
14			.2970		4127.3				.5561		4106.1						
15			.3170		4131.6				.5960		4112.5						

Reading Interval	8	6	15	12		Minutes

REMARKS: *First interval is equal to 11 minutes. ** = 18 minutes. OAS = open at surface C = choke change
M = minimum flow pressure

3

SPECIAL PRESSURE DATA

NOMENCLATURE

b	= Approximate Radius of Investigation	Feet
b_1	= Approximate Radius of Investigation (Net Pay Zone h)	Feet
D.R.	= Damage Ratio	——
El	= Elevation	Feet
GD	= B.T. Gauge Depth (From Surface Reference)	Feet
h	= Interval Tested	Feet
h_1	= Net Pay Thickness	Feet
K	= Permeability	md
K_1	= Permeability From Net Pay Zone h)	md
m	= Slope Extrapolated Pressure Plot (Psi/cycle Gas)	psi/cycle
OF_1	= Maximum Indicated Flow Rate	MCF/D
OF_2	= Minimum Indicated Flow Rate	MCF/D
OF_3	= Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF_4	= Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P_s	= Extrapolated Static Pressure	Psig.
P_f	= Final Flow Pressure	Psig.
P_o	= Potentiometric Surface (Fresh Water*)	Feet
Q	= Average Adjusted Production Rate During Test	bbls/day
Q_1	= Theoretical Production w/Damage Removed	bbls/day
Q_g	= Measured Gas Production Rate	MCF/D
R	= Corrected Recovery	bbls
r_w	= Radius of Well Bore	Feet
t	= Flow Time	Minutes
t_o	= Total Flow Time	Minutes
T	= Temperature Rankine	°R
Z	= Compressibility Factor	——
μ	= Viscosity Gas or Liquid	CP
Log	= Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 122 °F

ATOKA TIGHT GAS SANDS PRODUCTION

Botenbough #1

Prepared by Ray F. Nokes, Reservoir Engineer

HARVEY E. YATES COMPANY

February 1, 1982

Potential test 6-18-80: 832 MCF/2 BO/28 BW on 1/2" ck in 24 hrs.

Average Daily Production
(Sales)

Month	BO	MCF	BW
7-80	31	420	30
8-80	43	795	12
9-80	46	754	9
10-80	38	682	8
11-80	30	574	8
12-80	27	539	7
1-81	33	744	9
2-81	17	291	6
3-81	15	380	5
4-81	10	324	4
5-81	10	311	4
6-81	11	288	4
7-81	10	247	4
8-81	8	197	3
9-81	9	233	3
10-81	8	197	5
11-81	7	203	5
12-81	9	177	6

Cumulative Production: 9024 BO/188277 MCF/2841 BW

Note: Production reflects effects of stimulation of the Atoka Formation.

Robert H. Strand, P.A.

Attorney at Law

Practice Limited to Oil and Gas Law

Telephone (505) 624-0251
Suite 124 - Petroleum Building
Roswell, New Mexico 88201

Please Reply To: P.O. Box 2226

January 27, 1982

Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Case 7491

ATTN: Mr. Richard Stamets

Re: Application of Harvey E. Yates
Designation of Tight Formation
Lea County, New Mexico

Dear Mr. Stamets:

Enclosed for filing is an original and two copies of the Application of Harvey E. Yates Company in the above referenced matter. This case has previously been set for hearing on the February 17, 1982 Docket.

Sincerely yours,

Robert H. Strand

RHS/bjt
encls

BEFORE THE OIL CONSERVATION DIVISION

ENERGY AND MINERALS DEPARTMENT

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION :
OF HARVEY E. YATES COMPANY FOR : Case No. 7171
DESIGNATION OF A TIGHT FORMATION :
LEA COUNTY, NEW MEXICO :

APPLICATION

COMES NOW HARVEY E. YATES COMPANY by its attorney and respectfully states;

1. Applicant is the owner of an interest in the Atoka Formation underlying the following described lands situated in Lea County, New Mexico:

Township 12 South, Range 35 East, NMPM
Sections 31 and 32

Township 13 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 35 East, NMPM
Sections 5, 6, 7, 8, 17, 18, 19, 20

Township 12 South, Range 36 East, NMPM
Sections 32, 33, 34, 35, 36

Township 13 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 36 East, NMPM
Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24

Containing a total of 46, 720 acres, more or less.

2. The Atoka formation underlying the above described lands is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy.

3. The stabilized production rate, against atmospheric pressure of wells completed for production in said formation, without stimulation, is not expected to exceed the production levels set out in 18 C.F.R. §271.703 (c)(2)(B).

4. No well drilled into said formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

WHEREFORE, applicant prays:

A. That this application be set for hearing before an examiner, and that notice of said hearing be given as required by law.

B. That upon such hearing, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, the Atoka formation underlying the above described lands be designated a tight formation.

DATED this 27th day of January, 1982.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P.O. Box 2226
Roswell, New Mexico 88202-2226

RHS/bjt

Memo

From

FLORENE DAVIDSON
ADMINISTRATIVE SECRETARY

To February 17, 1982

Called in by Bob Strand
1/25/82

Harvey E. Yates Company
Designation of Tight Formation
Atoka Area 46,720 acres

T12S, R35E
S31 and 32
T13S, R35E
S5-8, 17-20, 29-32
T14S, R35E
S5-8, 17-20
T12S, R36E
S32-36
T13S, R36E
S1-5, 8-17, 21-28, 33-36
T14S, R36E
S1-4, 8-17, 20-24

OIL CONSERVATION COMMISSION-SANTA FE

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7491
Order No. R-6537-A

APPLICATION OF HARVEY E. YATES
COMPANY FOR DESIGNATION OF A
TIGHT FORMATION, LEA COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 17, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this _____ day of March, 1982, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the Division on December 17, 1980, entered its order No. R-6537, recommending to the Federal Energy Regulatory Commission that the Atoka Formation, underlying the following described lands situated in Lea County, New Mexico, be designated as a tight formation pursuant to Section 107 of the Natural Gas Policy Act of 1978 and 18 CFR, Section 271.701-705:

TOWNSHIP 12 SOUTH, RANGE 35 EAST, NMPM
Sections 33 through 36: All

TOWNSHIP 12 SOUTH, RANGE 36 EAST, NMPM
Section 31: All

TOWNSHIP 13 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 13 SOUTH, RANGE 36 EAST, NMPM
Sections 6 and 7: All
Sections 18 through 20: All
Sections 29 through 32: All

TOWNSHIP 14 SOUTH, RANGE 35 EAST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 24: All

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Sections 5 through 7: All
Sections 18 and 19: All

Containing a total of 37,760 acres, more or less.

(3) That the Federal Energy Regulatory Commission by its Order No. 138, so designated the Atoka Formation underlying the above described lands as a tight formation.

(4) That the applicant, Harvey E. Yates Company, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 CFR §271.701-705, recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying the following lands situated in Lea County, New Mexico, which are contiguous to the previously designated lands, hereinafter referred to as the Atoka formation, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations:

WESTERN CONTIGUOUS AREA

Township 12 South, Range 35 East, NMPM
Sections 31 and 32: All

Township 13 South, Range 35 East, NMPM
Section 5 through 8: All
" 17 " 20: All
" 29 " 32: All

Township 14 South Range 34 East, NMPM
Section 5 through 8: All
" 17 " 20: All

EASTERN CONTIGUOUS AREA

Township 12 South Range 36 East, NMPM
Section 32 through 36: All

Township 13 South, Range 36 East, NMPM

Section 1 through 5: All

" 8 " 17: All

" 21 " 28: All

" 33 " 36: All

Township 14 South, Range 36 East, NMPM

Section 1 through 4: All

" 8 " 17: All

" 20 " 24: All

~~The~~ The entire area to be added containing a total of 46,720 acres, more or less.

(5) That the Atoka formation underlies all of the above described lands; that the formation consists of shales interspersed with thin lime and sand sections; that the top of such formation is found at an average depth of 12,200 feet below the surface of the area set out in Finding No. (4) above; and that the thickness of such formation is from 375 to 750 feet within said area.

(6) That the type section for the Atoka formation for the proposed tight formation designation is found at a depth of from approximately 12,230 feet to 12,970 feet on the Gamma Ray-Neutron log dated May 18, 1980, from the Harvey E. Yates Company Betenbough No. 1 Well located in Unit C of Section 32, Township 13 South, Range 36 East, Lea County, New Mexico.

(7) That the following wells produce or have produced natural gas from the Atoka Formation within the proposed area:

Harvey E. Yates Company Betenbough #1	660 Feet from North Line and 1980 feet from West line of Section 32, Township 13 South, Range 36 East, NMPM, Lea County, New Mexico.

(8) That the Atoka formation underlying the above described lands has been penetrated by several other wells, none of which produced natural gas in commercial quantities from the Atoka formation.

(9) That the evidence presented in this case demonstrated that no well formerly or currently completed in the Atoka formation within the proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 CFR §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(10) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) The estimated average in situ gas permeability throughout the pay section of the Atoka formation is expected to be 0.1 millidarcy or less; and

(b) The stabilized production rate, against atmospheric pressure, of wells completed for production in the Atoka formation, without stimulation, is not expected to exceed production levels determined by reference to well depth, as found in the table set out in 18 CFR §271.703(c)(2)(B) of the regulations; and

(c) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(11) That within the proposed area there are two recognized water aquifers being the Ogallala, found at depths of from 250 feet to 400 feet, and the Santa Rosa, found at depths of from 900 feet to 1200 feet.

(12) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Atoka formation will not adversely affect said water zones.

(13) That the Atoka formation, or any portion thereof, as described herein, is not currently being developed by infill drilling as defined in 18 CFR §271.703(b)(6) of the regulations.

(14) That the Atoka formation within the proposed area, described under Finding (4) above, should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 CFR §271.701-705 of

The regulations

That the Atoka formation tight gas formation area recommended by Division Order No R-6537 and Approved by FERC Order No 138 effective March 30, 1981 be extended, by designation, to include the following contiguous areas:

WESTERN CONTIGUOUS AREA

Township 12 South, Range 35 East, NMPM
Sections 31 and 32: All

Township 13 South, Range 35 East, NMPM
Section 5 through 8: All
" 17 " 20: All
" 29 " 32: All

Township 14 South, Range 34 East, NMPM
Section 5 through 8: All
" 17 " 20: All

EASTERN CONTIGUOUS AREA

Township 12 South, Range 36 East, NMPM
Section 32 through 36: All

Township 13 South, Range 36 East, NMPM
Section 1 through 5: All
" 8 " 17: All
" 21 " 28: All
" 33 " 36: All

Township 14 South, Range 36 East, NMPM
Section 1 through 4: All
" 8 " 17: All
" 20 " 24: All

~~The~~
The entire area ~~above~~ described containing a total of 46720 acres, more or less

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Joe D. Ramey
Director

SEAL

CASE 7492: HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, CHAVES COUNTY, NEW MEXICO