CASE 7085: HARVEY E. YATES COMPANY FOR DESIGNATION OF A TIGHT FORMATION, LEA COUNTY, NEW MEXICO

Case No.

7085

Application

Transcripts

Small Exhibits

ETC

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
12 November 1980

EXAMINER HEARING

IN THE MATTER OF:

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

CASE 7085

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, 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
Suite 300
Security National Bank Bldg.
Roswell, New Mexico 88201

I N D E X

E X H I B I T S

MR. STAMETS: We'll call Case 7085.

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

MR. STAMETS: I'll ask for appearances in this case.

MR. STRAND: Mr. Examiner, Robert H. Strand, attorney from Roswell, appearing for the applicant, Harvey E. Yates Company; and I'll have two witnesses who need to be sworn.

MR. STAMETS: I'd like to have both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, Harvey E. Yates Company is applicant in Case Number 7085 and is requesting the Division to recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying approximately 37,760 acres in Township 12 South, 13 South, 14 South, all in Range 35 East, Township 12 South, Township 13 South, Township 14 South, in Range 36 East, as more particularly described in the application which has been filed in this matter, all 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.

ANDREW LATTU

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

DIRECT EXAMINATION

BY MR. STRAND:

Q. Will you please state your name for the record?

A. Andrew Lattu.

Q. Mr. Lattu, where do you reside and what is your occupation?

A. I'm a geologist. I live in Midland, Texas, and I work for Harvey E. Yates Company.

Q. Mr. Lattu, have you testified before the Division in the past and are your qualifications a matter of record?

A. Yes, I have and they are.

MR. STRAND: Mr. Examiner, is Mr. Lattu considered qualified as an expert geologist?

MR. STAMETS: Yes.

Q. Mr. Lattu, are you familiar with the

application in Case Number 7085, which I have just described, and have you prepared certain exhibits for presentation at this hearing?

A. Yes, I have.

Q. Will you please briefly describe each of these exhibits and how they relate to the application?

A. Yes, I will. Exhibit Number One is a geologic structure map contoured on the top of the Devonian in Lea County, New Mexico. The contour interval is 100 feet. The map scale is one inch equals 8000 feet. This is from a commercially prepared structure map by GeoMap Corporation.

There is also indicated on this map a cross section A-A', which will be Exhibit Number Three.

This exhibit shows the, the Devonian structure map shows the basic geologic structure within the area of Lea County.

Q. Mr. Lattu, would you briefly describe Exhibit Number Two?

A. Exhibit Number Two is a sand/shale ratio map of the Atoka formation in the area of this application. The Atoka section, the Atoka interval in this particular area is essentially mostly shales and it has some thin bedded limes and some sands within this interval, and the interval varies from 700 to 900 feet in thickness.

And as these percent lines show, the map scale here is contour interval of five percent and a horizontal scale of one inch equals 4000 feet.

As you can see, the best developed sands in this area are only 17 to 18 percent of the Atoka interval. And this map shows more or less the depositional grain of where these sands are expected to be encountered, the higher percentage, of course, having more sands and therefor more prospective.

This exhibit is most of the basis for the outline of the area we have requested; that we feel within this area is the area where we expect to find the Atoka formation productive.

Q. Mr. Lattu, for the record will you explain in a little more detail just exactly what a sand/shale ratio map is?

A. Well, you take the entire interval and divide the net number of feet of sand by the net number of feet of shale.

Q. And the contour lines such as you have on the map pictorially represent those ratios, is that correct?

A. Yes, they do.

MR. STAMETS: What we're looking at, then, when you -- on your 15 foot contour line --

A. It's 15 percent.

MR. STAMETS: 15 percent, so in 100 feet --

A. You'd have 15 feet of sand; of course, if you had 1000 feet, 150 feet.

MR. STAMETS: What about your lime sections? Are those tossed out or is that included?

A. No, they're not included. Of course, sometimes it's a little difficult to tell a sand from a lime just from electric logs, but using all the data available, we eliminated the limes and just used the sands and the shales.

Q. Mr. Lattu, would you please describe Exhibit Number Three?

A. Yes. Exhibit Number Three is a cross section, as indicated both on Exhibit Number One and Exhibit Number Two as A-A'.

This cross section A-A' contains eighteen wells, all of which are both near and within the boundaries of our requested area for this hearing. Only one well has been left out and that is down in Section 19 of 14, 36, which is right on the eastern boundary of the requested area. Now this well was still being drilled and hadn't been logged at the time this exhibit was prepared. The Atoka sands were found nonproductive in that well, both by drill stem test and by log analysis, and we do have copies of that log available

if they're requested.

But other than that one exception, every well within this area that penetrated the Atoka formation is on this cross section.

Of all these wells only one has been commercially productive at this time, and that is well number twelve, the Harvey E. Yates No. 1 Betenbough in Section 32 of Township 13 South, Range 36 EAst.

Within this well we perforated five separate sands in the Atoka formation for a net of 72 net feet sand included in these perforations. Gross sand was naturally much more than that. We were perforating the sands that appeared productive by log analysis and drilling shows and drill stem test.

Q. Mr. Lattu, what is the gross thickness of the Atoka formation which you have outlined on your cross section, on the average?

A. On the average, it varies from 700 to nearly 900 feet. When you get up on top of very steep structures the Atoka formation thins, as in the case of this Union of Texas, Petroleum Corporation, Shell State No. 1 in Section 6 of Township 13 South, Range 35 East, in which case it's approximately 440 feet thick.

Otherwise, it's about 700 to 900 feet.

The Atoka formation in this area, a little geologic history, this is a fairly shallow, slowly subsiding basin. You had essentially quiet waters. Sands and shales were periodically washed out in this area from exposed rocks, both to the north and to the west. And these sands were probably winnowed and accumulated by along shore currents and possible tidal action or wave action into a series of bars. And these bars occur throughout the Atoka formation in this area.

The sands within these bars is fine grained to medium grained sand; it's slightly calcareous; some of them are very silty, and a few, of course, where you can catch the center of one of these bars, are quite clean and show good porosity.

Q. Mr. Lattu, in this application we are requesting that the entire Atoka formation as you've outlined it on your cross section be designated a tight formation, is that correct?

A. Yes, it is.

Q. But am I correct that what you're saying is that within this gross interval of 700 to 900 feet, that you have varying thicknesses of sands interspersed with shale, as shown on your sand/shale ratio map?

A. Yes. The -- the sands tend to be best concentrated down, as the sand/shale ratio map shows, through

the center or the heart of the area requested; however, I feel several -- because these sands are divided over such a thick section, you could have an area with only, say, 8 percent sand in the interval, but if you had 20 feet of sand, it would still be productive.

But because of the nature of this and this geology, or the history of this area, is fairly uniform through this period of time, these bars are scattered vertically up and down through the section in any one well.

Q. Mr. Lattu, on the average what is the depth from the surface to the top of the Atoka formation underlying this area?

A. Okay, within the area we're requesting the tight reservoir designation for, it is approximately 12,200 feet.

Q. Mr. Lattu, based on your analysis of the -- of the geology of this formation, in your opinion does it underly all of the area requested for tight formation?

A. Yes, it does.

Q. And to backtrack just a bit, on Exhibit Number Two the outline of the requested area is set out in a heavy crosshatched line.

A. Yes. It's -- it's indicated by a heavy line, with heavy lines and little dots.

Q. Is it further your opinion that the Atoka formation which you've described is at least potentially productive under the entire area?

A. Yes, I believe it is.

Q. Mr. Lattu, would you please describe the fresh water aquifers that underlie the area proposed for designation?

A. The fresh water aquifers are the Santa Rosa and the Ogalallah. The ~~Santa Rosa~~ Ogalallah is at a depth of from 300 to 400 feet and the ~~Ogalallah~~ Santa Rosa would be at a depth of 900 to 1200 feet.

Q. Do these fresh water aquifers occur quite uniformly under this area?

A. Fairly uniformly, yes.

Q. Are you familiar with the rules and policies of the Oil Conservation Division relating to casing and cementing programs for wells which would be drilled into the Atoka formation in this area?

A. Yes, I am.

Q. In your opinion would carrying out of such casing and cementing programs adequately protect these fresh water aquifers from contamination?

A. Yes, it will.

Q. Mr. Lattu, were Exhibits One through

Three prepared by you or under your supervision?

A. Yes, they were.

MR. STRAND: That's all I have for Mr. Lattu.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Lattu, I may have missed it, I believe you did say, or at least I interpreted, the dashed outline on Exhibit Number Two to be the area that has been requested here.

A. Yes.

Q. Okay.

MR. STRAND: Mr. Examiner, the exact legal description is set out in the application.

MR. STAMETS: All right, but for purposes of cross examination; and whatnot, I want to be able to relate that to what I saw on Exhibit Two.

Talking about lime zones awhile ago, your analysis of the depositional environment would seem to limit any lime zones to relatively thin stringers as opposed to major reef buildup in this area.

A. Yes, it would. The Atoka formation where these large carbonate and reef development occurs are

much further south; approximately down near the Texas-New Mexico border.

Q. Would you approve a type log for this area?

A. We should probably pick a well that's producing and in that case it would be the Harvey E. Yates No. 1 Betenbough in Section 32 of 13, 36.

Q. Okay. What -- do you have the top and bottom of the Atoka there?

A. Let's see, I can read them off the cross section. That is well number twelve on the cross section and the top of the Atoka appears to be about 12,230 and the base of the Atoka formation will be 12,970.

MR. STAMETS: Are there any other questions of Mr. Lattu?

MR. PADILLA: I've got one or two.

CROSS EXAMINATION

BY MR. PADILLA:

Q. Mr. Lattu, did I understand you to say that only the Betenbough No. 1 was producing from the Atoka formation?

A. Yes, it is the only one that has been producing.

Texas Crude-Sinclair Oil and Gas-Richardson 5 No. 1 attempted a completion that did not produce.

Q. Has any other well in the subject area produced from the Atoka formation in the time that you've observed this?

A. Not to my knowledge at all.

Q. Do you know whether the Atoka formation has been tested specifically in the subject area?

A. It's been tested, of course, by production from our No. 1 Betenbough and by drill stem tests on some recent wells we have drilled.

Q. But historically, well, historically has the Atoka formation been considered a -- not a prospective formation in this area?

A. Not in this -- not in this immediate area, no.

MR. PADILLA: I have no further questions.

MR. STAMETS: Any other questions of this witness? He may be excused.

MR. STAMETS: Mr. Examiner, we'll call Mr. Ralph Viney as our next witness.

RALPH VINEY

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

DIRECT EXAMINATION

BY MR. STRAND:

Q. State your full name for the record.

A. My name is Ralph Viney.

Q. Mr. Viney, where do you reside and what is your occupation?

A. I'm an engineering consultant. I reside in Midland.

Q. Mr. Viney, have you been retained by Harvey E. Yates Company to present testimony in Case Number 7085?

A. Yes, sir.

Q. Mr. Viney, have you testified before the Division in the past and are your qualifications a matter of record?

A. Yes, sir.

MR. STRAND: Mr. Examiner, is Mr. Viney considered qualified as a petroleum engineer?

MR. STAMETS: Yes.

Q. Mr. Viney, are you familiar with the

application in Case Number 7085?

A. Yes, sir.

Q. And in that regard have you prepared a set of exhibits relating to the engineering aspects of this application, which we have designated as Exhibit Number Four?

A. Yes, sir.

Q. Referring to Exhibit Four-1, would you please -- which is a summary of the basic data for each of the wells set out thereon, will you please describe the permeability calculations which you've arrived at, and the supporting data?

A. Yes, sir, I will note that the two wells are considered: A drill stem test, and a reservoir build-up, and a drill stem test of a second well.

The permeability calculations are determined by a normal Horner build-up pressure -- reservoir pressure build-up technique, and as you are aware, in the case of drill stem tests the actual flow conditions are then related to the actual pressure conditions during a shut-in period and that pressure extrapolated to a dimensionless point and from that the permeability and drainage radius calculations can be made.

Q. Mr. Viney, would you describe the results of these calculations with respect to each of the wells you have listed on the exhibit?

A. Yes, sir. In the case of the Betenbough Well No. 1 drill stem test data, you will note that the flow rate on this particular test was approximately 102 Mcf and the calculated permeability by extrapolating the pressures and using that data indicated a permeability of 0.025 millidarcy.

In the case of the reservoir build-up test which was conducted after production from the Betenbough Well, the test rate at the -- the flow rate prior to shutting in and taking the reservoir build-up test was about 833 Mcf per day, and this well was shut in for a considerable period of time as you will notice in the data, and the permeability calculated using this data was .0767.

It should be noted that the Betenbough reservoir pressure build-up is after the well stimulation. This well was acidized, produced, and the results then analyzed and compared.

The third tabulation represents the findings of a drill stem test on the Harvey E. Yates Superior 19 State No. 1 Well.

You will note that the flow rate in drill stem test is 305 Mcf a day and the permeability was 0.01 of a millidarcy.

Q. Mr. Viney, would you discuss the pay section involved that these calculations were based on in

the Betenbough No. 1 Well?

A. Yes, sir. For the purposes of arriving at a capacity or permeability footage value we used 72 feet of pay section.

Q. Does that 72 feet of pay section basically represent the perforated interval of the well?

A. Nearly, yes, sir.

Q. And you heard Mr. Lattu's testimony previously as to the characteristics of this Atoka formation with various sands interspersed with shale. You did not consider in your permeability calculation on this well these other sands within this interval of 12,175 to 12,347?

A. No, sir, we only selected the high porosity appearing sands.

Q. Mr. Viney, considering Mr. Lattu's geological testimony and your permeability analysis, is it your opinion that the Atoka formation underlying the area proposed for designation would be expected to have an estimated average in situ gas permeability of less than 0.1 millidarcy throughout the pay section?

A. Based on this evidence, yes, sir.

MR. STAMETS: Mr. Viney, considering only the -- what you considered the higher permeability sands, would that have a tendency to increase or decrease the perme-

ability figure that you arrive at?

A. By using the lower thickness figure, it would tend to give a maximum permeability that could be expected.

MR. STAMETS: So if you considered the entire interval, you would have even a lower number.

A. It would probably be by a factor of 10 percent of this figure if you used the entire section, yes, sir.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, referring back to Exhibit Four-1, would you please describe your analysis and calculations relating to production rates against atmospheric pressure?

A. Yes, sir. The flow rates, as shown on the bottom of the exhibit, Four-1, are normal rates that you would arrive at using a radial flow Darcy equation, which is the standard equation used basically in all fluid flow measurements. And you will note that with the radius of investigation during the test, why, none of the wells would exceed -- or none of the flow rates of any of these tests would exceed more than 1215 Mcf per day.

Q. Mr. Viney, have you also included as Exhibit Four-2 a general statistical summary of production

from the Betenbough No. 1 Well?

A. Yes, sir.

Q. And to what date does that summary contain information on production?

A. The summary in the exhibit is through November -- I mean, September 3rd.

Q. Have you also reviewed production figures from this well since that date and are they comparable?

A. Yes, sir, they are.

MR. STRAND: Mr. Examiner, we do have copies of those additional figures if you feel they're necessary.

MR. STAMETS: Okay.

Q. Mr. Viney, what is the status of the Superior 19 State No. 1 Well?

A. The Superior State No. 19-1 is temporarily abandoned and possibly can be re-entered at a later date.

Q. But there is no production history from that well?

A. No, sir, other than the drill stem test.

Q. Mr. Viney, based on your analysis of this data, is it your opinion that the stabilized production rate against atmospheric pressure of wells which might be com-

pleted for production in the Atoka formation we've been discussing without any type of stimulation would not be expected to exceed 1238 Mcf per day?

A. Yes, sir, the probable rate would be 300 to 400 Mcf a day without stimulation.

Q. And is it also your opinion that this would be true generally throughout the area proposed for designation?

A. Yes, sir, we would assume this would hold.

Q. Mr. Viney, referring to Exhibit Number Four and the various types of information you have in there, will you please describe the liquids produced from the formation and your conclusions as to their physical state in the reservoir?

A. Yes, sir. The liquids as being produced are a light-colored, straw-colored liquid. The weather (sic) gravity is approximately 46 degrees. We do not have a recombination of the fluid samples at surface; however, looking at the shape and performance of the build-up curves, it would appear that we have a phase change at approximately 3560 pounds in the tubing liquids -- of the liquids in the [illegible]ng, which would indicate with reason a dewpoint of approxima[illegible]3500 to 3600 pounds. Consequently, all liquids at

higher pressures would exist, all fluids would exist in a single phase in the reservoir.

Q. And what phase would that be?

A. That would be a gas phase.

Q. And that -- would that be the status of the reservoir at the present time or at least at the time the well was completed?

A. Yes, sir.

Q. What is the current pressure? Do you have that information?

A. Yes, sir, the current pressure as stated on the build-ups, which will be Exhibit Four-1(b), is 4279 pounds. That is page five, Mr. Stamets.

Q. Mr. Viney, is it then your opinion that this liquids would be considered condensate as condensate is normally defined as --

A. Yes, sir.

Q. -- opposed to crude oil?

A. It would be a retrograde condensate in all probability.

Q. Would it also then be your opinion that there would not be any crude oil produced from the proposed tight formation?

A. There is no crude in the reservoir so

none can be produced; it would all be condensate.

Q. Mr. Viney, referring to Exhibit Four-3, does this exhibit set out, together with other information, the casing and cementing program utilized in the Betenbough No. 1 Well?

A. Yes, sir.

Q. In your opinion would this type of program adequately protect the fresh water aquifers described by Mr. Lattu?

A. Yes, sir. You will note that the surface casing is set through 369 and cemented and the intermediate string of 9-5/8ths is set through 4600, adequately protecting both the 900 to 1200 and the 300 to 400 water zones.

Q. To your knowledge, Mr. Viney, does this casing and cementing program conform with the regulations and policies of the Oil Conservation Division relating to this field?

A. As I understand it, yes, sir.

Q. And in your opinion would compliance generally with rules -- with their rules for this type of well protect the fresh water aquifers?

A. Yes, sir.

Q. Mr. Viney, with regard to various types of treatment programs which might be employed for the wells u

be completed in the Atoka formation, in your opinion would they have any adverse affect on the fresh water aquifers?

A. They should not if the casing is properly cemented, no, sir.

Q. Was Exhibit Number Four prepared by you or under your supervision?

A. Yes, sir.

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

MR. STAMETS: Exhibit Number -- all the exhibits are accepted.

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

MR. STAMETS: Are there questions of Mr. Viney? Mr. Padilla.

CROSS EXAMINATION

BY MR. PADILLA:

Q. I'm not sure whether Mr. Viney can answer this question. It's of a general nature. Even you, Mr. Strand.

Is any area, or the subject area being currently developed by infill drilling as defined in the rules and regulations?

MR. STRAND: No, not to my knowledge.

A. Not to our knowledge, no, sir.

Q. Mr. Viney, what type of stimulation techniques would be required in addition to acidizing for the Atoka formation? Would any other type of technique be required?

A. Since none have been done, Mr. Padilla, a fracture treatment would appear very suitable for this type of formation, but since we don't know what it would -- how it would react, I cannot say, but if we take engineering technique, yes, a fracture treatment could possibly increase the productivity of these wells.

Q. Do you estimate that stimulation will be required in all the wells drilled to the Atoka?

A. I would say that you'd at least have to have acid cleanup work, or some acid work, to clean up your -- some possible mud filtrate around the wellbore, yes, sir.

Q. What I'm trying to get at is would you necessarily require massive stimulation for the Atoka formation in the subject area?

A. I'm not going to say you would require it. It may be desireable, yes, sir.

MR. STRAND: Mr. Viney, isn't the treatment programs that you would employ on these types of wells

something that would have to be determined from each individual well, logs and tests, and so forth?

A. Well, on the flow rates you'd want to look at your initial flow rate prior to stimulation, and your flow rate after a massive clean-up, and then from that point I think, Mr. Padilla, you could possibly generalize and say I'd want to go to a larger treatment, whether it be acid, or acid frac, or some type of propping fracture method.

MR. STRAND: Mr. Viney, can you conceive of any type of fracturing program, be it however exotic, which would cause any kind of problem with the fresh water aquifers?

A. No, sir, there should be no problem. Again this will depend upon the cementing condition around the producing zones, and if properly cemented should not migrate 10 or 12,000 feet.

Q. Another general question. Where is the subject located in relation to -- to the closest towns in Lea County?

A. Tatum, I guess, would be --

MR. STRAND: Yeah, well, approximately --

A. McDonald and Tatum, I guess.

MR. STRAND: Approximately 10 miles south of Tatum. So really the area proposed for designation, the northern boundary would be approximately 2-1/2 to 3 miles

southwest of Tatum.

MR. PADILLA: I have nothing else.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Viney, the two sets of calculations that you run through to show in situ permeability --

A. Yes, sir.

Q. -- are both located on the eastern edge of the area --

A. Yes, sir.

Q. -- and fairly close together. Why do you feel that we should expect to see this same permeability apply to this somewhat larger area?

A. Based on the geological information developed, Mr. Stamets, and the conditions that appear throughout the sections of the logs, the conditions of the deposition appear almost identical.

I can't answer that it will occur because I don't know, but based on the interpretation of the sands and the -- in other wells and in the wells that we tested, they appear very identical or very similar.

MR. STRAND: Would that same permeability factor be expected to occur?

A. Based on what we have seen, the conditions and the sands appear the same, you would have to make that conclusion based on the evidence at hand.

MR. STAMETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. STRAND: Nothing further, Mr. Examiner.

MR. STAMETS: If there is nothing further, the case will be taken under advisement.

(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 C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7085, heard by me on 11-12 1980.

Richard L. Stamets, Examiner
Oil Conservation Division

VERIFICATION

STATE OF NEW MEXICO)
)ss.
COUNTY OF SANTA FE)

ERNEST L. PADILLA, being first duly sworn, on oath, states that he is an attorney for the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico; that he has executed the foregoing document with full power and authority to do so; and that the matters and facts set forth therein are true to the best of his information, knowledge and belief.

Ernest L. Padilla
ERNEST L. PADILLA

Subscribed and sworn to before me, this 9th day of January, 1981.

Diana Richardson
NOTARY PUBLIC

My Commission Expires:

October 28, 1981

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing Recommendation to Harvey E. Yates Company in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated this 9th day of January, 1981.

Ernest L. Padilla
ERNEST L. PADILLA

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NGPA SECTION 107 TIGHT FORMATION RECOMMENDATION	)	
STATE OF NEW MEXICO OIL CONSERVATION DIVISION OF THE ENERGY AND MINERALS DEPARTMENT	)	Docket No. _____

RECOMMENDATION FOR TIGHT FORMATION DESIGNATION UNDER SECTION 107 OF THE NGPA.

Harvey E. Yates Company, pursuant to Section 107 of the Natural Gas Policy Act, 18 CFR §271.703 of the FERC regulations, and the Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 of the Oil Conservation Division, petitioned the Oil Conservation Division for tight formation designation of a portion of the Atoka formation in Lea County, New Mexico.

After notice and hearing on the application of Harvey E. Yates Company, the Oil Conservation Division hereby recommends that that portion of the Atoka formation which is described in Exhibit A (being Oil Conservation Division Order No. R-6537) attached hereto and incorporated by reference, be designated a tight formation. Additionally, the Oil Conservation Division, submits herewith Exhibits B and C, attached hereto and incorporated herein by reference, which are supporting data required under 18 CFR §271.703(c)(3) of the FERC regulations and United States Geological Survey ratification of this recommendation, respectively.

Respectfully submitted,

ERNEST L. PADILLA
Attorney for the
Oil Conservation Division

dr/

1

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. 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

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/

United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

07 JAN 1981

Mr. Ernest L. Padilla
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Padilla:

This jurisdictional agency recommends that the described lands in Case No. 7085, Atoka formation, located in Lea County, New Mexico, be designated as a tight formation under Section 107 of the Natural Gas Policy Act.

Please include this recommendation with the information submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

for Gene F. Daniel
Deputy Conservation Manager,
Oil and Gas

Exhibit C

HEYCO

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601
ROSWELL, NEW MEXICO 88201

December 3, 1980

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

Attention: Mr. Richard Stamets

Re: Case No. 7085
Application for Tight
Formation Designation
Lea County, New Mexico

Gentlemen:

Enclosed are the following relating to the above referenced hearing:

1. Two copies of the transcript.
2. Two copies of a proposed order.
3. Envelope with postage addressed to the Federal Energy Regulatory Commission.

We have reviewed the transcript and would request that lines 10-13 on page 11 be corrected on the file transcript as indicated. Also, as we discussed after the hearing, you have sufficient copies of the Exhibits so that a set can be included in the packet to be sent to the Federal Energy Regulatory Commission.

If you need anything further, please let me know.

Sincerely yours,

Robert H. Strand
Attorney

RHS/cj
Enclosures

United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

07 JAN 1981

Mr. Ernest L. Padilla
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Padilla:

This jurisdictional agency recommends that the described lands in Case No. 7085, Atoka formation, located in Lea County, New Mexico, be designated as a tight formation under Section 107 of the Natural Gas Policy Act.

Please include this recommendation with the information submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

for Jack Williams

Gene F. Daniel
Deputy Conservation Manager,
Oil and Gas

Exhibit C

1

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NGPA SECTION 107 TIGHT FORMATION RECOMMENDATION	)	
STATE OF NEW MEXICO OIL CONSERVATION DIVISION OF THE ENERGY AND MINERALS DEPARTMENT	)	Docket No. _____

RECOMMENDATION FOR TIGHT FORMATION DESIGNATION UNDER SECTION 107 OF THE NGPA.

Harvey E. Yates Company, pursuant to Section 107 of the Natural Gas Policy Act, 18 CFR §271.703 of the FERC regulations, and the Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 of the Oil Conservation Division, petitioned the Oil Conservation Division for tight formation designation of a portion of the Atoka formation in Lea County, New Mexico.

After notice and hearing on the application of Harvey E. Yates Company, the Oil Conservation Division hereby recommends that that portion of the Atoka formation which is described in Exhibit A (being Oil Conservation Division Order No. R-6537) attached hereto and incorporated by reference, be designated a tight formation. Additionally, the Oil Conservation Division, submits herewith Exhibits B and C, attached hereto and incorporated herein by reference, which are supporting data required under 18 CFR §271.703(c)(3) of the FERC regulations and United States Geological Survey ratification of this recommendation, respectively.

Respectfully submitted,

ERNEST L. PADILLA
Attorney for the
Oil Conservation Division

dr/

1

VERIFICATION

STATE OF NEW MEXICO)
)ss.
COUNTY OF SANTA FE)

ERNEST L. PADILLA, being first duly sworn, on oath, states that he is an attorney for the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico; that he has executed the foregoing document with full power and authority to do so; and that the matters and facts set forth therein are true to the best of his information, knowledge and belief.

Ernest L. Padilla
ERNEST L. PADILLA

Subscribed and sworn to before me, this 9th day of January, 1981.

Diana Richardson
NOTARY PUBLIC

My Commission Expires:

October 28, 1981

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing Recommendation to Harvey E. Yates Company in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated this 9th day of January, 1981.

Ernest L. Padilla
ERNEST L. PADILLA

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

January 6, 1981

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

Federal Energy Regulatory Comm.
Department of Energy
825 North Capitol Street, N.E.
Washington, D. C. 20426

Attention: Mr. Howard Kilchrist

Dear Mr. Kilchrist:

Enclosed is a tight formation recommendation for the Commission's consideration which I am sending to you for your handling. Let me know if additional information is required.

Very truly yours,

ERNEST L. PADILLA
General Counsel

ELP/dr
enc.

cc: Harvey E. Yates

HEYCO

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601
ROSWELL, NEW MEXICO 88201

October 21, 1980

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

Case 7085

Attention: Mr. Richard Stamets

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

Dear Mr. Stamets:

Enclosed for filing is original and four copies of the above referenced application. This matter has been set for Examiner hearing on the November 12, 1980 Docket. Thank you.

Sincerely,

Robert H. Strand
Attorney

RHS/lhc
OCD-1 #40

Enclosure

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. 7085

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, N.M.P.M.
Sections 33, 34, 35, 36

Township 13 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24

Township 12 South, Range 36 East, N.M.P.M.
Section 31

Township 13 South, Range 36 East, N.M.P.M.
Sections 6, 7, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 36 East, N.M.P.M.
Sections 5, 6, 7, 18, 19

Containing a total of 37,760 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.

C. For such further relief as the Division deems just and proper.

DATED this 21st day of October, 1980.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201

RHS/lhc

OCD-1 #39

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. 7085

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, N.M.P.M.
Sections 33, 34, 35, 36

Township 13 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24

Township 12 South, Range 36 East, N.M.P.M.
Section 31

Township 13 South, Range 36 East, N.M.P.M.
Sections 6, 7, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 36 East, N.M.P.M.
Sections 5, 6, 7, 18, 19

Containing a total of 37,760 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.

C. For such further relief as the Division deems just and proper.

DATED this 21st day of October, 1980.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201

RHS/lhc

OCD-1 #39

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. 7085

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, N.M.P.M.
Sections 33, 34, 35, 36

Township 13 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24

Township 12 South, Range 36 East, N.M.P.M.
Section 31

Township 13 South, Range 36 East, N.M.P.M.
Sections 6, 7, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 36 East, N.M.P.M.
Sections 5, 6, 7, 18, 19

Containing a total of 37,760 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.

C. For such further relief as the Division deems just and proper.

DATED this 21st day of October, 1980.

HARVEY E. YATES COMPANY

By: Robert H. Strand

Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201

RHS/[illegible]

OCD-1 #39

Husky

Husky Oil Company

600 South Cherry Street
Denver, Colorado 80222
(303) 370-1300

Russell M. Davidson
Vice President

7085

February 10, 1981

Office of the Secretary
FEDERAL ENERGY REGULATORY COMMISSION
825 North Capitol Street, N.E.
Washington, D.C. 20426

Gentlemen:

RE: Docket No. RM79-76 (New Mexico-2)
NOTICE OF PROPOSED RULEMAKING
BY DIRECTOR, OPPR

Husky Oil Company ("Husky") is active in exploration and production in the Rocky Mountain Region. Husky currently has oil and gas production in portions of New Mexico.

Husky wishes to support the recommendation of the State of New Mexico Oil Conservation Division that the Atoka Formation be designated a tight formation under the Commission's final regulation, Section 271.703. Husky believes that such a designation will offer the needed economic stimulus for further natural gas exploration in this area. Husky further believes that the technology required to protect the environment is currently availavle.

Thank you for the opportunity to comment.

Sincerely,

R. M. Davidson
Vice President

cc: New Mexico Oil & Gas
Conservation Commission

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

December 19, 1980

Re: CASE NO. 7085
ORDER NO. R-6537

Mr. Robert H. Strand, Attorney
Harvey E. Yates Company
P. O. Box 1933
Roswell, New Mexico 88201

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. 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

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/

CASE 7083: Application of Bass Enterprises Production Co. for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp, Cisco, Canyon and Strawn formations underlying the S/2 NE/4 of Section 13, Township 16 South, Range 36 East, Northeast Lovington Field, 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 7005: (Continued from October 29, 1980, Examiner Hearing)

Application of Sol West III for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Morrow formation for his Turkey Track-Morrow Sand Well No. 1 in Unit I of Section 26, Township 18 South, Range 28 East.

CASE 7038: (Continued from October 29, 1980, Examiner Hearing)

Application of Natura Energy Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the NE/4 NE/4 of Section 6, 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 7073: (Readvertised)

Application of Enserch Exploration, Inc. for pool creation, temporary special pool rules, and assignment of a discovery allowable, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Fusselman oil pool for its J. C. O'Brien Well No. 1 located 1980 feet from the North line and 660 feet from the West line of Section 31, Township 7 South, Range 29 East, with special rules therefor, including provisions for 80-acre spacing, a limiting gas-oil ratio of 3000 to one and special well location requirements providing for the drilling of wells within 150 feet of the center of a quarter-quarter section. Applicant further seeks approval of a 74.24-acre proration and spacing unit and a discovery allowable for said J. C. O'Brien Well No. 1.

CASE 7084: Application of Harvey E. Yates Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Duncan Unit Area, comprising 7679 acres, more or less, of State, Federal, and fee lands in Townships 13 and 14 South, Range 35 East.

CASE 7085: 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 37,760 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 7086: Application of Blackwood & Nichols Company, Ltd. for designation of a tight formation, San Juan and Rio Arriba Counties, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Pictured Cliffs formation underlying portions of Townships 30 and 31 North, Ranges 6, 7, and 8 West, containing 33,500 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 7087: Application of Blackwood & Nichols Company, Ltd. for designation of a tight formation, San Juan and Rio Arriba Counties, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Fruitland formation underlying portions of Townships 30 and 31 North, Ranges 6, 7, and 8 West, containing 33,500 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.

Called in by Bob Strand
10/21/80

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

Applicant seeks designation of the Atoka formation as a tight formation underlying the following=described lands:

Township 12 South, Range 35 East:	Sections 33, 34, 35, and 36;
Township 13 South, Range 35 East:	Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, and 36
Township 14 South, Range 35 East:	Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24
Township 12 South, Range 36 East:	Section 31
Township 13 South, Range 36 East:	Sections 6, 7, 18, 19, 20, 29, 30, 31, and 32
Township 14 South, Range 36 East:	Sections 5, 6, 7, 18, and 19

Total of 37,760 acres

HEYCO PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P. O. BOX 1933 SUITE 300, SECURITY NATIONAL BANK BUILDING 505/623-6601
ROSWELL, NEW MEXICO 88201

October 29, 1980

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

Case 7085

Attention: Mr. Richard Stamets

Re: Application for Designation
of Tight Formation
Atoka Formation
Lea County, New Mexico

Gentlemen:

Enclosed are three sets of exhibits which will be presented as evidence at the hearing on the above reference application on November 12, 1980.

Sincerely yours,

Robert H. Strand
Attorney

RHS/cj
Ecnlosures

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. 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 _____ 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 Divison 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, N.M.P.M.

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

~~Section~~

Township 14 South, Range 36 East, NMPM

Sections 5 through 7: All

Sections 16 and 19: All

Township 12 South, Range 36 East, N.M.P.M.
Section 31

Township 13 South, Range 36 East, N.M.P.M.
Sections 6, 7, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 36 East, N.M.P.M.
Sections 5, 6, 7, 18, 19

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 ~~or have produced~~ natural gas from the ~~Austin-Mississippian~~ 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 ~~water~~ 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 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 ~~water zones~~. 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 fromation underlying the following described lands in Lea County, New Mexico, be designated as a tight formation:

Township 12 South, Range 35 East, N.M.P.M.

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 described.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
12 November 1980

EXAMINER HEARING

IN THE MATTER OF:

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

CASE 7085

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, 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
Suite 300
Security National Bank Bldg.
Roswell, New Mexico 88201

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. 7085
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, N.M.P.M.
Sections 33, 34, 35, 36

Township 13 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36

Township 14 South, Range 35 East, N.M.P.M.
Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24

Township 12 South, Range 36 East, N.M.P.M.
Section 31

Township 13 South, Range 36 East, N.M.P.M.
Sections 6, 7, 18, 19, 20, 29, 30, 31, 32

Township 14 South, Range 36 East, N.M.P.M.
Sections 5, 6, 7, 18, 19

Containing a total of 37,760 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.

C. For such further relief as the Division deems just and proper.

DATED this 21st day of October, 1980.

HARVEY E. YATES COMPANY

By: _____

Robert H. Strand
Attorney for Applicant
P. O. Box 1933
Roswell, New Mexico 88201

RHS/lhc

OCD-1 #39

I N D E X

E X H I B I T S

MR. STAMETS: We'll call Case 7085.

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

MR. STAMETS: I'll ask for appearances in this case.

MR. STRAND: Mr. Examiner, Robert H. Strand, attorney from Roswell, appearing for the applicant, Harvey E. Yates Company; and I'll have two witnesses who need to be sworn.

MR. STAMETS: I'd like to have both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, Harvey E. Yates Company is applicant in Case Number 7085 and is requesting the Division to recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying approximately 37,760 acres in Township 12 South, 13 South, 14 South, all in Range 35 East, Township 12 South, Township 13 South, Township 14 South, in Range 36 East, as more particularly described in the application which has been filed in this matter, all 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.

ANDREW LATTU

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

DIRECT EXAMINATION

BY MR. STRAND:

Q Will you please state your name for the record?

A Andrew Lattu.

Q Mr. Lattu, where do you reside and what is your occupation?

A I'm a geologist. I live in Midland, Texas, and I work for Harvey E. Yates Company.

Q Mr. Lattu, have you testified before the Division in the past and are your qualifications a matter of record?

A Yes, I have and they are.

MR. STRAND: Mr. Examiner, is Mr. Lattu considered qualified as an expert geologist?

MR. STAMETS: Yes.

Q Mr. Lattu, are you familiar with the

application in Case Number 7065, which I have just described, and have you prepared certain exhibits for presentation at this hearing?

A. Yes, I have.

Q. Will you please briefly describe each of these exhibits and how they relate to the application?

A. Yes, I will. Exhibit Number One is a geologic structure map contoured on the top of the Devonian in Lea County, New Mexico. The contour interval is 100 feet. The map scale is one inch equals 8000 feet. This is from a commercially prepared structure map by GeoMap Corporation.

There is also indicated on this map a cross section A-A', which will be Exhibit Number Three.

This exhibit shows the, the Devonian structure map shows the basic geologic structure within the area of Lea County.

Q. Mr. Lattu, would you briefly describe Exhibit Number Two?

A. Exhibit Number Two is a sand/shale ratio map of the Atoka formation in the area of this application. The Atoka section, the Atoka interval in this particular area is essentially mostly shales and it has some thin bedded limes and some sands within this interval, and the interval varies from 700 to 900 feet in thickness.

And as these percent lines show, the map scale here is contour interval of five percent and a horizontal scale of one inch equals 4000 feet.

As you can see, the best developed sands in this area are only 17 to 18 percent of the Atoka interval. And this map shows more or less the depositional grain of where these sands are expected to be encountered, the higher percentage, of course, having more sands and therefor more prospective.

This exhibit is most of the basis for the outline of the area we have requested; that we feel within this area is the area where we expect to find the Atoka formation productive.

Q Mr. Lattu, for the record will you explain in a little more detail just exactly what a sand/shale ratio map is?

A Well, you take the entire interval and divide the net number of feet of sand by the net number of feet of shale.

Q And the contour lines such as you have on the map pictorially represent those ratios, is that correct?

A Yes, they do.

MR. STAMETS: What we're looking at, then, when you -- on your 15 foot contour line --

A. It's 15 percent.

MR. STAMETS: 15 percent, so in 100 feet --

A. You'd have 15 feet of sand; of course, if you had 1000 feet, 150 feet.

MR. STAMETS: What about your lime sections? Are those tossed out or is that included?

A. No, they're not included. Of course, sometimes it's a little difficult to tell a sand from a lime just from electric logs, but using all the data available, we eliminated the limes and just used the sands and the shales.

Q. Mr. Lattu, would you please describe Exhibit Number Three?

A. Yes. Exhibit Number Three is a cross section, as indicated both on Exhibit Number One and Exhibit Number Two as A-A'.

This cross section A-A' contains eighteen wells, all of which are both near and within the boundaries of our requested area for this hearing. Only one well has been left out and that is down in Section 19 of 14, 36, which is right on the eastern boundary of the requested area. Now this well was still being drilled and hadn't been logged at the time this exhibit was prepared. The Atoka sands were found nonproductive in that well, both by drill stem test and by log analysis, and we do have copies of that log available

if they're requested.

But other than that one exception, every well within this area that penetrated the Atoka formation is on this cross section.

Of all these wells only one has been commercially productive at this time, and that is well number twelve, the Harvey E. Yates No. 1 Betenbough in Section 32 of Township 13 South, Range 36 EAst.

Within this well we perforated five separate sands in the Atoka formation for a net of 72 net feet sand included in these perforations. Gross sand was naturally much more than that. We were perforating the sands that appeared productive by log analysis and drilling shows and drill stem test.

Q Mr. Lattu, what is the gross thickness of the Atoka formation which you have outlined on your cross section, on the average?

A On the average, it varies from 700 to nearly 900 feet. When you get up on top of very steep structures the Atoka formation thins, as in the case of this Union of Texas, Petroleum Corporation, Shell State No. 1 in Section 6 of Township 13 South, Range 35 East, in which case it's approximately 440 feet thick.

Otherwise, it's about 700 to 900 feet.

The Atoka formation in this area, a little geologic history, this is a fairly shallow, slowly subsiding basin. You had essentially quiet waters. Sands and shales were periodically washed out in this area from exposed rocks, both to the north and to the west. And these sands were probably winnowed and accumulated by along shore currents and possible tidal action or wave action into a series of bars. And these bars occur throughout the Atoka formation in this area.

The sands within these bars is fine grained to medium grained sand; it's slightly calcareous; some of them are very silty, and a few, of course, where you can catch the center of one of these bars, are quite clean and show good porosity.

Q Mr. Lattu, in this application we are requesting that the entire Atoka formation as you've outlined it on your cross section be designated a tight formation, is that correct?

A Yes, it is.

Q But am I correct that what you're saying is that within this gross interval of 700 to 900 feet, that you have varying thicknesses of sands interspersed with shale, as shown on your sand/shale ratio map?

A Yes. The -- the sands tend to be best concentrated down, as the sand/shale ratio map shows, through

the center or the heart of the area requested; however, I feel several -- because these sands are divided over such a thick section, you could have an area with only, say, 8 percent sand in the interval, but if you had 20 feet of sand, it would still be productive.

But because of the nature of this and this geology, or the history of this area, is fairly uniform through this period of time, these bars are scattered vertically up and down through the section in any one well.

Q Mr. Lattu, on the average what is the depth from the surface to the top of the Atoka formation underlying this area?

A Okay, within the area we're requesting the tight reservoir designation for, it is approximately 12,200 feet.

Q Mr. Lattu, based on your analysis of the -- of the geology of this formation, in your opinion does it underly all of the area requested for tight formation?

A Yes, it does.

Q And to backtrack just a bit, on Exhibit Number Two the outline of the requested area is set out in a heavy crosshatched line.

A Yes. It's -- it's indicated by a heavy line, with heavy lines and little dots.

Q Is it further your opinion that the Atoka formation which you've described is at least potentially productive under the entire area?

A Yes, I believe it is.

Q Mr. Lattu, would you please describe the fresh water aquifers that underlie the area proposed for designation?

A The fresh water aquifers are the Santa Rosa and the Ogalallah. The ~~Santa Rosa~~ Ogallallah is at a depth of from 300 to 400 feet and the ~~Ogalallah~~ Santa Rosa would be at a depth of 900 to 1200 feet.

Q Do these fresh water aquifers occur quite uniformly under this area?

A Fairly uniformly, yes.

Q Are you familiar with the rules and policies of the Oil Conservation Division relating to casing and cementing programs for wells which would be drilled into the Atoka formation in this area?

A Yes, I am.

Q In your opinion would carrying out of such casing and cementing programs adequately protect these fresh water aquifers from contamination?

A Yes, it will.

Q Mr. Lattu, were Exhibits One through

Three prepared by you or under your supervision?

A. Yes, they were.

MR. STRAND: That's all I have for Mr. Lattu.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Lattu, I may have missed it, I believe you did say, or at least I interpreted, the dashed outline on Exhibit Number Two to be the area that has been requested here.

A. Yes.

Q. Okay.

MR. STRAND: Mr. Examiner, the exact legal description is set out in the application.

MR. STAMETS: All right, but for purposes of cross examination, and whatnot, I want to be able to relate that to what I saw on Exhibit Two.

Talking about lime zones awhile ago, your analysis of the depositional environment would seem to limit any lime zones to relatively thin stringers as opposed to major reef buildup in this area.

A. Yes, it would. The Atoka formation where these large carbonate and reef development occurs are

much further south, approximately down near the Texas-New Mexico border.

Q Would you approve a type log for this area?

A We should probably pick a well that's producing and in that case it would be the Harvey E. Yates No. 1 Betenbough in Section 32 of 13, 36.

Q Okay. What -- do you have the top and bottom of the Atoka there?

A Let's see, I can read them off the cross section. That is well number twelve on the cross section, and the top of the Atoka appears to be about 12,230 and the base of the Atoka formation will be 12,970.

MR. STAMETS: Are there any other questions of Mr. Lattu?

MR. PADILLA: I've got one or two.

CROSS EXAMINATION

BY MR. PADILLA:

Q Mr. Lattu, did I understand you to say that only the Betenbough No. 1 was producing from the Atoka formation?

A Yes, it is the only one that has been producing.

Texas Crude-Sinclair Oil and Gas-Richardson 5 No. 1 attempted a completion that did not produce.

Q. Has any other well in the subject area produced from the Atoka formation in the time that you've observed this?

A. Not to my knowledge at all.

Q. Do you know whether the Atoka formation has been tested specifically in the subject area?

A. It's been tested, of course, by production from our No. 1 Betenbough and by drill stem tests on some recent wells we have drilled.

Q. But historically, well, historically has the Atoka formation been considered a -- not a prospective formation in this area?

A. Not in this -- not in this immediate area, no.

MR. PADILLA: I have no further questions.

MR. STAMETS: Any other questions of this witness? He may be excused.

MR. STAMETS: Mr. Examiner, we'll call Mr. Ralph Viney as our next witness.

RALPH VINEY

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

DIRECT EXAMINATION

BY MR. STRAND:

Q State your full name for the record.

A My name is Ralph Viney.

Q Mr. Viney, where do you reside and what is your occupation?

A I'm an engineering consultant. I reside in Midland.

Q Mr. Viney, have you been retained by Harvey E. Yates Company to present testimony in Case Number 7085?

A Yes, sir.

Q Mr. Viney, have you testified before the Division in the past and are your qualifications a matter of record?

A Yes, sir.

MR. STRAND: Mr. Examiner, is Mr. Viney considered qualified as a petroleum engineer?

MR. STAMETS: Yes.

Q Mr. Viney, are you familiar with the

application in Case Number 7035?

A. Yes, sir.

Q. And in that regard have you prepared a set of exhibits relating to the engineering aspects of this application, which we have designated as Exhibit Number Four?

A. Yes, sir.

Q. Referring to Exhibit Four-1, would you please -- which is a summary of the basic data for each of the wells set out thereon, will you please describe the permeability calculations which you've arrived at, and the supporting data?

A. Yes, sir, I will note that the two wells are considered: A drill stem test, and a reservoir build-up, and a drill stem test of a second well.

The permeability calculations are determined by a normal Horner build-up pressure -- reservoir pressure build-up technique, and as you are aware, in the case of drill stem tests the actual flow conditions are then related to the actual pressure conditions during a shut-in period and that pressure extrapolated to a dimensionless point and from that the permeability and drainage radius calculations can be made.

Q. Mr. Viney, would you describe the results of these calculations with respect to each of the wells you have listed on the exhibit?

A Yes, sir. In the case of the Betenbough Well No. 1 drill stem test data, you will note that the flow rate on this particular test was approximately 102 Mcf and the calculated permeability by extrapolating the pressures and using that data indicated a permeability of 0.025 millidarcy.

In the case of the reservoir build-up test which was conducted after production from the Betenbough Well, the test rate at the -- the flow rate prior to shutting in and taking the reservoir build-up test was about 833 Mcf per day, and this well was shut in for a considerable period of time as you will notice in the data, and the permeability calculated using this data was .0767.

It should be noted that the Betenbough reservoir pressure build-up is after the well stimulation. This well was acidized, produced, and the results then analyzed and compared.

The third tabulation represents the findings of a drill stem test on the Harvey E. Yates Superior 19 State No. 1 Well.

You will note that the flow rate in drill stem test is 305 Mcf a day and the permeability was 0.01 of a millidarcy.

Q Mr. Viney, would you discuss the pay section involved that these calculations were based on in

the Betenbough No. 1 Well?

A. Yes, sir. For the purposes of arriving at a capacity or permeability footage value we used 72 feet of pay section.

Q. Does that 72 feet of pay section basically represent the perforated interval of the well?

A. Nearly, yes, sir.

Q. And you heard Mr. Lattu's testimony previously as to the characteristics of this Atoka formation with various sands interspersed with shale. You did not consider in your permeability calculation on this well these other sands within this interval of 12,175 to 12,347?

A. No, sir, we only selected the high porosity appearing sands.

Q. Mr. Viney, considering Mr. Lattu's geological testimony and your permeability analysis, is it your opinion that the Atoka formation underlying the area proposed for designation would be expected to have an estimated average in situ gas permeability of less than 0.1 millidarcy throughout the pay section?

A. Based on this evidence, yes, sir.

MR. STAMETS: Mr. Viney, considering only the -- what you considered the higher permeability sands, would that have a tendency to increase or decrease the perme-

ability figure that you arrive at?

A. By using the lower thickness figure, it would tend to give a maximum permeability that could be expected.

MR. STAMETS: So if you considered the entire interval, you would have even a lower number.

A. It would probably be by a factor of 10 percent of this figure if you used the entire section, yes, sir.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, referring back to Exhibit Four-1, would you please describe your analysis and calculations relating to production rates against atmospheric pressure?

A. Yes, sir. The flow rates, as shown on the bottom of the exhibit, Four-1, are normal rates that you would arrive at using a radial flow Darcy equation, which is the standard equation used basically in all fluid flow measurements. And you will note that with the radius of investigation during the test, why, none of the wells would exceed -- or none of the flow rates of any of these tests would exceed more than 1215 Mcf per day.

Q. Mr. Viney, have you also included as Exhibit Four-2 a general statistical summary of production

from the Betenbough No. 1 Well?

A. Yes, sir.

Q. And to what date does that summary contain information on production?

A. The summary in the exhibit is through November -- I mean, September 3rd.

Q. Have you also reviewed production figures from this well since that date and are they comparable?

A. Yes, sir, they are.

MR. STRAND: Mr. Examiner, we do have copies of those additional figures if you feel they're necessary.

MR. STAMETS: Okay.

Q. Mr. Viney, what is the status of the Superior 19 State No. 1 Well?

A. The Superior State No. 19-1 is temporarily abandoned and possibly can be re-entered at a later date.

Q. But there is no production history from that well?

A. No, sir, other than the drill stem test.

Q. Mr. Viney, based on your analysis of this data, is it your opinion that the stabilized production rate against atmospheric pressure of wells which might be com-

pleted for production in the Atoka formation we've been discussing without any type of stimulation would not be expected to exceed 1238 Mcf per day?

A. Yes, sir, the probable rate would be 300 to 400 Mcf a day without stimulation.

Q. And is it also your opinion that this would be true generally throughout the area proposed for designation?

A. Yes, sir, we would assume this would hold.

Q. Mr. Viney, referring to Exhibit Number Four and the various types of information you have in there, will you please describe the liquids produced from the formation and your conclusions as to their physical state in the reservoir?

A. Yes, sir. The liquids as being produced are a light-colored, straw-colored liquid. The weather (sic) gravity is approximately 46 degrees. We do not have a recombination of the fluid samples at surface; however, looking at the shape and performance of the build-up curves, it would appear that we have a phase change at approximately 3560 pounds in the tubing liquids -- of the liquids in the tubing, which would indicate with reason a dewpoint of approximately 3500 to 3600 pounds. Consequently, all liquids at

higher pressures would exist, all fluids would exist in a single phase in the reservoir.

Q And what phase would that be?

A. That would be a gas phase.

Q. And that -- would that be the status of the reservoir at the present time or at least at the time the well was completed?

A. Yes, sir.

Q What is the current pressure? Do you have that information?

A. Yes, sir, the current pressure as stated on the build-ups, which will be Exhibit Four-1(b), is 4279 pounds. That is page five, Mr. Stamets.

Q Mr. Viney, is it then your opinion that this liquids would be considered condensate as condensate is normally defined as --

A. Yes, sir.

Q -- opposed to crude oil?

A. It would be a retrograde condensate in all probability.

Q Would it also then be your opinion that there would not be any crude oil produced from the proposed tight formation?

A. There is no crude in the reservoir so

none can be produced; it would all be condensate.

Q Mr. Viney, referring to Exhibit Four-3, does this exhibit set out, together with other information, the casing and cementing program utilized in the Betenbough No. 1 Well?

A Yes, sir.

Q In your opinion would this type of program adequately protect the fresh water aquifers described by Mr. Lattu?

A Yes, sir. You will note that the surface casing is set through 369 and cemented and the intermediate string of 9-5/8ths is set through 4600, adequately protecting both the 900 to 1200 and the 300 to 400 water zones.

Q To your knowledge, Mr. Viney, does this casing and cementing program conform with the regulations and policies of the Oil Conservation Division relating to this field?

A As I understand it, yes, sir.

Q And in your opinion would compliance generally with rules -- with their rules for this type of well protect the fresh water aquifers?

A Yes, sir.

Q Mr. Viney, with regard to various types of treatment programs which might be employed for the wells to

be completed in the Atoka formation, in your opinion would they have any adverse affect on the fresh water aquifers?

A. They should not if the casing is properly cemented, no, sir.

Q. Was Exhibit Number Four prepared by you or under your supervision?

A. Yes, sir.

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

MR. STAMETS: Exhibit Number -- all the exhibits are accepted.

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

MR. STAMETS: Are there questions of Mr. Viney? Mr. Padilla.

CROSS EXAMINATION

BY MR. PADILLA:

Q. I'm not sure whether Mr. Viney can answer this question. It's of a general nature. Even you, Mr. Strand.

Is any area, or the subject area being currently developed by infill drilling as defined in the rules and regulations?

MR. STRAND: No, not to my knowledge.

A Not to our knowledge, no, sir.

Q Mr. Viney, what type of stimulation techniques would be required in addition to acidizing for the Atoka formation? Would any other type of technique be required?

A Since none have been done, Mr. Padilla, a fracture treatment would appear very suitable for this type of formation, but since we don't know what it would -- how it would react, I cannot say, but if we take engineering technique, yes, a fracture treatment could possibly increase the productivity of these wells.

Q Do you estimate that stimulation will be required in all the wells drilled to the Atoka?

A I would say that you'd at least have to have acid cleanup work, or some acid work, to clean up your -- some possible mud filtrate around the wellbore, yes, sir.

Q What I'm trying to get at is would you necessarily require massive stimulation for the Atoka formation in the subject area?

A I'm not going to say you would require it. It may be desireable, yes, sir.

MR. STRAND: Mr. Viney, isn't the treatment programs that you would employ on these types of wells

something that would have to be determined from each individual well, logs and tests, and so forth?

A Well, on the flow rates you'd want to look at your initial flow rate prior to stimulation, and your flow rate after a massive clean-up, and then from that point I think, Mr. Padilla, you could possibly generalize and say I'd want to go to a larger treatment, whether it be acid, or acid frac, or some type of propping fracture method.

MR. STRAND: Mr. Viney, can you conceive of any type of fracturing program, be it however exotic, which would cause any kind of problem with the fresh water aquifers?

A No, sir, there should be no problem. Again this will depend upon the cementing condition around the producing zones, and if properly cemented should not migrate 10 or 12,000 feet.

Q Another general question. Where is the subject located in relation to -- to the closest towns in Lea County?

A Tatum, I guess, would be --

MR. STRAND: Yeah, well, approximately --

A McDonald and Tatum, I guess.

MR. STRAND: Approximately 10 miles south of Tatum. So really the area proposed for designation, the northern boundary would be approximately 2-1/2 to 3 miles

southwest of Tatum.

MR. PADILLA: I have nothing else.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Viney, the two sets of calculations that you run through to show in situ permeability --

A. Yes, sir.

Q. -- are both located on the eastern edge of the area --

A. Yes, sir.

Q. -- and fairly close together. Why do you feel that we should expect to see this same permeability apply to this somewhat larger area?

A. Based on the geological information developed, Mr. Stamets, and the conditions that appear throughout the sections of the logs, the conditions of the deposition appear almost identical.

I can't answer that it will occur because I don't know, but based on the interpretation of the sands and the -- in other wells and in the wells that we tested, they appear very identical or very similar.

MR. STRAND: Would that same permeability factor be expected to occur?

A. Based on what we have seen, the conditions and the sands appear the same, you would have to make that conclusion based on the evidence at hand.

MR. STAMETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. STRAND: Nothing further, Mr. Examiner.

MR. STAMETS: If there is nothing further, the case will be taken under advisement.

(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.

_____

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
12 November 1980

EXAMINER HEARING

IN THE MATTER OF:

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

CASE 7085

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, 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
Suite 300
Security National Bank Bldg.
Roswell, New Mexico 88201

I N D E X

E X H I B I T S

MR. STAMETS: We'll call Case 7085.

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

MR. STAMETS: I'll ask for appearances in this case.

MR. STRAND: Mr. Examiner, Robert H. Strand, attorney from Roswell, appearing for the applicant, Harvey E. Yates Company; and I'll have two witnesses who need to be sworn.

MR. STAMETS: I'd like to have both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. STRAND: Mr. Examiner, Harvey E. Yates Company is applicant in Case Number 7085 and is requesting the Division to recommend to the Federal Energy Regulatory Commission that the Atoka formation underlying approximately 37,760 acres in Township 12 South, 13 South, 14 South, all in Range 35 East, Township 12 South, Township 13 South, Township 14 South, in Range 36 East, as more particularly described in the application which has been filed in this matter, all 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.

ANDREW LATTU

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

DIRECT EXAMINATION

BY MR. STRAND:

Q Will you please state your name for the record?

A Andrew Lattu.

Q Mr. Lattu, where do you reside and what is your occupation?

A I'm a geologist. I live in Midland, Texas, and I work for Harvey E. Yates Company.

Q Mr. Lattu, have you testified before the Division in the past and are your qualifications a matter of record?

A Yes, I have and they are.

MR. STRAND: Mr. Examiner, is Mr. Lattu considered qualified as an expert geologist?

MR. STAMETS: Yes.

Q Mr. Lattu, are you familiar with the

application in Case Number 7085, which I have just described, and have you prepared certain exhibits for presentation at this hearing?

A. Yes, I have.

Q. Will you please briefly describe each of these exhibits and how they relate to the application?

A. Yes, I will. Exhibit Number One is a geologic structure map contoured on the top of the Devonian in Lea County, New Mexico. The contour interval is 100 feet. The map scale is one inch equals 8000 feet. This is from a commercially prepared structure map by GeoMap Corporation.

There is also indicated on this map a cross section A-A', which will be Exhibit Number Three.

This exhibit shows the, the Devonian structure map shows the basic geologic structure within the area of Lea County.

Q. Mr. Lattu, would you briefly describe Exhibit Number Two?

A. Exhibit Number Two is a sand/shale ratio map of the Atoka formation in the area of this application. The Atoka section, the Atoka interval in this particular area is essentially mostly shales and it has some thin bedded limes and some sands within this interval, and the interval varies from 700 to 900 feet in thickness.

And as these percent lines show, the map scale here is contour interval of five percent and a horizontal scale of one inch equals 4000 feet.

As you can see, the best developed sands in this area are only 17 to 18 percent of the Atoka interval. And this map shows more or less the depositional grain of where these sands are expected to be encountered, the higher percentage, of course, having more sands and therefor more prospective.

This exhibit is most of the basis for the outline of the area we have requested; that we feel within this area is the area where we expect to find the Atoka formation productive.

Q. Mr. Lattu, for the record will you explain in a little more detail just exactly what a sand/shale ratio map is?

A. Well, you take the entire interval and divide the net number of feet of sand by the net number of feet of shale.

Q. And the contour lines such as you have on the map pictorially represent those ratios, is that correct?

A. Yes, they do.

MR. STAMETS: What we're looking at, then, when you -- on your 15 foot contour line --

A. It's 15 percent.

MR. STAMETS: 15 percent, so in 100 feet --

A. You'd have 15 feet of sand; of course, if you had 1000 feet, 150 feet.

MR. STAMETS: What about your lime sections? Are those tossed out or is that included?

A. No, they're not included. Of course, sometimes it's a little difficult to tell a sand from a lime just from electric logs, but using all the data available, we eliminated the limes and just used the sands and the shales.

Q. Mr. Lattu, would you please describe Exhibit Number Three?

A. Yes. Exhibit Number Three is a cross section, as indicated both on Exhibit Number One and Exhibit Number Two as A-A'.

This cross section A-A' contains eighteen wells, all of which are both near and within the boundaries of our requested area for this hearing. Only one well has been left out and that is down in Section 19 of 14, 36, which is right on the eastern boundary of the requested area. Now this well was still being drilled and hadn't been logged at the time this exhibit was prepared. The Atoka sands were found nonproductive in that well, both by drill stem test and by log analysis, and we do have copies of that log available

if they're requested.

But other than that one exception, every well within this area that penetrated the Atoka formation is on this cross section.

Of all these wells only one has been commercially productive at this time, and that is well number twelve, the Harvey E. Yates No. 1 Petenbough in Section 32 of Township 13 South, Range 36 EAst.

Within this well we perforated five separate sands in the Atoka formation for a net of 72 net feet sand included in these perforations. Gross sand was naturally much more than that. We were perforating the sands that appeared productive by log analysis and drilling shows and drill stem test.

Q Mr. Lattu, what is the gross thickness of the Atoka formation which you have outlined on your cross section, on the average?

A On the average, it varies from 700 to nearly 900 feet. When you get up on top of very steep structures the Atoka formation thins, as in the case of this Union of Texas, Petroleum Corporation, Shell State No. 1 in Section 6 of Township 13 South, Range 35 East, in which case it's approximately 440 feet thick.

Otherwise, it's about 700 to 900 feet.

The Atoka formation in this area, a little geologic history, this is a fairly shallow, slowly subsiding basin. You had essentially quiet waters. Sands and shales were periodically washed out in this area from exposed rocks, both to the north and to the west. And these sands were probably winnowed and accumulated by along shore currents and possible tidal action or wave action into a series of bars. And these bars occur throughout the Atoka formation in this area.

The sands within these bars is fine grained to medium grained sand; it's slightly calcareous; some of them are very silty, and a few, of course, where you can catch the center of one of these bars, are quite clean and show good porosity.

Q Mr. Lattu, in this application we are requesting that the entire Atoka formation as you've outlined it on your cross section be designated a tight formation, is that correct?

A Yes, it is.

Q But am I correct that what you're saying is that within this gross interval of 700 to 900 feet, that you have varying thicknesses of sands interspersed with shale, as shown on your sand/shale ratio map?

A Yes. The -- the sands tend to be best concentrated down, as the sand/shale ratio map shows, through

the center or the heart of the area requested; however, I feel several -- because these sands are divided over such a thick section, you could have an area with only, say, 8 percent sand in the interval, but if you had 20 feet of sand, it would still be productive.

But because of the nature of this and this geology, or the history of this area, is fairly uniform through this period of time, these bars are scattered vertically up and down through the section in any one well.

Q. Mr. Lattu, on the average what is the depth from the surface to the top of the Atoka formation underlying this area?

A. Okay, within the area we're requesting the tight reservoir designation for, it is approximately 12,200 feet.

Q. Mr. Lattu, based on your analysis of the -- of the geology of this formation, in your opinion does it underly all of the area requested for tight formation?

A. Yes, it does.

Q. And to backtrack just a bit, on Exhibit Number Two the outline of the requested area is set out in a heavy crosshatched line.

A. Yes. It's -- it's indicated by a heavy line, with heavy lines and little dots.

Q Is it further your opinion that the Atoka formation which you've described is at least potentially productive under the entire area?

A Yes, I believe it is.

Q Mr. Lattu, would you please describe the fresh water aquifers that underlie the area proposed for designation?

A The fresh water aquifers are the Santa Rosa and the Ogalallah. The Santa Rosa is at a depth of from 300 to 400 feet and the Ogalallah would be at a depth of 900 to 1200 feet.

Q Do these fresh water aquifers occur quite uniformly under this area?

A Fairly uniformly, yes.

Q Are you familiar with the rules and policies of the Oil Conservation Division relating to casing and cementing programs for wells which would be drilled into the Atoka formation in this area?

A Yes, I am.

Q In your opinion would carrying out of such casing and cementing programs adequately protect these fresh water aquifers from contamination?

A Yes, it will.

Q Mr. Lattu, were Exhibits One through

Three prepared by you or under your supervision?

A. Yes, they were.

MR. STRAND: That's all I have for Mr. Lattu.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Lattu, I may have missed it, I believe you did say, or at least I interpreted, the dashed outline on Exhibit Number Two to be the area that has been requested here.

A. Yes.

Q. Okay.

MR. STRAND: Mr. Examiner, the exact legal description is set out in the application.

MR. STAMETS: All right, but for purposes of cross examination, and whatnot, I want to be able to relate that to what I saw on Exhibit Two.

Talking about lime zones awhile ago, your analysis of the depositional environment would seem to limit any lime zones to relatively thin stringers as opposed to major reef buildup in this area.

A. Yes, it would. The Atoka formation where these large carbonate and reef development occurs are

much further south; approximately down near the Texas-New Mexico border.

Q Would you approve a type log for this area?

A We should probably pick a well that's producing and in that case it would be the Harvey E. Yates No. 1 Betenbough in Section 32 of 13, 36.

Q Okay. What -- do you have the top and bottom of the Atoka there?

A Let's see, I can read them off the cross section. That is well number twelve on the cross section and the top of the Atoka appears to be about 12,230 and the base of the Atoka formation will be 12,970.

MR. STAMETS: Are there any other questions of Mr. Lattu?

MR. PADILLA: I've got one or two.

CROSS EXAMINATION

BY MR. PADILLA:

Q Mr. Lattu, did I understand you to say that only the Betenbough No. 1 was producing from the Atoka formation?

A Yes, it is the only one that has been producing.

Texas Crude-Sinclair Oil and Gas-Richardson 5 No. 1 attempted a completion that did not produce.

Q. Has any other well in the subject area produced from the Atoka formation in the time that you've observed this?

A. Not to my knowledge at all.

Q. Do you know whether the Atoka formation has been tested specifically in the subject area?

A. It's been tested, of course, by production from our No. 1 Betenbough and by drill stem tests on some recent wells we have drilled.

Q. But historically, well, historically has the Atoka formation been considered a -- not a prospective formation in this area?

A. Not in this -- not in this immediate area, no.

MR. PADILLA: I have no further questions.

MR. STAMETS: Any other questions of this witness? He may be excused.

MR. STAMETS: Mr. Examiner, we'll call Mr. Ralph Viney as our next witness.

RALPH VINEY

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

DIRECT EXAMINATION

BY MR. STRAND:

Q. State your full name for the record.

A. My name is Ralph Viney.

Q. Mr. Viney, where do you reside and what is your occupation?

A. I'm an engineering consultant. I reside in Midland.

Q. Mr. Viney, have you been retained by Harvey E. Yates Company to present testimony in Case Number 7085?

A. Yes, sir.

Q. Mr. Viney, have you testified before the Division in the past and are your qualifications a matter of record?

A. Yes, sir.

MR. STRAND: Mr. Examiner, is Mr. Viney considered qualified as a petroleum engineer?

MR. STAMETS: Yes.

Q. Mr. Viney, are you familiar with the

application in Case Number 7085?

A. Yes, sir.

Q. And in that regard have you prepared a set of exhibits relating to the engineering aspects of this application, which we have designated as Exhibit Number Four?

A. Yes, sir.

Q. Referring to Exhibit Four-1, would you please -- which is a summary of the basic data for each of the wells set out thereon, will you please describe the permeability calculations which you've arrived at, and the supporting data?

A. Yes, sir, I will note that the two wells are considered: A drill stem test, and a reservoir build-up, and a drill stem test of a second well.

The permeability calculations are determined by a normal Horner build-up pressure -- reservoir pressure build-up technique, and as you are aware, in the case of drill stem tests the actual flow conditions are then related to the actual pressure conditions during a shut-in period and that pressure extrapolated to a dimensionless point and from that the permeability and drainage radius calculations can be made.

Q. Mr. Viney, would you describe the results of these calculations with respect to each of the wells you have listed on the exhibit?

A. Yes, sir. In the case of the Betenbough Well No. 1 drill stem test data, you will note that the flow rate on this particular test was approximately 102 Mcf and the calculated permeability by extrapolating the pressures and using that data indicated a permeability of 0.025 millidarcy.

In the case of the reservoir build-up test which was conducted after production from the Betenbough Well, the test rate at the -- the flow rate prior to shutting in and taking the reservoir build-up test was about 833 Mcf per day, and this well was shut in for a considerable period of time as you will notice in the data, and the permeability calculated using this data was .0767.

It should be noted that the Betenbough reservoir pressure build-up is after the well stimulation. This well was acidized, produced, and the results then analyzed and compared.

The third tabulation represents the findings of a drill stem test on the Harvey E. Yates Superior 19 State No. 1 Well.

You will note that the flow rate in drill stem test is 305 Mcf a day and the permeability was 0.01 of a millidarcy.

Q. Mr. Viney, would you discuss the pay section involved that these calculations were based on in

the Betenbough No. 1 Well?

A. Yes, sir. For the purposes of arriving at a capacity or permeability footage value we used 72 feet of pay section.

Q. Does that 72 feet of pay section basically represent the perforated interval of the well?

A. Nearly, yes, sir.

Q. And you heard Mr. Lattu's testimony previously as to the characteristics of this Atoka formation with various sands interspersed with shale. You did not consider in your permeability calculation on this well these other sands within this interval of 12,175 to 12,347?

A. No, sir, we only selected the high porosity appearing sands.

Q. Mr. Viney, considering Mr. Lattu's geological testimony and your permeability analysis, is it your opinion that the Atoka formation underlying the area proposed for designation would be expected to have an estimated average in situ gas permeability of less than 0.1 millidarcy throughout the pay section?

A. Based on this evidence, yes, sir.

MR. STAMETS: Mr. Viney, considering only the -- what you considered the higher permeability sands, would that have a tendency to increase or decrease the perme-

ability figure that you arrive at?

A. By using the lower thickness figure, it would tend to give a maximum permeability that could be expected.

MR. STAMETS: So if you considered the entire interval, you would have even a lower number.

A. It would probably be by a factor of 10 percent of this figure if you used the entire section, yes, sir.

MR. STAMETS: Okay, thank you.

Q. Mr. Viney, referring back to Exhibit Four-1, would you please describe your analysis and calculations relating to production rates against atmospheric pressure?

A. Yes, sir. The flow rates, as shown on the bottom of the exhibit, Four-1, are normal rates that you would arrive at using a radial flow Darcy equation, which is the standard equation used basically in all fluid flow measurements. And you will note that with the radius of investigation during the test, why, none of the wells would exceed -- or none of the flow rates of any of these tests would exceed more than 1215 Mcf per day.

Q. Mr. Viney, have you also included as Exhibit Four-2 a general statistical summary of production

from the Betenbough No. 1 Well?

A. Yes, sir.

Q. And to what date does that summary contain information on production?

A. The summary in the exhibit is through November -- I mean, September 3rd.

Q. Have you also reviewed production figures from this well since that date and are they comparable?

A. Yes, sir, they are.

MR. STRAND: Mr. Examiner, we do have copies of those additional figures if you feel they're necessary.

MR. STAMETS: Okay.

Q. Mr. Viney, what is the status of the Superior 19 State No. 1 Well?

A. The Superior State No. 19-1 is temporarily abandoned and possibly can be re-entered at a later date.

Q. But there is no production history from that well?

A. No, sir, other than the drill stem test.

Q. Mr. Viney, based on your analysis of this data, is it your opinion that the stabilized production rate against atmospheric pressure of wells which might be com-

pleted for production in the Atoka formation we've been discussing without any type of stimulation would not be expected to exceed 1238 Mcf per day?

A. Yes, sir, the probable rate would be 300 to 400 Mcf a day without stimulation.

Q. And is it also your opinion that this would be true generally throughout the area proposed for designation?

A. Yes, sir, we would assume this would hold.

Q. Mr. Viney, referring to Exhibit Number Four and the various types of information you have in there, will you please describe the liquids produced from the formation and your conclusions as to their physical state in the reservoir?

A. Yes, sir. The liquids as being produced are a light-colored, straw-colored liquid. The weather (sic) gravity is approximately 46 degrees. We do not have a recombination of the fluid samples at surface; however, looking at the shape and performance of the build-up curves, it would appear that we have a phase change at approximately 3560 pounds in the tubing liquids -- of the liquids in the tubing, which would indicate with reason a dewpoint of approximately 3500 to 3600 pounds. Consequently, all liquids at

higher pressures would exist, all fluids would exist in a single phase in the reservoir.

Q And what phase would that be?

A That would be a gas phase.

Q And that -- would that be the status of the reservoir at the present time or at least at the time the well was completed?

A Yes, sir.

Q What is the current pressure? Do you have that information?

A Yes, sir, the current pressure as stated on the build-ups, which will be Exhibit Four-A(b), is 4279 pounds. That is page five, Mr. Stamets.

Q Mr. Viney, is it then your opinion that this liquids would be considered condensate as condensate is normally defined as --

A Yes, sir.

Q -- opposed to crude oil?

A It would be a retrograde condensate in all probability.

Q Would it also then be your opinion that there would not be any crude oil produced from the proposed tight formation?

A There is no crude in the reservoir so

none can be produced; it would all be condensate.

Q Mr. Viney, referring to Exhibit Four-3, does this exhibit set out, together with other information, the casing and cementing program utilized in the Betenbough No. 1 Well?

A Yes, sir.

Q In your opinion would this type of program adequately protect the fresh water aquifers described by Mr. Lattu?

A Yes, sir. You will note that the surface casing is set through 369 and cemented and the intermediate string of 9-5/8ths is set through 4600, adequately protecting both the 900 to 1200 and the 300 to 400 water zones.

Q To your knowledge, Mr. Viney, does this casing and cementing program conform with the regulations and policies of the Oil Conservation Division relating to this field?

A As I understand it, yes, sir.

Q And in your opinion would compliance generally with rules -- with their rules for this type of well protect the fresh water aquifers?

A Yes, sir.

Q Mr. Viney, with regard to various types of treatment programs which might be employed for the wells to

be completed in the Atoka formation, in your opinion would they have any adverse affect on the fresh water aquifers?

A. They should not if the casing is properly cemented, no, sir.

Q. Was Exhibit Number Four prepared by you or under your supervision?

A. Yes, sir.

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

MR. STAMETS: Exhibit Number -- all the exhibits are accepted.

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

MR. STAMETS: Are there questions of Mr. Viney? Mr. Padilla.

CROSS EXAMINATION

BY MR. PADILLA:

Q. I'm not sure whether Mr. Viney can answer this question. It's of a general nature. Even you, Mr. Strand.

Is any area, or the subject area being currently developed by infill drilling as defined in the rules and regulations?

MR. STRAND: No, not to my knowledge.

A. Not to our knowledge, no, sir.

Q. Mr. Viney, what type of stimulation techniques would be required in addition to acidizing for the Atoka formation? Would any other type of technique be required?

A. Since none have been done, Mr. Padilla, a fracture treatment would appear very suitable for this type of formation, but since we don't know what it would -- how it would react, I cannot say, but if we take engineering technique, yes, a fracture treatment could possibly increase the productivity of these wells.

Q. Do you estimate that stimulation will be required in all the wells drilled to the Atoka?

A. I would say that you'd at least have to have acid cleanup work, or some acid work, to clean up your -- some possible mud filtrate around the wellbore, yes, sir.

Q. What I'm trying to get at is would you necessarily require massive stimulation for the Atoka formation in the subject area?

A. I'm not going to say you would require it. It may be desircable, yes, sir.

MR. STRAND: Mr. Viney, isn't the treatment programs that you would employ on these types of wells

something that would have to be determined from each individual well, logs and tests, and so forth?

A. Well, on the flow rates you'd want to look at your initial flow rate prior to stimulation, and your flow rate after a massive clean-up, and then from that point I think, Mr. Padilla, you could possibly generalize and say I'd want to go to a larger treatment, whether it be acid, or acid frac, or some type of propping fracture method.

MR. STRAND: Mr. Viney, can you conceive of any type of fracturing program, be it however exotic, which would cause any kind of problem with the fresh water aquifers?

A. No, sir, there should be no problem. Again this will depend upon the cementing condition around the producing zones, and if properly cemented should not migrate 10 or 12,000 feet.

Q. Another general question. Where is the subject located in relation to -- to the closest towns in Lea County?

A. Tatum, I guess, would be --

MR. STRAND: Yeah, well, approximately --

A. McDonald and Tatum, I guess.

MR. STRAND: Approximately 10 miles south of Tatum. So really the area proposed for designation, the northern boundary would be approximately 2-1/2 to 3 miles

southwest of Tatum.

MR. PADILLA: I have nothing else.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Viney, the two sets of calculations that you run through to show in situ permeability --

A. Yes, sir.

Q. -- are both located on the eastern edge of the area --

A. Yes, sir.

Q. -- and fairly close together. Why do you feel that we should expect to see this same permeability apply to this somewhat larger area?

A. Based on the geological information developed, Mr. Stamets, and the conditions that appear throughout the sections of the logs, the conditions of the deposition appear almost identical.

I can't answer that it will occur because I don't know, but based on the interpretation of the sands and the -- in other wells and in the wells that we tested, they appear very identical or very similar.

MR. STRAND: Would that same permeability factor be expected to occur?

A. Based on what we have seen, the conditions and the sands appear the same, you would have to make that conclusion based on the evidence at hand.

MR. STANETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. STRAND: Nothing further, Mr. Examiner.

MR. STANETS: If there is nothing further, the case will be taken under advisement.

(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.

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