STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 9935

EXAMINER HEARING

IN THE MATTER OF:

Application of Harvey E. Yates Company for a Horizontal Directional Drilling Pilot Project and Special Operating Rules Therefor, Lea County, New Mexico

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

May 2, 1990

ORIGINAL

A P P E A R A N C E S

FOR THE DIVISION:

ROBERT G. STOVALL
Attorney at Law
Legal Counsel to the Division
State Land Office Building
Santa Fe, New Mexico

FOR THE APPLICANT:

CAMPBELL & BLACK, P.A.
Attorneys at Law
By: WILLIAM F. CARR
Suite 1 - 110 N. Guadalupe
P.O. Box 2208
Santa Fe, New Mexico 87504-2208

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E X H I B I T S

APPLICANT'S EXHIBITS:

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WHEREUPON, the following proceedings were had at 2:47 p.m.:

EXAMINER CATANACH: At this time we'll call Case 9935, Application of Harvey E. Yates Company for a horizontal directional drilling pilot project and special operating rules therefor, Lea County, New Mexico.

Appearances in this case?

MR. CARR: May it please the Examiner, my name is William F. Carr with the law firm Campbell and Black, P.A., of Santa Fe. I represent Harvey E. Yates Company, and I have three witnesses.

EXAMINER CATANACH: No other appearances in this case?

Will the witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

MR. CARR: At this time we call Mr. Bell.

ROBERT H. BELL,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. CARR:

Q. Will you state your name and place of residence?

A. Robert H. Bell, Roswell, New Mexico.

Q. By whom are you employed, and in what capacity?

A. Harvey E. Yates Company as a land manager.

Q. Have you previously testified before the Oil Conservation Division?

A. Yes, sir, I have.

Q. At the time of that prior testimony, were your qualifications as a landman accepted and made a matter of record?

A. Yes, sir, they were.

Q. Are you familiar with the Application filed in this case on behalf of Harvey E. Yates Company?

A. Yes, sir.

Q. Are you familiar with the area that is the subject of this Application?

A. Yes, sir, I am.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Would you briefly state what Harvey E. Yates Company seeks with this Application?

A. Harvey E. Yates Company seeks authority to initiate a horizontal directional drilling project in the south half of Section 26, Township 13 South, Range

35 East, forming a standard 320-acre gas spacing proration unit in the Northwest Austin-Mississippian Gas Pool.

Q. Could you identify what has been marked as Heyco Exhibit Number 1 and review that for the Examiner?

A. Yes, sir. Exhibit Number 1 is a colored plat showing the 12-section Duncan Unit outlined. It also shows the proration unit, being the south half of Section 26, as well as our surface location for the proposed well.

Q. Is the acreage that you propose to dedicate to this well a standard unit in the Northwest Austin-Mississippian Gas Pool?

A. Yes, sir, it is.

Q. And all the acreage that is shaded in yellow that offsets this tract is in the unit and operated by Heyco?

A. That's correct.

Q. Is the ownership that is going to be dedicated to this particular well common?

A. Yes, it is.

Q. And it's just a standard spacing unit?

A. Yes, sir.

Q. Is it either federal or state acreage?

A. The acreage that's to be dedicated is federal acreage.

Q. Have you reviewed your proposal with the BLM and also with the State Land Office?

A. Yes, sir, we have.

Q. Would you refer to what has been marked as Exhibit Number 2 and identify that for the Examiner, please?

A. Okay, Exhibit Number 2 is a letter of June 16th, 1989, granting approval by the Commissioner of Public Lands for our Duncan Plan of Development.

Q. Are you currently in the second phase of this development plan?

A. Yes, sir, we are.

Q. And have you reviewed your plans for the directional and horizontal drilling of the proposed well with the New Mexico State Land Office?

A. Yes, sir, we have. As a matter of fact, we visited with them yesterday.

Q. I'd now like to hand you what's been marked Heyco Exhibit Number 3, and I would ask you to identify that.

A. Exhibit Number 3 is a BLM Approval and Sundry Notice, dated April 25th, 1990.

Q. And is this the BLM Approval for your

proposed horizontal drilling project?

A. Yes, it is, that's correct.

Q. Now, Mr. Bell, if you would refer to Exhibit Number 4, identify that and explain what this is to Mr. Catanach.

A. Exhibit Number 4 is a letter compiled by me, which outlines our proposal, the various steps in this project, and it was sent to all the working-interest owners within the Duncan Unit.

Q. Have you received any response from the owners in the unit?

A. Yes, we have. About 50 percent have responded favorably. We have not received any negative response from any of the owners.

Q. Because this well is -- and the acreage dedicated to the well are in the center of this unit, are there any offsetting owners to whom notice must be given in accordance with Oil Conservation Division Rules?

A. No, sir.

Q. Were Exhibits 1 through 4 either prepared by you or compiled under your direction and supervision?

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, I would move the admission of Heyco Exhibits 1 through 4.

EXAMINER CATANACH: Exhibits 1 through 4 will be admitted as evidence.

MR. CARR: That concludes my direct examination of Mr. Bell.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Bell, do you know what order approved the Duncan units, what order number approved the Duncan Unit?

A. What order number?

MR. CARR: Mr. Catanach, we'd be happy to provide that. I don't think we have that with us now.

Q. (By Examiner Catanach) That unit covers all formations? Are all formations unitized?

A. I'm not sure. That's something I'd have to check.

Q. Is the Mississippian unitized?

A. The Mississippian is definitely unitized.

EXAMINER CATANACH: That's all the questions I have. The witness may be excused.

MR. CARR: At this time we would call Mr. Brooks.

LARRY BROOKS,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. CARR:

Q. Would you state your full name for the record, please?

A. Larry Brooks.

Q. Mr. Brooks, where do you reside?

A. Roswell, New Mexico.

Q. By whom are you employed and in what capacity?

A. Harvey E. Yates Company as a geologist.

Q. Have you previously testified as a geologist before the Oil Conservation Division?

A. I have.

Q. And at that time were your qualifications as a geologist accepted and made a matter of record?

A. They were.

Q. Are you familiar with the Application filed in this case on behalf of Harvey E. Yates Company?

A. I am.

Q. And are you familiar with the subject area?

A. Yes.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: The witness is so qualified.

Q. (By Mr. Carr) Mr. Brooks, when you when you were previously qualified as an expert in geology, were you an employee and witness for the New Mexico Oil Conservation Division?

A. No.

Q. Did you previously work for the Oil Conservation Division?

A. Yes, I did.

Q. As a geologist?

A. Right.

Q. Could you basically describe for the Examiner the general characteristics of the Mississippian Formation in this area?

A. Okay. Exhibit Number 5 is a cross-section -- is a cross-section of datum subsea 9200. It shows the Upper Austin, Middle Austin and Lower Austin. The Upper Austin, the Duncan Unit Number 2 is the most updip well, and it is in the north half of Section 26.

The Austin-Upper Mississippian is divided into three members, of which the Upper and the Middle Austin are of reservoir quality, oolitic shoals and bioclastic carbonate accumulations which can be highly fractured and can locally increase hydrocarbon production.

This cross-section also shows our proposed

kickoff point of 13,090 feet.

Q. What interval do you propose to core in this project?

A. The Upper Austin interval, primarily, and possibly 20 feet or so of the Middle Austin.

Q. About how many feet of core do you plan to take?

A. Okay, we will obtain two 40-foot oriented cores for examination and identification of fractures and the azimuth of the fracture trend. We will also try to determine minimum and maximum stress axises.

Q. When these wells were originally drilled, were either the Morrow or Atoka zones capable of producing hydrocarbons?

A. No, they were not. In fact, we ran a DST on the Duncan Unit Number 2 through 12,710 to 12,990, and it was tight; 12,379 to -616, and 12,325-408. When they were acidized, they flooded formation water and gas that was too small to measure and were definitely non-economic.

Q. And that was in the Duncan Number 2?

A. That was in the Duncan Number 2, the most updip well.

Q. Could you identify what has been marked as Heyco Exhibit Number 6? And I think it might be easier

to review this for the Examiner if you would go to the larger copy that's on the wall.

A. Okay. Exhibit Number 6 is a structural map on the top of the Austin Mississippian zone, using seismic and well-control integration. There is numerous -- There's probably 23 lines that came up in the structure evaluation.

What it shows is a strong north-south normal fault and several cross-faulting through the center of the basin. The structural highs are the oolitic shoals, the structural lows due to some deformation but also indicate the lower, more basinal facies.

The pink outlines are the structural highs. These are bounded by normal faults. These are high-angle, greater than 60-degree normal. They cut through Middle Morrow up through Lower Wolf Camp.

The Duncan Unit is outlined in the square, and the proposed well is circled in red. They indicate maximum stress directions, and what we're trying to do is determine fracture directions and direct a horizontal drill perpendicular to that fracture trend.

Q. Mr. Brooks, were Exhibits 5 and 6 prepared by you?

A. They were.

MR. CARR: At this time, Mr. Catanach, we

would move the admission of Heyco Exhibits 5 and 6.

EXAMINER CATANACH: Exhibits 5 and 6 will be admitted as evidence.

Q. (By Mr. Carr) Mr. Brooks, will Heyco also be calling an engineering witness to discuss the actual procedures to be employed in drilling this well?

A. They will.

MR. CARR: That concludes my direct examination of Mr. Brooks.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Brooks, the Duncan Well Number 2 is producing from which portion of the --

A. The Duncan Unit Number 2 is a Bough C producer in the -- either -- you can call it Lower Wolf Camp or Upper Penn. It has cum'd 42,385 barrels to date and is not -- will not be interfered with by this project.

Q. So at this point there's no Mississippian production in this unit?

A. Well, the Austin-Mississippian was produced in the Number 3 Well, and it completed at 3.2 million a day. But subsequently it was shut in, and I'd rather refer to the engineering side of that for the reasoning, mechanical reasoning behind that.

Q. The targeted horizontal portion of the wellbore would fall into which member of the Austin?

A. Primarily the Upper Mississippian is the most productive. It has the higher energy environment and a higher porosity. The Middle Austin can be fractured, but most fractures, over all the wells in all the Austin-Mississippian zones, primarily occur in the upper hundred feet of the Upper Austin zone.

Q. And do you have evidence as to the fractured nature of the Upper Austin?

A. Yes, we do. We have several cores throughout the unit. We have several wells that have showed interference and drainage, in these two wells and also these two wells, plus we have cores as being a partner, and when we have slash cores which we've identified several fractures in the core. They're -- run horizontal across the length, and they are not drilling-induced fractures. They're mineralized, and so natural fractures.

They're probably of Cretaceous Age, as the Mississippian signature is partially destroyed by the Laramide Orogeny. So we've got some of that paleomag and actual core inspection of existing cores. But those cores were non-oriented, so you really don't have a handle on the direction.

Q. Mr. Brooks, the cores you were talking about are --

A. Superior 19 Well, Section 19 of 14-35, Barbee LL in Section 18, 14 South, 35 East.

Q. In your geologic opinion, do you think this particular formation is a good candidate for a horizontal --

A. Definitely.

EXAMINER CATANACH: -- wellbore? I have no further questions of the witness.

MR. CARR: At this time we'd call Mr. Nokes.

RAY F. NOKES,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. CARR:

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

A. Ray F. Nokes.

Q. Mr. Nokes, where do you reside?

A. Roswell, New Mexico.

Q. By whom are you employed and in what capacity?

A. I work for Harvey E. Yates Company as production manager and engineer.

Q. Have you previously testified before the New Mexico Oil Conservation Division?

A. Yes, sir, I have.

Q. And at that time were your credentials as an engineer accepted and made a matter of record?

A. Yes, sir, they were.

Q. Are you familiar with the Application in this case?

A. Yes, sir, I am.

Q. Are you familiar with the subject area?

A. Yes, sir, I am.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: Yes, they are.

Q. (By Mr. Carr) Mr. Nokes, is the northwest Austin-Mississippian Gas Pool governed by statewide rules?

A. Yes, sir, it is.

Q. Are there any particular exceptions to the statewide rules that Heyco needs if it is to implement its proposed horizontal drilling project?

A. For the horizontal extension, Phase 3 of this operation, we would request exemption from the 330 in-boundary limitation.

Q. But the -- Other than just an exemption from

that 330-foot setback from the interior boundaries, you will need no other changes in the --

A. Not that I'm aware of, no, sir.

Q. It will be a standard setback from the outer boundary of the 320 acres dedicated to this well?

A. Yes, sir.

Q. Would you identify for Mr. Catanach and review what has been marked as Heyco Exhibit Number 7?

A. Heyco Exhibit Number 7 is a one-to-one-thousand blowup of Section 26 of Township 13 South, Range 35 East, Lea County, New Mexico, representing the south half of the section showing the Well Number 3, Duncan Unit Number 3.

The 200-foot radius is a radius that was incorporated on this plat to represent an aerial view of the cumulative inclination which was incurred during the original drilling. It's not to indicate that that is the direction or that it did go 200 feet, but that cumulative that would be 200 foot.

The 1000-foot radius indication on there is the 1000-foot radius displacement from vertical wellbore that is proposed by Heyco when they proceed with the horizontal, if the Phase 2 operation is successful.

Q. Now, Mr. Nokes, the circle with the 1000-foot

radius extends to the southern border of the dedicated proration unit or spacing unit; is that correct?

A. Yes, sir.

Q. By doing that, you're not suggesting that you intend to horizontally drill to a point that would be closer to the outer boundary of that unit than a standard setback?

A. No, sir, our preliminary objective is to drill in the direction of Quadrant 1, be in a north to northeast direction, which would put you away from the boundary lines.

Q. Are there currently any Austin-Mississippian wells in the south half of Section 26?

A. No, sir, that's the only well.

Q. Would you now go to Exhibit Number 8 and just identify that for the Examiner?

A. Exhibit Number 8 was the federal Form 9-330 that was submitted when the well was originally completed as a wildcat and as an open-hole completion for the Austin-Mississippian, which was -- after being submitted, was given fill for the Austin-Mississippian fill.

Q. And this shows the location of the well and the open-hole completion?

A. Yes, sir, it does. It gives the surface

location, the open-hole completed interval, and also the physical name of the well.

I would like to make note that on Number 4 of that, it was corrected. It indicated that it was 1980 from the south, which was a typographical error which was corrected to 660 from the south.

Q. Mr. Nokes, now would you just identify what has been marked as Heyco Exhibit Number 9?

A. Exhibit Number 9 is a well, C-102 state form, Well Location and Acreage Dedication Plat, showing the official survey of Mr. John West when this well was originally surveyed and showing the acreage dedication of 320 acres for the south half of Section 26 of Township 13 South, Range 35 East, and the footages thereof of the well location and the New Mexico Lease Number 1668- -- or 16648.

Q. Mr. Nokes, I think at this time, if you could review for Mr. Catanach the procedures that Heyco intends to utilize in drilling this well, and in this regard I direct your attention to what has been marked as Heyco Exhibit Number 10.

A. Yes, sir. Exhibit Number 10 -- And if I might, I would like to combine Exhibit Number -- or talk about Exhibit 10 and 11 at the same time so that you all will be able to see some of the problems we

have involved.

On the left-hand side of the Exhibit 10, which is a procedural recommendation that we've sent out to partners and gave copies to the state for their observation and input, it has an indication of Phase 1, Phase 2 and Phase 3.

This is not the same phases that were mentioned earlier as far as in the state requirements. This is phases within the operation of the physical work in the field.

Phase 1 will be to correct a mechanical problem in the hole. On Exhibit 11, the wellbore schematic, if you will notice, down -- about three-fourths of the way down the page, it shows a Howco EZ-Drill cement retainer and also a retrieving neck on a Lok-Set, 5-1/2 Lok-Set bridge plug.

When the well was originally tested for the Bough, as a plug-back and test procedure, the cement was not sufficient to retain the weight of the retainer, and as a result of it the retainer was not drilled up and was only partially drilled up.

It spun through the cement that was very soft and wound up being on top of the Lok-Set packer that's down below, down at 13,000.

Our first operation in Phase 1 is to go in

and retrieve, if possible, that portion of the cement retainer, get it out of the hole, and retrieve the Lok-Set bridge plug.

At that time, if we are successful, we will run production equipment in the hole so that we can do a couple of things: One, put the well back on production and have -- test the well.

This is a joint venture with Sandia Labs, and they are requesting current testing information and pressure data for comparison to the information that we'll receive, hopefully, in Phase 2.

But Phase 1, if we are unsuccessful in removing this, we will possibly at that point in time, instead of kicking off at our proposed 13,090 feet, which is below our obstruction right here, if we cannot remove that obstruction we'll have to kick off above that obstruction, above 13,000 feet where this is located.

In Phase 1, at the end of Phase 1, we will hopefully, if we are able to get this out of the hole, we will be putting the well on production, testing its production rates, buildups, and then as a precursor to Phase 2, we will also run a survey of the hole down through tubing with a company out of Midland, SDI.

They have a finder tool which will give us

the orientation of the hole as far as vertical displacement and drift from the original surface hole, true vertical to measured depth.

And that way we can find out which way the original hole was deviated when it was drilled, due to the drilling conditions.

At that point in time, we will have a base to give us a comparison to know where the original hole was so that when we go to do Phase 2, which is our side track with our whipstock, we will be able to know how far away from our original hole we are and be able to determine interference from magnetics.

Phase 2 will incorporate the use of a whipstock, milling a window. Hopefully if we're successful in Phase 1, at 13,090 foot for a kickoff, we will cut a window and subsequently do a sidetrack with a downhole motor-and-diamond bit combination to our core point, which will be mentioned on Exhibit 12.

Q. Do you want to go to Exhibit 12 now and reference that?

A. Yes, sir, if I could. Exhibit 12 is an expanded view of the direction that the hole we project will be as far as displacement from the vertical hole.

We will be utilizing a bottom-trip whipstock that has been modified so that it can be retrieved. It

will be placed at 13,090 feet, and with a 1-1/2 degree faceplate sustaining that 1-1/2 degree disk projection that you see on Exhibit 12 would give you the distance from the original vertical hole.

At this point in time we do not know what high-side, low-side is, and these calculations would be corrected at that point in time. But based on a true vertical hole, this is the deviation or displacement from the original wellbore that we would anticipate.

At the kickoff to our core point, we're looking at 13,090 feet for kickoff, and we will start coring at approximately 13,443. That is projected to be the top of our carbonate interval. And at that point in time we will survey the hole.

If we are unsuccessful with the survey tools that we are proposing to use at this time, the electronic survey tool that we will be using in the side track can be utilized to survey the hole.

But we've come up with a little bit better by what we feel in talking with survey companies, to run an electronic multi-shot in combination with a gyro on top of it to help and evaluate the correction factors and know exactly what our magnetic interference is.

But that will be utilized to survey the side track down to core point so we'll know where we are at

that point in time.

Once we determine that, then we will pick up a core barrel, an orientation sub, SDI's electronic multi-shot tool, which will be inside of the Monel collar, and we will proceed on to core two 40-foot cores in the carbonate.

Our porosity interval that we suspect but we are not positive about, as far as our producing interval, is approximately -- The top of it is 13,454, and approximately 12 feet thick.

We will core through that with the first core, and then with the second core, we will core on below that, which will give us a distance far enough away from casing that we should not have any magnetic interference, which will help us in verifying our orientation up in our sidetrack, which was offsetting our casing.

Once we have successfully cored these -- and it will be an orientative core -- we will be in a 3-1/2-inch barrel with a 2-inch core. And once we are successful with this, the cores will be utilized by Sandia Lab to give us the information that was previously mentioned by Larry Brooks.

We are trying to determine orientation of fractures. They will do some permeability studies.

They will also do some additional work that they would like to do that will help us in possible recovery factors.

But at that point in time it will probably, or most logically, be put into their hands as far as the evaluation of the cores.

We will wait on their decision, their information, they have told us, a minimum of two months just to get some preliminary information.

But based on the information in Phase 2, the core, the success of the orientation, will depend on what we do in Phase 3, or if we do Phase 3, the horizontal.

Q. And also the direction of the horizontal hole --

A. Yes, sir.

Q. -- will be based on that, will it not?

A. That is correct. If we are lucky enough. We are assuming some things in Phase 2, as far as positioning our whipstock for the side track. We are trying to pre-position for Phase 3, hoping that we can save some money.

If not, that was the intention of the retrieval whipstock, so that we can pull it out of the hole and re-position the whipstock so that we can put

it in the direction that would intersect our fractures.

But if we are successful in utilizing -- or if we are successful in pre-determining that direction, if we're lucky enough, then we can save some money and also expedite the horizontal.

The side track would be cemented and then feathered with a bent housing. Sperry-Son out Oklahoma has been contracted to do this. We will do a 364-foot radius, and that would be the Exhibit 14, if I may.

Exhibit 14 shows a preliminary evaluation of the intermediate or medium-radius curve, and the extension of the lateral out to a distance of 1000-foot displacement from vertical.

The curve indicates a 562-foot radius -- or curve length over a 364-foot radius. The total length of the drilling from start to finish of this 1000-foot lateral will be 1208 feet total.

But this is to give you all some indication of what we project to be our horizontal if we're successful in Phase 2.

Q. Mr. Nokes, would you identify what has been marked as Heyco Exhibit Number 13?

A. The Exhibit 13 was the -- or is -- It's a combination -- and I believe your all's are stapled together.

The second page of Exhibit 13 is the tabular data from the inclination survey that the drilling company supplied us, Hondo Drilling Company, dated February the 28th of 1984. It was utilized to plot a cumulative deviation from the original drilling of the well to give the maximum distance from the surface location or where the hole -- or the downhole position might be.

Once we have surveyed the hole, we will know better where this downhole position will be, but that will be at the end of Phase 1 of the operation and would be submitted to the Commission.

Q. Mr. Nokes, in your opinion, if this Application is granted will Heyco be able to effectively and efficiently produce the reserves under the 320-acre tract dedicated to this well?

A. Yes, sir, we are -- We are very optimistic. We've been looking at this for approximately 18 months with Sandia.

They are extremely excited about it, and we are too, that we might be able to extend the limitations of our drawdown from just a well -- near wellbore drawdown to a six-hundred-and -- approximately six-hundred-and-thirty-something-foot lateral lens.

The lateral will not be cased at this point

in time. We have looked at it, but we do not at this point in time feel the need to case the lateral that is at a 90-degree plane. But the sidetrack itself, from the casing kickoff down to the bottom of the curve, will be lined and cemented back, tied into the casing.

Q. In your opinion, will granting this Application be in the best interests of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, sir, we feel that it is.

Q. Mr. Nokes, are there any time considerations that Heyco is facing in getting this project going?

A. Yes, sir. This is a operation that we have already been given an extension from the April 1 deadline. We were given a 90-day extension by the State Land Office to have Phase 2 completed by June the 30th.

Q. And therefore you're requesting that the Order be expedited?

A. Please, yes, sir.

Q. Were Exhibits 7 through 14 prepared by you?

A. Yes, sir, they were.

MR. CARR: At this time, Mr. Catanach, we move the admission of Heyco Exhibits 7 through 14.

EXAMINER CATANACH: Exhibits 7 through 14

will be admitted as evidence.

Q. (By Mr. Carr) Do you have anything further to add to our testimony, Mr. Nokes?

A. No, sir, I don't.

MR. CARR: That concludes my examination of Mr. Nokes.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Nokes, just briefly I want to go over -- see if I'm correct in understanding the procedure here. You've got the cement retainer you're going to try and retrieve from the hole?

A. Yes, sir.

Q. If that's successful, you're going to drill out or retrieve the bridge plug and kick off at 13,090 feet?

A. Yes, sir.

Q. That will be in a north or northeast direction; is that right?

A. Yes, sir. We are going to run the survey at the end of Phase 1, which will help us to know better what our high-side, low-side.

If I remember correctly, across this interval of 13,090 we have about a one-degree Totco, and we're not sure what our high-side/low-side will be as far as

placement of the whipstock.

We're hoping that that will give us the benefit of utilizing high-side/low-side relationship for Quadrant 1, so that due to the information that Mr. Brooks indicated in his testimony that we can project the whipstock in a north to northeasternly direction, so that when we do our side track we will be in that -- already pre-positioned, hopefully, for Phase 3.

There's not really a reason for doing what we're doing in Phase 2, other than try to second-guess Phase 3, because our intentions are to do the horizontal. But as I mentioned, we will not know whether it will be beneficial until we have successfully done Phase 2.

If we are lucky in determining that our fracture orientation is in a north-to-south, a northeast-to-southwest plane, then we can better determine whether our existing whipstock that we use in Phase 2 will be adequately positioned to use for Phase 3.

Q. Now, I guess I don't understand. In Phase 2 you're going to -- Wasn't that the phase that you were going to do the coring?

A. Yes, sir.

Q. And you actually have to -- how are you going

to -- you're going to do the -- You're going to drill the curve, aren't you?

A. No, sir, I'm sorry. If I can refer back to Exhibit Number 12, this Exhibit Number 12 is strictly the side track.

Now, granted -- I apologize, I didn't run a normal -- This is an expanded view, basically for our field people's benefit, but it was to give them a displacement from a wellbore.

The Phase 2 is strictly sidetrack. It is a sidetrack in combination with oriented core. The curved part of it will not come into play until Phase 3, the horizontal.

Phase 2 will be the placement of a whipstock, the drilling and maintaining of 1-1/2 degree off of the faceplate to achieve a target zone that will hopefully be approximately 9 to 10 foot away from our casing at that point.

It will be a straight -- basically a straight drilling. There will not be a curve involved. It will be maintaining the 1-1/2-degree faceplate kickoff, and that will allow us to have a straight hole so that we can get our tools in the hole to core.

Once we have cored the well, we will deepen it. I apologize, I didn't go on into that. But we

will deepen it so that we can log it. We will run electric logs, slimhole tools, CBIL log, and try to determine also from our electric logs frac information, fracture, natural fracture information, from the CBIL log.

But it will be -- And the reason for this is that we originally, a year or so ago, were looking at using the original hole. But due to the fact that it has been stimulated, what natural fractures might be there, being that it is a carbonate and was acidized, are probably destroyed at this point in time.

We are trying to achieve enough distance away from this original hole so that we can get some virgin matrix in this Mississippian, so that our cores will be representative of what we would like to see in the virgin formation.

But the second phase, Phase 2 is strictly a side track maintaining a 1-1/2 degree off the kickoff for approximately 300 feet, 360-some feet.

Q. Well, what you're saying is that if you've accurately guessed which direction these fractures are in, then you can just go from there --

A. Yes, sir.

Q. -- into your --

A. Hopefully, if -- If we are lucky -- And

there's a lot of guessing right now, because we don't know.

But due to the interference we've seen in a couple of wells or two groups of wells, we feel that we can do a direction within the Quadrant 1 and position that so that hopefully we can be possibly set up to run Phase 3 out of the same window.

Now, if our core data and orientation information that comes back says that we're -- we were in the wrong direction or that we've got to go in a different direction, then we will, you know, address that.

But at this point in time we do not feel that there would be any reason -- and this is from in-house evaluation -- that we would be drilling in any direction as far as Quadrant 2 or 3.

We would be going to the north, northeast, possibly east, but staying away from lease lines and giving us the benefit of our distance for our horizontals.

But Phase 3 is the point at which we will cement that up that you're looking at, cement it back up, if we're lucky enough to use the same kickoff, and then feather that with a bent-housing and diamond-motor bit combination and proceed on to do our medium-

radius lateral.

Q. The actual lateral portion of the wellbore is about 700 feet long?

A. The lateral would be approximately 636 foot if we, you know, try to nail it on the nose.

At this point in time, we're looking from the standpoint of economics.

We've got a number of preliminary recommendations or bids in, but now that we have given them a little bit more information they're at this point in time giving us some hard, cold numbers of what they think will be able to do it, because our original drilling was set up to be conventional, not with a motor-and-diamond bit combination.

So with that in mind, they have re-evaluated it and are looking at being able to use a diamond -- a special diamond bit that has been manufactured for us for the type of formation we're drilling in. We've got a shale-and-limestone combination.

But if we are successful, and all rights -- Their information indicates that it has and has some test wells -- we will be able to utilize this assembly and save us a considerable amount of money and time.

Q. Okay, the well is going to be initially surveyed to see exactly where you're at, at this point?

A. Yes, sir.

Q. And what other survey at -- when -- Or is it a continuous survey that's run?

A. The survey that we're looking at right now will be originally in Phase 1, the original survey. And the reason, on Step 10 of Phase 1 on Exhibit 10, this will be run through tubing.

The companies and myself are not comfortable with running a survey of the open-hole segment, so what I'm going to do is run a tailpipe in there, down through, nearly to the bottom of the open hole, and run their survey tool internally through the tubing so that we can not have a danger of hanging up or losing the tool in the hole.

We're hoping that this way we can survey the original hole even down to where the open-hole segment was that would be offsetting, hopefully, our side-track interval to give us some indication of the relationship of old hole to new hole.

But it will be surveyed down through tubing for protection also. That's the main consideration.

That will be the first survey that we run.

The second survey that we are proposing will be run off of an orientation sub above the motor assembly that SDI has.

We can run in -- It's like their steering tool, if you're familiar with that. They'll run in with an orientation for their steering tool, and it will give us basically information, and that will help us to determine strictly inclination at that point in time, in the side track.

Once the inclination has been determined and we feel that we are maintaining this 1-1/2 degree away in our side track, then we will pull that out of the hole.

Once the side track has been completed down to the top of the core, or the core point, that hole will be surveyed with a -- Their terminology or their tool trade name is Champ tool, which is an electronic multi-shot, piggybacked with a gyro on top of it. And that will be surveyed to measure the hole direction on the side track.

Then that will be pulled out of the hole, and then we will go and core the well with an orientation Monel collar, an orientation tool, Champ tool, riding on top of the core barrel, and it will be surveyed as we drill, if we're lucky enough that it does not malfunction.

We should be able to determine the direction of that core and the orientation of the core.

When we get to the point where we do Phase 3, that will be with a downhole steering tool, and it will be measurement while drilling, and we should be able to measure the hole from the time -- Once we get to the end of it, we should be able to measure and determine orientation of the lateral hole all the way back, tying into our previous survey.

Q. Okay. And you do -- Do you propose that the well will not cross over any -- will not encroach on the outer boundary of a -- or the legal limits of the well?

A. No, sir, at this time we do not feel that it would. We're looking at a north to -- to -- in a north or northeasternly direction, as far as the direction that we anticipate.

If for any reason there is other information that would lead us to believe that it would need to be different, we would approach the Commission at that time. But at this point in time, Sandia and ourselves agree that there is no need to go in a south or west direction, as such.

EXAMINER CATANACH: Okay, that's all the questions I have of the witness.

FURTHER EXAMINATION

BY MR. CARR:

Q. Mr. Nokes, will the survey information be provided to the Division?

A. Yes, sir. Once it is -- Once we are completed with Phase 2, that information will be submitted to the Commission. And if we proceed on with Phase 3 of the curve and lateral, once that is completed the Commission will be supplied by the survey company with that information for hole position.

MR. CARR: That's all I have.

MR. STOVALL: A couple of questions, Mr. Examiner.

EXAMINATION

BY MR. STOVALL:

Q. Just to make sure that I understand, as a non-engineer, if I took a line on Exhibit 12 and transferred it to Exhibit 14, what I'd end up with is a virtually vertical line that comes down about halfway between zero and the first hash mark on the horizontal scale?

A. Yes, sir.

Q. Okay. You stated that as far as a time -- as far as your timetable, that you had to get an extension from the State Land Office and that they're requiring

Phase 3 to be done by --

A. Phase 2.

Q. Phase 2, by what date?

A. June the 30th.

Q. Why are they putting this timetable on you? Do you -- I mean, what is their --

A. They gave us a 90-day extension --

Q. I mean what --

A. -- for a completion of Phase 2, and I do not feel that I'm qualified to give that. If you would like to ask, I believe --

Q. Well, I see Mr. Brooks back there --

A. -- Mr. Brooks was the one --

Q. -- waving his hand. We'll wait a minute until I'm finished with you, and then --

A. Right. That is the deadline that I have been given that I have to operate under.

Q. Okay. Now, as far as assuming that you -- Phase 3 is the actual deviation and horizontal hole --

A. Yes, sir.

Q. -- is that correct?

Are you at the point competent enough that we can write the authority in the Order to go in a northeast direction a distance of whatever, or should we incorporate into the Order some provisions for

approval of your direction and horizontal hole at the time you actually have completed Phase 2 and know where you're going to be?

A. Preliminary evaluations obviously indicate, in-house as well as multiple meetings with Sandia, that we'll either be projecting in a northernly direction or an easternly direction.

In that regard, we anticipate that we can intersect perpendicular to the fracture plane.

The fractures that we have seen in other cores, the Barbee LL and the Superior 19, the interference that we have seen with the Barbee LL and Austin 18 Well, the interference that we have seen also in another Austin-Mississippian in the Richardson Unit 1, Richardson Fee 1, are in a north-to-south relationship or a northwest-to-southeast relationship, maybe a 20-degree azimuth.

We are looking at communication between wells that we feel they're in a northernly intersect. Whether it is secondary fractures linking or primary fractures, we're not sure.

But we feel that we should be able to go in either an easternly -- easternly direction or a northernly direction, whichever the case may be, and intersect these without any problem. That's why we are

predominantly looking at Quadrant 1. And Sandia has agreed.

There again, I cannot absolutely guarantee that that is the quadrant that would be best to intersect. But within the limitations of the Commission, if we have that ability to utilize anything within Quadrant 1, the direction of Quadrant 1, then we can, I would feel, if there's not a problem, have the Order written to approve it that way.

If it requires any other problems, I would believe we could come back to the Commission and get -- you know, show evidence to show what we're needing to do and ask for you all's recommendation.

Q. Well, I'm anticipating -- Of course, page 2 is your deadline time. By Quadrant 1, first let me make sure we're talking -- You're talking zero to 90 degrees?

A. Yes, sir.

Q. Is that that quadrant?

A. Yes, sir.

Q. And perhaps even, Mr. Carr, you could answer this. Should the Order incorporate a provision that if we elect -- if we approve it and say, all right, you can drill into Quadrant 1 a distance of not more than so many feet or whatever -- whatever the Examiner

decides to recommend -- but should it incorporate a provision which would allow you to come back, and unless it becomes unorthodox, unless any portion of the whole becomes unorthodox, allow for administrative approval to change the orientation of the horizontal hole? Would that be --

MR. CARR: Mr. Stovall, I think that -- and having talked to Heyco, my concern would be that we have a full approval.

We would, in that context, if changes are needed, certainly prefer to do it administratively, without having to go through the whole process of the hearing.

And to the extent we could incorporate that into the Order, I think that would be desirable.

MR. STOVALL: Well, yeah. My whole line of questioning is based upon the fact that, normally, you know, the -- horizontal is still fairly experimental in our field, and what we've usually done is, on any deviated, is identify a target. And this is a pretty big target, and really is a --

MR. CARR: We know that, and we --

MR. STOVALL: -- a directional target, rather than an end-point target. So we want it to be fairly accurate. I think that might be the way to do it.

I don't think I have any further questions.

EXAMINER CATANACH: We've seen this just recently, Mr. Carr, where an operator was doing the same type of thing, and they missed the guess on the fracture direction and had to drill in a different direction than they anticipated in, so we had to bring it back in for hearing.

MR. CARR: And we would prefer to avoid that, if it can be done within the context of this Order.

Although we feel, from what I understand, quite confident that we will be going north and east and wouldn't have to do that, we certainly, if we're wrong, and decide to go forward with the project, we'd prefer to have subsequent contact with the Division in an administrative context rather than the hearing process.

MR. STOVALL: I think, perhaps -- I mean, my inclination is that if you were to go outside -- If you were going to go unorthodox towards the outer boundaries of the proration unit, we'd probably have to come back, but possibly we can write something, and that's my re- -- I'm not the Examiner and Director, so I can't tell you what we'll do, but I would think as long as you -- If we don't change the unorthodoxness of the Order --

MR. CARR: I can assure you that, as the operator of all offsetting tracts, we will give you a waiver --

(Off the record)

MR. STOVALL: Are these all unitized?

MR. CARR: Yes, sir.

MR. STOVALL: The whole -- The whole project there is unitized?

MR. CARR: It's unitized, and Heyco is the operator of all offsetting property.

MR. STOVALL: Is it a common participating area so there's no problem with allocation of costs?

MR. CARR: I don't know that.

MR. BELL: That's correct.

MR. STOVALL: Let the record reflect that Mr. Bell stated that that was correct.

FURTHER EXAMINATION

BY EXAMINER CATANACH:

Q. Just a couple more questions, Mr. Nokes.

A. Yes.

Q. The well -- This particular well was drilled in 1983, and did it produce for a few years?

A. Yes, sir.

Q. And what was Heyco attempting to do when they went in there with the cement retainer and --

A. To answer your first question, the cumulative production from the Austin-Mississippian for this well, the Duncan Unit Number 3, as of July of 1988, was 96,113 MCF, with a total of 549 barrels of condensate.

The purpose -- The purpose of the retainer was to supply a cement sheet around casing, thereby allowing us to test the Bough Interval.

If I may direct you back to the wellbore schematic, Figure 11, there is an X on the right-hand side of that wellbore, which the colored part of it indicates cement.

Those perforations were added after cement had been -- a secondary cement job. Those perforations will be squeezed to eliminate any problems with the Bough Interval.

But it was not productive. It had been exposed to an open annulus for many years until we went to cement.

The first cement job that was attempted was not successful, and as a result of that, the partial retainer that was left after trying to drill it out went to bottom.

We subsequently went back and cemented it again and were successful in cementing it and testing it, knowing that we had this problem down below and

that we would have to address it later on. But it was due to a bad cement problem.

We do not understand why it occurred. But after cementing, which pressured up, they came back and drilled it out the next day, or a couple of days later. They got partially out from underneath the retainer and the cement disappeared. And therefore that partial retainer went to bottom.

So we have gone to the extent of measuring what we feel, and what the driller feel at the time, what is left and have designed a retrieving tool to hopefully go down and swallow it and pull it out.

MR. STOVALL: I have one more question, Mr. Examiner, again largely for my edification.

FURTHER EXAMINATION

BY MR. STOVALL:

Q. Looking at Exhibit 13, that's showing your cumulative deviation. If I'm not --

A. Yes, sir.

Q. If I'm not -- If I understand you correctly, each of these deviation measurements is not necessarily in the same direction; is that correct?

A. That is right. This is a cumulative to show you worst case.

Q. If they all went the same way, this is where

the bottom would be, okay.

A. That's right. And also the District 1 Office has been given a copy of this for their benefit. They will receive an updated copy that's in color.

But Jerry Sexton, I have worked with him on this to get a little better insight of what the new regulations are on horizontal, and this information was supplied.

Q. I'm going to ask you just another question again, interest question. Is Los Alamos at all involved in this project, do you know?

A. No, sir, it's out of the Albuquerque division.

Q. Strictly Sandia?

A. Yes, sir. Now, there may be some other departments, but the paleo work, I do know on this preliminary stuff went to Alaska and was evaluated by some people in Alaska. Larry could probably better tell you who that was.

Q. I was just curious because I know Los Alamos has also been involved in a lot of experimental stuff and Los Alamos and Sandia are jointly involved in some of this --

A. Right.

MR. STOVALL: I just have a -- I guess -- my

question -- Is Mr. Brooks the appropriate one to answer my other question, if we're through with Mr. Nokes? Are we through with him?

EXAMINER CATANACH: Uh-huh.

MR. STOVALL: Are you through with him?

MR. CARR: I'm through with him, at least in terms of my direct examination.

LARRY BROOKS (Recalled),

the witness herein, having been previously duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. STOVALL:

Q. Mr. Brooks, my -- My question was, and -- and -- My understanding is that you've submitted this project as part of a unit plan of development for the year to the State Land Office?

A. Right.

Q. It's a state unit, correct?

A. State Unit, and it was submitted as a two-year plan of development.

Q. Okay. What -- Do you know why they put a time limit on you --

A. Well --

Q. -- for doing this?

A. -- since there is research involved as well

as doing diligent work to the unit, development of the unit, it was decided that they would approve it phase by phase. That was their contingency.

I isolated it out into phases, phase by phase.

Really the plan of development is under six phases, and the phases kind of get mixed up with Phase 1, 2 and 3 of this development.

But Phase 2 of the plan of development is simply coring the well and getting the core. That's Phase 2. And then the rest of it is researching the core. They're going to do stuff to the extent of wetabilities, fluid compatibilities.

There is other things in the formation, like the pore throats are a strange breed, that they're bottlenecked, they're small, drilling fluids invade and kill the formation. If you acidize them, you raise fines.

So we're going to have all these studies done, and it had to be set up over a time frame. And then all of a sudden to develop non-formation damage in stimulation fluid to stimulate this.

So I put it over the time periods, and when Sandia was trying to get their personnel budgeted around a time frame, they ran into some conflicts.

And also tool-manufacturing of the retrieval whipstocks pretty much put it back 90 days.

So I had to go simply to the -- to the Land Office and ask for a 90-day extension in writing, in which they approved the extension before I asked for the approval. So then I had to write back for the approval, and I got that.

So -- I mean, that's --

Q. Is that --

A. It's something that can't -- that's flexible as far as the extension, but up -- I've already had one 90-day extension.

Q. Is there -- Now, a plan of development is submitted, is it not, to show the lessor that this unitized area is being developed in a diligent --

A. Right.

Q. -- and prudent manner. Is there other development going on in the unit besides this or --

A. No, no.

Q. -- is this -- Is this the main development --

A. This is the main --

Q. -- in the unit that we're talking about?

A. -- body of development within the unit.

Q. Okay. Do you intend to -- Do you have thoughts that if this is successful, you may do --

attempt some additional wells --

A. Sure.

Q. -- in the area with this?

A. Of course, that's the main -- That's the buffer of the whole thing.

If this is successful, your economic standpoints change.

MR. STOVALL: I have nothing further to add or ask or anything else.

EXAMINER CATANACH: I have no further questions.

MR. CARR: I have nothing further in this case.

(Off the record)

EXAMINER CATANACH: There being nothing further in this case, Case 99- --

(Off the record)

MR. CARR: May it please the Examiner, we will have an expedited rough draft to you on Monday.

EXAMINER CATANACH: That will be fine.

MR. STOVALL: Even later than that, if you want a little more time, I think, as -- Your timetable more than ours.

EXAMINER CATANACH: Case 9935 will therefore be taken under advisement.

(Thereupon, these proceedings were concluded at 3:55 p.m.)

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL May 24, 1990.

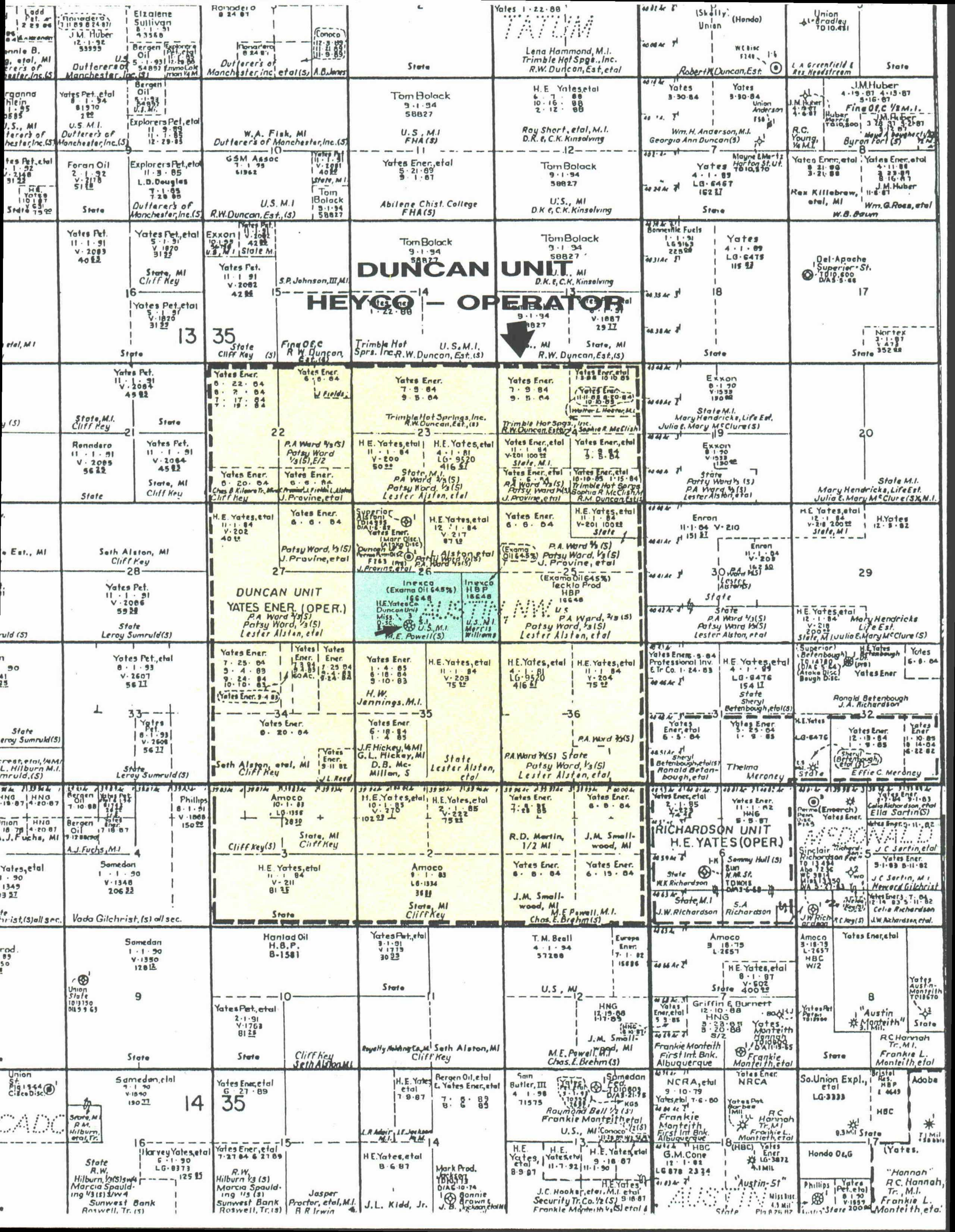
STEVEN T. BRENNER
CSR No. 106

My commission expires: October 14, 1990

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9435, heard by me on May 3 1990.

David R. Catanach, Examiner
Oil Conservation Division

Exhibits 1 through 14


DUNCAN UNIT
HEYCO — OPERATOR
DUNCAN UNIT
YATES ENER. (OPER.)
RICHARDSON UNIT
H.E. YATES (OPER.)

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
HEYCO EXHIBIT NO. 1
CASE NO. 9935

State of New Mexico

Commissioner of Public Lands

W.R. HUMPHRIES
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

June 16, 1989

Harvey E. Yates Company
P.O. Box 1933
Roswell, New Mexico 88202-1933

ATTN: Larry Brooks

RE: 1989 Plan of Development
Duncan Unit
Lea County, New Mexico

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
HEYCO EXHIBIT NO. 2
CASE NO. 9935

Gentlemen:

We received your initial Plan of Development and the additional information provided in your letter of June 12, 1989 for the Duncan Unit. The Commissioner of Public Lands has this date approved the above captioned 1989 Plan of Development (Phase 1) with the following contingencies:

1. All reports and correspondence between HEYCO and Sandia National Laboratory be submitted to the Commissioner of Public Lands.

2. Quarterly progress reports will be submitted to the Commissioner of Public Lands.

3. Approval of Phases 2 through 6 will be subject to the results of Phase 1.

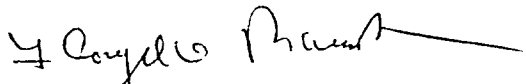
4. Production in paying quantities shall commence on or before December 31, 1991. If there is no production in paying quantities at this time, the Duncan Unit will expire under its own terms on January 1, 1992.

Our approval is subject to like approval by all other appropriate agencies.

Enclosed is an approved copy for your files. If we may be of further help, please do not hesitate to contact us.

Very truly yours,

W.R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: 

FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5749

cc: OCD - Santa Fe, New Mexico
BLM
Unit Correspondence File

WRH/FOP/SMH

Form 3160-5
(November 1983)
(Formerly 9-331)

APR 27 1990

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO: NM 16648

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1. OIL WELL [ ] GAS WELL [X] OTHER

7. UNIT AGREEMENT NAME: Duncan Unit

2. NAME OF OPERATOR: Harvey E. Yates Company

8. FARM OR LEASE NAME:

3. ADDRESS OF OPERATOR: P.O. Box 1933, Roswell, New Mexico 88202

9. WELL NO.: #3

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: Unit Ltr. N, 660' FSL & 1980' FWL

10. FIELD AND POOL, OR WILDCAT: Austin Mississippian NW

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 26, T13S, R35E

14. PERMIT NO.	15. ELEVATIONS (Show whether DF, RT, GR, etc.)	12. COUNTY OR PARISH	13. STATE
30-025-28535	4020.8' GL (18' KB)	Lea	NM

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF [ ]	PULL OR ALTER CASING [ ]	WATER SHUT-OFF [ ]	REPAIRING WELL [ ]
FRACTURE TREAT [ ]	MULTIPLE COMPLETE [ ]	FRACTURE TREATMENT [ ]	ALTERING CASING [ ]
SHOOT OR ACIDIZE [ ]	ABANDON* [ ]	SHOOTING OR ACIDIZING [ ]	ABANDONMENT* [ ]
REPAIR WELL [ ]	CHANGE PLANS [ ]	(Other) [ ]	
(Other) 1. Side track 2. Horizontal Hearing		(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)	

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

HEYCO proposed to sidetrack at a depth of 13,090' w/an oriented whipstock & drill to a depth of approximately 13,434', and core up to 80' in the Mississippian Lime to a depth of 13,514'. Evaluate the core data & if favorable cmt sidetrack & drill horizontal to a maximum length of 1000' or less (staying inside the proration unit boundries). HEYCO is in the process of making application for hearing & will present data at hearing on the May 2, 1990 Docket before the OCD in Santa Fe.

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
HEYCO EXHIBIT NO. 3
CASE NO. 9935

RECEIVED
APR 11 11 00 AM '90
CARLSBAD, NEW MEXICO
AREA MANAGERS

18. I hereby certify that the foregoing is true and correct

SIGNED Ray L. Doss TITLE Production Manager/Engineer skh DATE 4-9-90

(This space for Federal or State office use)

APPROVED BY Adam Salamon for PETROLEUM ENGINEER TITLE _____ DATE 4/25/90

CONDITIONS OF APPROVAL, IF ANY:

Subject to Like Approval by State

*See Instructions on Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

HEYCO

PETROLEUM PRODUCERS

HARVEY E. YATES COMPANY

P.O. BOX 1933 ONE SUNWEST CENTRE 505/623-6601
FAX 505/622-4221
ROSWELL, NEW MEXICO 88202-1933

March 28, 1990

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
HEYCO EXHIBIT NO. 4
CASE NO. 9935

DUNCAN UNIT WORKING INTEREST OWNERS
(See attached mailing list)

Re: 1990-1991 Duncan Unit Project
Lea County, New Mexico

Gentlemen:

Harvey E. Yates Company (HEYCO) has been involved in an eighteen month study to evaluate the reserve potential of the Austin-Mississippian formation under the Duncan Unit, Lea County, New Mexico. The Duncan Unit encompasses 7,679.24 acres which are being held by production from the Duncan Unit #2 well. We are being required by the Commissioner of Public Lands, in compliance with the Unit Plan of Development, to conduct a multiphase enhanced recovery project. Failure to complete this project will result in the contraction of this twelve-section unit to the producing proration unit (40 acres) of the Duncan Unit #2 well.

The project will involve the workover of the Duncan Unit #3 well, which is temporarily abandoned. It will be designed to fully evaluate the economic potential of the Austin-Mississippian formation. We will apply advanced technology from the Department of Energy Multiwell Experiment (MWX) for low permeability gas zones. Sandia National Laboratories, the principle participant in MWX, will be collaborating with HEYCO. Application of specialized Sandia technology and experience in low permeability gas reservoirs may result in greater recoverability of natural gas on a per well basis. This would result in economically drillable Mississippian prospects under current gas market prices.

HEYCO and Sandia have been very encouraged with the study to date and Sandia has agreed to contribute $100,000 of Department of Energy funds to the project, thereby reducing the AFE costs to the working interest owners.

The Duncan Unit's 7,679.24 acres represent a substantial acreage position in the Austin-Mississippian field. Should production cease, these leases would terminate and it would be virtually impossible to reconstruct a unit of this size. Likewise, everyone stands to benefit greatly from the success of this project.

We have enclosed a geological project summary, procedures and two copies of the AFE for your review and signature. Please return one signed copy of the AFE to our office at your earliest convenience. If you have any questions or comments about this project, please call me or Larry Brooks, Project Geologist. We would also be willing to meet with any non-operator to review this project in more detail.

Very truly yours,

Robert H. Bell
Landman

RHB:LLB/dlm
Enclosures

duncan#3.wio/LL

GEOLOGY OF THE AUSTIN-UPPER MISSISSIPPIAN GAS PLAY

The Austin-Upper Mississippian play in the Duncan Unit produces gas from secondary porosity in oolitic carbonates which is enhanced by fracturing. This facies occurs in the uppermost part of the Mississippian section.

The lowest facies is nonproductive in the Upper Mississippian formation and is comprised of 50-70% chert and very finely crystalline dark brown-gray limestone, suggesting a deep basinal environment.

The middle facies is an oolitic limestone slightly cherty (approx. 10-20%) and can be fractured. This suggests fluctuation between medium depth and shallow depth environments. As mentioned, the uppermost facies known as the Austin zone is an oolitic or biodastic grain stone with abundant secondary oomoldic and vuggy porosity. This zone has fractures that are partially filled to open. This suggests a higher energy environment of better reservoir quality.

Of the three facies that comprise the Upper Mississippian formation, the uppermost and the middle facies offer favorable reservoir potential. These uppermost and middle facies have abundant reserves but one has to use abboreal delicacy in exploiting them.. The pore throats are bottlenecked and as drilling fluid enters them, the fluid is trapped as it tries to exit. If the formation is acidized, the pores release bound up fines in the form of clays that clog the pore space.

The reservoir type carbonates are 70-150' thick in the Duncan Unit area.

Volumetrics: Volumetric calculations indicate that the formation can yield 10 BCF/section. The Phillips Austin Com #1, located in Section 17, T-14S, R-36E, cumulatively produced 6 BCF before the casing collapsed and it had to be prematurely abandoned.

Subsequent wells have had a myriad of drilling and stimulation induced formation damage, so current ultimate recovery is in the range of 2-3 BCF/well.

At current technological and market conditions, exploitation of the reservoir by the use of conventional technology is non-commercial. However, if the direction of vertical fractures can be deduced in Phase II of the proposal, then a horizontal wellbore may cause a multifold increase in productibility, reserves and economic viability of the project.

OBJECTIVES OF THE DUNCAN UNIT HEYCO/SANDIA PROJECT.

1. Evaluate the Austin-Upper Mississippian formation for fracture orientation and direction.

2. Pore geometry relationships.

3. Paleo stress direction vs. current day stress direction.

4. Wetability.

5. Fluid compatibility.

6. Compressibility.

7. Formation mineralogic anisotrophy.

8. Develop a non-damaging stimulation technology using techniques in effect from Sandia's multi-well experiment that has a high degree of success in tight, low permeability formations.

9.Institute a horizontal drilling endeavor crossing parallel fractures in a perpendicular direction opening up more reservoir.

The objectives have been outlined; these geomechanical studies are paramount in order to more effectively exploit the Austin-Upper Mississippian play. First one needs a candidate that is best suited for research. As mentioned, the candidate is the Duncan Unit #3 well, located 1980' FWL & 660' FSL Sec. 26, T-13S, R-35E, Lea County, New Mexico.. This well was completed as a shut-in Austin-Mississippian gas well.

PHASE I. The Duncan Unit #3 well currently has open Bough perforations which would need to be squeezed off. Then we would return to the Austin-Upper Mississippian zone. It must be noted at this time that there is a cement retainer resting on top of a retrievable bridge plug. This would have to be either fished out or milled up. Production pressure tests would then be performed.

PHASE II. The second major step would be an oriented whipstock set approximately at 13,090'; a window would then be cut in the casing and drilled to core point. At core point we would then cut two 40' oriented cores and deepen approximately 60' for logging. The logs to be run would be porosity, resistivity, circumferential borehole inspection log, (CBIL), an acoustic type log that displays the wellbore in a 360 degree fashion and can be oriented back to the core. All logs would be tied back to the original logs.

This step would provide all the raw materials from which to do restored state porosity and permeability, relative permeability, capillary pressure, petrographic SEM analyses, ASR mechanical properties formation damage studies fracture identification.

Sandia National Labs would then begin their research and testing of the core as previously outlined. Sandia has vast computer capabilities and scientific research capacity which is not afforded to independents large or small, and its research has not yet thoroughly infiltrated the private sector. Through a complex series of testing, an appropriate stimulation technique would be designed using fluids that are non-damaging, based on the compatibility studies.

Information about the project and its findings would be made available to all partners.

PHASE III. Recent advancements in horizontal drilling make horizontal drilling across known fracture planes and intersecting them a viable reality. This would be a logical next step in the evolution of this project.

MAILING LIST
March 27, 1990

DUNCAN UNIT #3

YATES PETROLEUM CORPORATION
ESTATE OF MARTIN YATES, III
LILLIE M. YATES
YATES DRILLING COMPANY
ABO PETROLEUM CORPORATION
105 S. 4th
Artesia, New Mexico 88210

CONNIE ENERGY
1012 E. Lincoln Road
Hobbs, New Mexico 88240

EXAMA OIL COMPANY
Suite 1040, Sonat Tower
5599 San Felipe
Houston, Texas 77056

JENNINGS PRODUCTION COMPANY
1700 Pacific Avenue
Suite 1715
Dallas, Texas 75201

W. T. REED TRUST
Liberty National Bank,
Successor Trustee
P. O. Box 1627
Lovington, New Mexico 88260

WESTWAY PETRO
Lock Box 70
500 N. Akard
Dallas, Texas 75201-3394
Attn: William E. Read

JAMES H. YATES, INC.
COLKELAN CORPORATION
906 S. St. Francis Drive, Suite C
Santa Fe, New Mexico 87501

YATES ENERGY CORPORATION
LDY CORPORATION
P. O. Box 2323
Roswell, New Mexico 88202

HARVEY E. YATES COMPANY
EXPLORERS PETROLEUM CORP.
SPIRAL, INC.
HEYCO EMPLOYEES, LTD.
P. O. Box 1933
Roswell, New Mexico 88202

ROSEMARY AVERY
SALLY MEADER-ROBERTS
O. E. GROVES
A. J. DEANS
P. O. Box 1933
Roswell, New Mexico 88202

\RESCALC\AFE\

HARVEY E. YATES COMPANY

DATE: 21-Mar-90

WO- AFE AFE # W-3

WELL NAME: DUNCAN UNIT # 3
LOCATION: N.660' FSL & 1980' FWL : SEC. 26, T-13S, R-35E, LEA CO, NM
FIELD: AUSTIN MISSISSIPPIAN NORTHWEST
ELEVATION: 4020.8' GL (18.2' KB)
TD: 13,600'
PBTD: 13,000' (ORIGINALLY =13,600' (OPEN HOLE 13443-13600'))

FOREMAN	CURTIS TOLLE	624-1818	837
FOREMAN	BOB WILLIAMS	624-1818	867
OFFICE		623-6601	
SUPERVISION:	RAY F. NOKES	624-1818	834 OR AT OFFICE

RECOMMENDED PROCEDURE:

PHASE # 1

1. MI & RU PU. ND WH NU BOP. POOH w/ 2 3/8" TBG. GIH w/ MOD. "R" PKR & SET 600' ABOVE BOUGH PERF:(LOCATED @ 10,283-84' & 86-92'). SQZ. PERFS TO 3000#. UNSET PKR & REV. WITH ANNULAR VOL. PULL 20 STDS LOAD BACKSIDE & REV. TBG. CLEAN. SET PKR. & PRESS. UP TO 3000#. LEAVE SHUT IN OVER NIGHT.
2. POOH. GIH w/ BIT, SCRAPER , COLLARS & TBG. DRL OUT CMT & TEST SQZ PERFS. TO 1000#. CIRC. HOLE CLEAN & POOH.
3. PU BULL DOG BAILER w/ 4 5/8" OD X (4 .37" ID X 3.5" ID) X 13" LONG, w/ DOUBLE FLAPPER IN BAILER, 3-3.5" COLLARS, 4' X 2 3/8" PERF. SUB. ON 2 3/8" N-80 TBG.
4. GIH TO FISH RET. SET DOWN ON PARTIAL RETAINER & STROKE BAILER. POH
5. IF SUCCESSFUL, RETR. LOK-SET BP & CONT. TO STEP # 8. IF NOT PU 4 5/8" BIT ON BAILER & GIH. SPUD ON RET. (NOTE: 2.65" (OD) "FL" ON\OFF RECEPT. ON LOK-SET PKR & TOP 1 1/2" OF "FL" RECEPTICAL HAS ONLY .14" WALL THICKNESS).
6. DRL ON RET. & GAIN POSS. 5 TO 7 INCHES & POH.
7. GIH WITH 4 5/8" OD X 3 13/16" ID WASH PIPE WITH KUTRITE ON BOTTOM & SLICK OUTSIDE. CLEAN OFF TO TOP OF LOK-SET BP & CIRC. HOLE CLEAN. POOH.

NOTE:>>>>>> HOLE TO BE CIRC. w/ NE AGENTS, CATIONIC SURFACTANTS & FOAMERS.

8. GIH WITH RETR. HEAD LATCH ONTO ON\OFF TOOL. RELEASE LOK-SET BP & POOH. IF UNABLE TO LATCH ONTO ON\OFF POOH & GIH w/ DRESS OFF MILL (2.65" ID) AND MILL OVER ON\OFF TOOL. POOH. GIH WITH SHORT CATCH (RIGHT HAND RELEASE) & BUMPER SUB, JARS, ACCELLARATOR & COLLARS ON 2 3/8" N-80 TBG.
9. REL. LOK-SET BP & POOH. IF UNABLE, POOH & GIH TO MILL OVER PKR. SLIPS & PUSH LOK-SET BP TO BOTTOM OF OPEN HOLE. POOH. GIH w/ 4.625" GR & JUNK BASKET TO 13,450'. RUN GR,CCL,CBL FROM 13,450 TO 12,450'.
10. ONCE THE LOK-SET BP IS REMOVED OR PUSHED TO BOTTOM THE WELL WILL BE SET UP TO TEST PRODUCTION FROM THE MISSISSIPPIAN. BHP BU WILL BE RUN IF PRODUCTION VOLUMES ARE FAVORABLE. (NOTE: RUN FULL BORE PKR WITH TAILPIPE TO BE RUN TO 13,560' + OR -.

PHASE # 2

11. MI & RU PU. ND WH NU BOP.
12. RU SDI & RUN FINDER INSIDE TBG, (WITHOUT/ THERMAL GUARD), FROM SURFACE TO 50' ABOVE SN & BACK. RU WEDGE & SET CIBP @ CASED HOLE DEPTH TO POSITION WHIPSTOCK.

13. PU BOTTOM TRIP WHIPSTOCK & CORRELATION SUB ON 2 7/8" DRL PIPE & GIH. POSITION WHIPSTOCK. FINDER WILL BE RUN FOR ORIENTATION OF RETR. WHIP STOCK AT KOP (13,090' CASED HOLE LOGS).
14. ONCE WHIPSTOCK IS ORIENTED, TAG RBP & SET WHIPSTOCK. SHEAR OFF OF WHIPSTOCK, (CSG COLLARS @ 13,062 & 13,105'. CASED HOLE CORRELATION FOR KOP (13,090'), POSITION OF BOTTOM WHIPSTOCK FACE.)
15. POOH. PU STARTING MILL ASSEMBLY GIH. START MILLING w/ 4 5/8" PILOT MILL AND ESTABLISH OPENING IN CASING. POOH.
16. LAY DOWN PILOT MILL ASSEMBLY. PU 4 5/8" WINDOW MILL, COLLARS, ON 2 7/8" DRILL PIPE. FOLLOW MILLING PROCEDURE UNTIL WHIPSTOCK SUPERVISOR IS SATISFIED. (DRLG WILL BE CONVENTIONAL).
17. POOH & PU 4 5/8" MILL TOOTH BIT, STABLIZER, 20- 30' -3.5" COLLARS, (1.5" ID) ON 2 7/8" DRILL PIPE. DRILL APPROX. 13 HOURS & TRIP FOR HYCOLOG BIT.
18. GIH & CONT. DRL APPROX. 344' TO CORE POINT (APPROX. 13,434' OH LOGS) & CIRC. HOLE CLEAN. (TOTCOS TO BE RUN WHILE DRILLING TO CORE POINT. (1 5/16" OD TOTCO))
19. ONCE CORE POINT IS REACHED THEN SURVEY WILL BE RUN TO DETERMINE DISTANCE FROM ORIGINAL HOLE & CASING POSITION RELATIVE TO NEW HOLE. (THIS WILL BE A "GYRO ON TOP OF EMS TOOL" SURVEY.)
20. RU TO RUN ORIENTATED CORES. GIH w/ 40' CORE BARRELS, MONEL COLLAR w/ ORIENTATION TOOL (EMS), COLLARS, & DRILL PIPE. (2 - 40' CORES TO BE TAKEN IF POSSIBLE).
21. ONCE CORES ARE TAKEN THEN HOLE WILL BE DEEPENED TO ALLOW FOR LOGGING. A POROSITY, RESISTIVITY AND CBIL LOG WILL BE RUN IN THE NEW HOLE & TIED BACK IN TO THE EXISTING HOLE.
22. ONCE LOGGING IS COMPLETED THE HOLE WILL BE PREPARED FOR STIMULATION & TESTING.
23. DRL PIPE & COLLARS WILL BE USED TO SPOT ACID IN SIDETRACK INTERVAL
24. POOH. GIH w/ PKR & TBG. POSITION PKR @ 13,100'+ OR - & REVERSE HOLE CLEAN. SET PKR. & BREAKDOWN FORMATION.
25. SWAB TO TEST. PUT ON PROD TO TEST. NOTE: TEMP WHIPSTOCK MAY BE PULLED TO TO PRODUCE ORIGINAL PRODUCTION INTERVAL & MISSISSIPPIAN SIDETRACKED HOLE.

PHASE # 3

WE WILL PROCEED w/ PHASE # 3 DEPENDENT ON RESULTS OF ORIENTATED CORES & FRACTURE IDENTIFICATION.

NOTE: IF ABOVE INFORMATION IS FAVORABLE & DIRECTION CAN BE ACHIEVED FROM ORIGINAL WINDOW THEN SIDE TRACK WILL BE CMT'D & DRILLED OUT FOR MEDIUM RADIUS LATERAL. IF DIRECTION OF WHIPSTOCK IS NOT DESIRABLE THEN WHIPSTOCK WILL BE RETREV'D & RE-ORIENTATED.

26. POOH & PREPARE TO DRILL DIRECTIONAL HOLE UP TO 1000' FEET. KOP & DIRECTION TO BE PICKED AFTER PHASE # 2 CORES ARE ANALYZED.
27. INTERMEDIATE LATERAL WILL BE LINED W/ 4" LINER W/ HANGER.

NOTE: THIS PROJECT IS A JOINT VENTURE BY SANDIA LABORATORIES,

(FUNDED BY D.O.E.), AND THE WORKING INTEREST PARTNERS.

RAY F. NOKES
PROD. MGR/ ENG.
HARVEY E. YATES COMPANY
ROSWELL, NM

CALC\AFE\DUNCANW3

HARVEY E. YATES COMPANY

WO-AFE# N-3

NAME & WELL NUMBER: DUNCAN UNIT # 3
LOCATION: N, 660' FSL & 1980' FWL of SEC. 26, T-13S, R-35E.
TY: LEA CO., NM. DEPTH:
YPE: (3) RECOMPLETION (4) OTHERS (5) P & A= 3

ACCT NO. 19530-03-0

FORMATION: MISSISSIPPIAN

		DRY HOLE COST	PRODUCING WELL COST
ETION COSTS:			
0	INTANGIBLE COMPLETION COSTS:		
924-001	COMPLETION UNIT COST: DAYS & $/DAY 18/12HRS 28/24HRS $1350/$2650	$98,500	$98,500
924-003	MUD, WATER & ADDITIVES	$24,000	$24,000
924-004	CEMENT, TOOLS & SERVICES (PROD.STRING...ETC)	$5,200	$5,200
924-005	ELECTRIC LOGS(CRC / WEDGE-GR CORR & DIR. SURVEY.....ETC.)	$58,000	$58,000
924-006	TOOL & EQUIPMENT RENTAL & TRUCKING(BOP,RACKS,CATWALK,REV. UNIT)	$300,548	$300,548
924-007	(PERFORATING), STIMULATION & TREATIN	$3,600	$3,600
924-008	COMPANY SUPERVISION	$16,100	$16,100
925-001	BITS, TOOLS & SUPPLIE	$2,440	$2,440
925-002	PLUG BACK	$0	$0
925-003	MISC. CONTINGENCIES	$5,084	$5,084
951-000	PLUGGING EXPENSE	$0	$0
	TOTAL INTANGIBLE COMPLETION COSTS	$513,472	$513,472
0	TANGIBLE DRILLING & COMPLETION COSTS:		
930-001	SURFACE CASING COSTS:(SIZE & FEET)	$0	$0
930-002	INTERMEDIATE CASING:(SIZE & FEET)	$0	$0
930-003	4" LINER:(SIZE & FEET) 4" 1000 FEET	$0	$11,000
930-004	PRODUCTION TUBING:(SIZE & FEET) 2 1/6" 1000 FEET	$0	$3,960
930-005	CASING HEAD		
930-006	CASING SPOOL		
930-007	TUBING HEAD		
930-008	CHRISTMAS TREE		
931-000	SUBSURFACE EQUIPMENT		$0
931-001	MISC PIPE CONNECTIONS		$0
931-002	PACKER & SPECIAL EQUIPMENT(LINER HANGER)		$10,460
931-003	MISCELLANEOUS CONTINGENCIES	$0	$636
	TOTAL TANGIBLE COMPLETIONS COSTS	$0	$26,056
	TOTAL INTANGIBLE COSTS:	$513,472	$513,472
	TOTAL TANGIBLE COSTS:	$0	$26,056
	TAXES:	$26,957	$28,325
	TOTAL COSTS	$540,429	$567,852.57

PREPARED BY: RAY F. NOKES DATE: 28-Mar-90

APPROVED BY: _____

COMPANY: _____

DATE: _____

"IT IS RECOGNIZED THAT THE AMOUNTS PROVIDED FOR HEREIN ARE ESTIMATED ONLY, AND APPROVAL OF THIS AUTHORIZATION SHALL EXTEND TO THE ACTUAL COSTS INCURRED IN CONDUCTING THE OPERATIONS SPECIFIED, WHETHER MORE OR LESS THAN HEREIN SET OUT"

THE ABOVE COSTS WILL BE REDUCED BY APPROXIMATELY $100,000 (D.O.E. FUNDING TO SANDIA LABS) FOR USE TOWARDS ORIENTATION, CORES, CORE EVALUATION & LOGGING.

DUNCANW3.XLS RFN 3/28/90 2:30 PM

RETURN ONE SIGNED COPY TO:

Bob Bell
HEYCO
P. O. Box 1933
Roswell, New Mexico 88202