STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 10,798

EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Exploration and Production, Inc., to authorize the expansion of a portion of its Cooper Jal Unit Waterflood Project and qualify said expansion for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act", Jalmat and Langlie-Mattix Pools, Lea County, New Mexico

ORIGINAL

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

17 1993

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

August 12, 1993

A P P E A R A N C E S

FOR THE DIVISION:

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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 2:54 p.m.:

EXAMINER CATANACH: At this time we'll call Case 10,798, which is the Application of Texaco Exploration and Production, Inc., to authorize the expansion of a portion of its Cooper Jal Unit Waterflood Project and qualify said expansion for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act", Jalmat and Langlie-Mattix Pools, Lea County, New Mexico.

Are there appearances in this case?

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge and Sheridan.

I represent Texaco Exploration and Production, Inc.

I have one witness, Mr. Jim Ohlms, and Mr. Ohlms has been sworn.

EXAMINER CATANACH: Any additional appearances?

Okay, you may proceed, Mr. Carr.

JIM H. OHLMS,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. My name is Jim Ohlms.

Q. By whom are you employed?

A. I am employed by Texaco Exploration and Production, Inc.

Q. And what is your current position with Texaco?

A. I am a petroleum engineer.

Q. Does the geographic area of your responsibility with Texaco include southeast New Mexico?

A. Yes, it does.

Q. Have you previously testified before this Division?

A. Yes.

Q. At the time of that testimony, were your credentials as a petroleum engineer accepted and made a matter of record?

A. Yes, they were.

Q. Are you familiar with the Application filed in this case on behalf of Texaco?

A. Yes.

Q. And have you made a study of the portions of the Jalmat and Langlie-Mattix Pools which are the subject of this Application?

A. Yes, I have.

Q. Have you prepared certain exhibits for presentation in this hearing?

A. Yes, I have.

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

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Mr. Ohlms, would you briefly state what Texaco seeks in this case?

A. Texaco is asking for an order qualifying a portion of the Cooper Jal Unit waterflood project for the recovered oil tax rate pursuant to the New Mexico Enhanced Oil Recovery Act.

Q. What type of secondary recovery project is Texaco proposing in this project area?

A. We are proposing a waterflood.

Q. And at what rates do you anticipate injecting water?

A. In the project area we anticipate injecting

water at 15,000 barrels per day.

Q. And that's the total project volume?

A. Yes, it is.

Q. When was the Cooper Jal Unit approved by the Division?

A. The Cooper Jal was approved August 25th, 1970, by Order Number R-4018, and the unit became effective on October 1st of 1970.

Q. And when was waterflooding in this unit approved by the Division?

A. Waterflooding was approved in the Langlie-Mattix Pool and the Jalmat Pool on August 25th of 1970.

Q. And basically have you been conducting a waterflood project with an 80-acre fivespot pattern?

A. Yes, starting on October 1st of that year, we started an 80-acre fivespot waterflood pattern on the Langlie-Mattix Pool and the Jalmat Pool.

Q. And that's the pattern you're still using at this time?

A. Yes, it is.

Q. Could you identify and review what has been marked as Texaco Exhibit Number 1?

A. Exhibit 1 is a basic unit map showing the current completions.

Injection wells are signified by triangles,

producers by circles. The circles with the dot in the middle are producers which are completed in both the Langlie-Mattix and Jalmat Pools.

There's a few gas wells; as you get into Section 18, the Jalmat becomes gas-productive. And the majority of the Jalmat production in this area outside the unit boundary is gas-productive.

The unit is unique. It's a syncline or a low area which makes it a small oil pool, but it is quite productive on the unit.

Q. On this exhibit you have a trace for a subsequent cross-section.

A. Yes, I believe in Exhibit Number 3 we were going to refer to a line of east-west cross-section going through those wells, which is a represented cross-section through the unit.

Q. And this is the trace for that exhibit?

A. Yes, it is.

Q. Now, the project area is less than the entire unit; is that correct?

A. That's correct. As I -- We limited the project area to those portions of the Jalmat and Langlie-Mattix that are both oil-productive.

Q. And so basically the portion of the unit in Section 18 is not part of the project area?

A. Except for the proration unit around injection well 1-16, the rest will be excluded. And we'll have a map of that in the upcoming exhibits.

Q. The Application that was filed in this case defined the project area by section, township and range, did it not?

A. Yes, it did, and it included a listing of wells, current use and proposed use through the implementation of the project.

Q. And it identified those as either producing or injection wells?

A. It identified producing and injection wells and identified in which pools they will be completed.

Q. Okay. Let's go to Texaco Exhibit Number 2. Would you identify that?

A. Exhibit 2 is a type log from Cooper Jal Unit Number 221. It's a representative type log showing the Jalmat and Langlie-Mattix Pools.

The Jalmat is identified as the top of Tansill, extending down 250 feet from the top of the Seven Rivers. The main producing interval from the Jalmat is the Yates formation, and we will go into detail about the producing facies on Exhibit Number 3.

The Langlie-Mattix is defined as the lower 250 feet of the Seven Rivers and the Queen formation.

Q. Let's go now to the cross-section, Texaco Exhibit Number 3. Would you review that exhibit for Mr. Catanach?

A. Exhibit 3 is that line of cross-section referred to on the first exhibit, on the base map, and it's a five-well cross-section, and each well has a gamma ray on the left track with a neutron log on the right track.

And we've correlated the Yates and Seven Rivers sand intervals across that line of cross section.

We're going to be concentrating on the Yates pay for the most part. We have more information about the Yates.

The Seven Rivers will be similar. It's in the same depositional environment, and we feel what we find in the Yates will be equivalent to what we find in the Seven Rivers.

Below each well log we have the step-by-step completion process for that well, with the last step being the current completion.

We've identified or broken down the producing layers of the Yates into sand bodies or depositional cycles, and the Yates consists of cyclical deposition patterns of interbedded siliciclastics, both sandstones

and siltstones, and within in each layer we also have carbonate sections.

The producing facies is the sandstone, and the dolomite or carbonate sections are non-porous and are not the reservoir rock. In fact, they prevent production from the porous sandstones.

Q. Basically what you have is a series of lenticular stringers, is it not?

A. Yes, it's a -- stratified lenticular layers. These sand bodies were aeolian in nature. They were transported across the central basin platform. This is located on the northwestern margin of that platform.

They were deposited during portions of low tide, and then when the tide came up, or periods of high tide, the sand bodies were reworked.

And you also had at this point -- the dolomite layers were formed, and it created each layer. And each layer was created over a period of approximately 400,000 years.

Q. Are these layers continuous across the reservoir?

A. The layers -- The points or the correlation points are continuous, but within each layer you have discontinuous features. The dolomites and the siltstone or the shales prevent flow across these

continuous layers.

So although we can correlate them across the unit, you're not able to flow fluids through these layers because of the siltstones and the carbonate inclusions.

Q. Let's go now to what has been marked Texaco Exhibit Number 4, your Yates 1 Sand Gross Isopach map. Could you identify and review this for Mr. Catanach?

A. Okay, on the -- Through production data and core data we identified layers 1, 2 and 5 as the main producing layers in the Cooper Jal. And the next three exhibits are gross sand maps from those three layers.

And this exhibit shows the thickness of the Yates 1 sand. It's on two-foot contour intervals.

On these series of isopach maps, we just wanted to show the shifting nature of these sands. They're not continuously deposited. You had changing depo centers with each cycle. The sands were deposited so you had thick zones very close to thin zones, and that's mainly what we wanted to show in this.

We highlight the thick areas, and you can see as you go in almost any direction, you have thin areas nearby. So the layers thin and thicken across the unit.

So not only do you have vertical isolation

between each layer, you have thinning and thickening across the layers. And also with that thickening and thinning, you also find barriers to flow in each layer.

Q. Can you describe generally the change that Texaco is proposing in the existing waterflood project?

A. Yes, right now, or the beginning of the waterflood, current date, we've been basically on 40-acre spacing, and because of the stratigraphic and lenticular nature of the sand bodies, we do not feel we have contacted all the reservoir compartments, so there's oil that is not being contacted with the water. So we want to reduce our spacing.

Q. And so what is the effective spacing that you're going to be moving to?

A. We're going to move to 20-acre well spacing and reducing our waterflood patterns to 40-acre fivespots.

Q. If I understand your testimony from the cross-section and isopachs, what basically you have here is a discontinuous reservoir pay?

A. Correct.

Q. And you've got in each of the zones a sort of compartmentalized reservoir; is that right?

A. Right, continuing to zone 2, the zone 2 isopach, it's even more compartmentalized than zone 1.

We have thick and thin zones in close proximity, and we have not been able effectively to drain all the compartments through a 40-acre spacing.

Q. And so basically by going to an effective 20-acre spacing pattern and a 40-acre fivespot --

A. Yes.

Q. -- is it fair to say you're going to be able to encounter additional geographic areas in this reservoir that otherwise -- and have not to date been part of an effective waterflood project?

A. Yes, we're going to be contacting mobile oil that has not been contacted with water to date. We're not going to be accelerating production. We're going to be actually producing new oil.

And I think with the amount of oil that we predict to produce in the future, that it's quite obvious that this oil will not be produced under our current mechanism, with the 40-acre five- -- or the 40-acre spacing, the 80-acre well fivespot pattern.

Q. And what you're doing is, you're modifying the previous injection program in such a way as to intersect additional geographic areas in the reservoir?

A. Yes, due to the depositional nature of the Yates and the Seven Rivers formations, we'll be able to contact good sand bodies with the reduced well spacing

that have not been previously contacted.

Q. All right. Let's go to Exhibit Number 7. Could you identify that, please?

A. Yes. Starting with Exhibit 7, we're going to kind of go over the new technology or the different technology that we're going to use from this point forward on the Cooper Jal Unit, and I just wanted to start with Exhibit 7. It's just a unit performance curve from the data of unitization.

As you can see from the green curve, being the oil curve, we saw good initial response. We made close to -- nearly 2000 barrels a day at our peak response. And from that time we've been on a pretty well established decline.

And currently we're producing approximately 400 to 450 barrels per day.

Q. All right. Let's go now to Texaco Exhibit Number 8.

A. Exhibit Number 8 shows the current Jalmat waterflood patterns. And again, they're in that area that the Jalmat is oil-productive, and they are wide patterns because of the well spacing.

Q. Is that the reason they also appear to be somewhat irregular?

A. They're irregular for -- The reason they're

irregular is the Jalmat in the vicinity was thought to be gas-productive, so these locations were originally drilled on 160-acre proration units. And once they were found to be oil-productive they came back later and drilled back to 40s, which led to the varying well spacing, which created these irregular fivespot patterns.

Q. Could you identify Texaco Exhibit Number 9?

A. Yes, Exhibit Number 9 is an iso map showing the secondary oil production to date from the Jalmat. It's on 50,000-barrel contour intervals.

And as you can see, there's a wide variation of what we recovered for each proration unit, varying from zero for a low up to 250,000 barrels to date from secondary.

Q. And to what do you attribute these wide variations?

A. Two reasons that we attribute this:

One for the discontinuous nature of the reservoir. This is to be expected. It's not a nice, circular contour map.

And secondly, the wide irregular well spacing that led to the wide patterns.

Q. Let's go now to Texaco Exhibit Number 10. Would you identify that?

A. Exhibit Number 10 is the Langlie-Mattix waterflood pattern. Once again it's irregular for somewhat the same reasons, but it's a little more irregular because it was not originally drilled on gas-proration-size units.

But once again, you have 80-acre fivespot patterns.

And one thing I want to point out with this exhibit, the Jalmat and the Langlie-Mattix waterflood patterns do not overlay. They're offset from each other. You have Jalmat injection wells going down the center of the Langlie-Mattix patterns.

And one thing that we want to do with our project is to bring these patterns into alignment and thereby utilize wellbores. And by utilizing wellbores, we'll be able to recover reserves that are not recoverable on their own, or that would not be economic to recover.

Q. Let's go to Exhibit Number 11, the iso map on the Langlie-Mattix. What does this show?

A. This shows the same trend as the Jalmat. You have good recoveries on different parts of the unit, based on the different varying thickness of the sand bodies.

As we see, the sand bodies thick and thin

across the unit, and as a result you have varying recoveries across the unit. It's not a layer-cake geometry; you don't have sands piled on each other. It's discontinuous in nature.

Q. Now, Mr. Ohlms, at this time would you generally summarize for Mr. Catanach the modifications you're going to make and the process that you've been using to waterflood this project and the changes in technology that Texaco proposes to implement to develop this additional geographic area in this expanded project?

A. Okay. As I've been saying, we're going to a 20-acre well spacing, and through this process we're going to bring the Jalmat and the Langlie-Mattix waterflood patterns into concurrence where we'll have a single pattern for both pools.

And we're going to do that by infill drilling producing wells and injection wells where we need them.

And we're also going to recomplete existing wellbores. We have quite a few wellbores that are completed in one zone or the other, so that maybe if a well is singly completed in the Langlie-Mattix, we'll complete it in the Jalmat and either make it an injection well or a producing well in order to get to the desired pattern. And that way we're able to

develop reserves in the Langlie-Mattix which may not be recoverable by drilling stand-alone wells.

Q. Okay. Let's go to Texaco Exhibit Number 12. Would you identify that?

A. Exhibit 12 highlights the project area; it's the area in gray.

And as we said, we're excluding Section 18 for the most part because the Jalmat is not oil-productive in Section 18. And for the same reason we've excluded the small portion of Section 14 that is in the unit.

Q. Approximately how many acres do we have in the project area?

A. It's 1920 acres, more or less.

Q. Would you identify what is shown on Texaco Exhibit Number 13?

A. Yes, this is a fairly large project, and we want to phase the project over three years, and this exhibit shows the planned work for 1993, which we're calling phase one.

And it's a -- I'll just go over the symbols. We're doing quite a few things to implement this project.

The first thing, we're going to convert six Langlie-Mattix injectors to Jalmat production, and

they're symbolized by the diamonds with the solid dot.

We're going to commingle two producers which are now producing from a single zone.

We're going to convert three wells to injection, and that's symbolized by the open triangle.

We're going to recomplete -- I believe it's -- yes, we're going to recomplete four singly completed injection wells to dual, completed injection wells.

And finally, we're going to drill five infill producing wells, and those wells will be productive from both the Langlie-Mattix and Jalmat.

Q. Has Texaco filed Forms C-108 with the Division seeking administrative authority to drill or convert wells to injection?

A. Yes, we filed those in the first week of July, and they are now in the office of Ben Stone, who is waiting action on those applications for action on this enhanced recovery Application.

Q. And they're being held until a decision is reached on this case?

A. Yes, until a decision is reached on this case.

Q. Let's go to Exhibit Number 14. What is Exhibit Number 14?

A. Exhibit Number 14 symbolizes or shows phases

two and three of the project.

Phase one, we're concentrating on the heart or the middle of the unit. And phases two and three, we want to build on the performance and data we found in phase 1 and move out to optimize or maximize the production from the unit with the new modified, redesigned waterflood pattern.

Q. When do you plan to go forward with phase one?

A. Phase one we plan to initiate this year, with a starting date of October 1st.

Q. And then phase two would be implemented when?

A. We plan to do phase two right now. It's going to depend on the performance and the data we find in phase one, of course, but currently we plan to start phase two in 1994 and phase three in 1995.

Q. Let's go now to the economics involved in this effort, and I direct your attention to Texaco Exhibit Number 15. Would you identify and review this exhibit?

A. Yes, Exhibit 15 is a capital cost by well. First we have the well number and then we have the activity planned for that well. And it's just a by-well description of what was shown on the previous exhibit.

And in the last column it shows the amount planned or the capital cost for that activity.

Q. And what is the total capital cost for phase one?

A. The capital cost is just slightly more than $3.4 million.

Q. If we go to Exhibit 16, this sets out the capital costs involved in the other two phases; is that correct?

A. Yes, we have the planned activity. We don't have the wells defined as of yet, but we have the planned activity for each phase and the anticipated cost for each phase.

And the total cost from phases two and three is slightly more than $5.3 million, with the total cost of all three phases being $8.8 million.

Q. When you say $8.8 million, you're talking just about capital costs, are you not?

A. Yes, that is just the capital cost to implement the project.

There will be additional operating costs through the life of the project.

And the total anticipated cost through the end of the project is $19 million.

Q. Let's go now to Texaco Exhibit 17. Could you

identify and review that for Mr. Catanach?

A. Yes, this exhibit depicts our redesigned waterflood pattern.

As you can see, it's still not uniform. There's no way that we could get to a uniform pattern from what we started with.

But we're trying to optimize it on a smaller acreage, and also we're going to one pattern so we get to maximize our wellbore usage.

Q. I'd like to now direct your attention to Texaco Exhibit Number 18. And referring to this exhibit, would you explain to Mr. Catanach the volume or the amount of additional production you are hoping to achieve when you receive a response to the waterflood project?

A. Okay, the white area is our base production. This is a forecast to the economic limit of our secondary project, as is, without the implementation of this project. It is on a well-defined decline.

And above that white area we have the forecast for each phase, phase one being the biggest portion of that.

And as you can see, we've reached nearly the point that we reached at the initial waterflood peak of nearly 2000 barrels a day.

And the additional production we anticipate from this project up and above that white area is 3.2 million barrels.

Q. If we go to Texaco Exhibit 19, what does that show us?

A. That just breaks down our recovery and shows the extent of additional recovery we will get by this project.

Q. Based on your understanding of these reservoirs, how soon would you anticipate after you implemented waterflooding, how soon would you start seeing a response to the waterflood project?

A. I believe you would start seeing response within two months. So before the end of the year.

And going back to this exhibit, the pie represents the total production that we expect from the unit area, including the project.

As you can see under "Primary", we produced close to 6 million barrels. And under "Secondary", our current operations, we will produce 7.5 million barrels.

And with this project we will produce an additional 3.2 million barrels or increase by 19 percent the amount that we will -- That's not 19 percent of the oil in place; it's just 19 percent of

the recovery anticipated.

Q. Have you been able to estimate a value for this additional recovery?

A. We valued that additional recovery at $60 million, based on $18 oil.

Q. In your opinion, will the application of the proposed enhanced recovery techniques you are proposing in this Application today to this project area result in the increase in the amount of crude oil ultimately recovered that you have indicated?

A. Yes, definitely. It's not an acceleration, as we've stated. We are additionally going to recover more oil by implementing this project, and it's an economical project.

Q. Has the project area been so depleted that in your opinion it would be prudent to go forward with the proposed new waterflood project?

A. Yes, we've reached our peak response from the initial waterflood, and it's on an established decline, and we would expect to gain nothing if -- no additional reserves by doing nothing.

So I think it's at the point now that it could use additional infill investment dollars.

Q. Are you convinced that the project is both technically and economically feasible?

A. Yes.

Q. It is not being prematurely proposed or attempted?

A. No, no, it's not.

Q. In your opinion, will approval of this Application result in the recovery of hydrocarbons that, without what you're proposing here today, hydrocarbons that without this program would not be recovered?

A. Yes.

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

A. Yes.

Q. Is Texaco, in fact, proposing a significant change or modification in the enhanced recovery process that has been utilized in the past in this area?

A. Yeah, it's a significant modification. We're going to 20-acre well spacing through infill drilling and wellbore recompletions, and in thus doing we are redesigning the pattern.

So most definitely we do have a significant modification.

Q. Does this new project, in your opinion,

represent a project which will increase the size of the geologic area that is subject to waterflooding in the area?

A. Yes, through the additional completions we are contacting additional geological area.

We are going to be able to contact additional oil, which will not be recovered under existing conditions.

And through the discontinuous nature of the Yates and the Seven Rivers in this area, we will contact additional geological area by implementing this project.

Q. Now, Mr. Ohlms, Texaco is not just going to accelerate recovery of the reserves from this pool, are they?

A. No, we are not accelerating production; we are actually going to produce additional oil in place that would not be produced without this project.

Q. Were Exhibits 1 through 19 prepared by you?

A. They were prepared by me and under my coordination.

Q. And can you testify as to the accuracy of the exhibits?

A. Yes.

MR. CARR: At this time, Mr. Catanach, I move

the admission of Texaco Exhibits 1 through 19.

EXAMINER CATANACH: Exhibits 1 through 19 will be admitted as evidence.

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

MR. STOVALL: I have a question while you're sorting through.

EXAMINER CATANACH: Yes, certainly, Mr. Stovall.

EXAMINATION

BY MR. STOVALL:

Q. You are in what you call a secondary phase of the project now?

A. Yes, we've been in our secondary operation since 1971.

Q. When I look at Exhibit 19 -- that's your pie chart and stuff there --

A. Yes.

Q. -- how much of that 7.5 million barrels of oil have you recovered at this point?

A. We've recovered between 6 and 6.5 million barrels. So we've recovered the --

Q. So you've got roughly a million to a million and a half left; is that what you're --

A. Yes, we've recovered a majority of that

amount.

Q. And the 3 million recovered from the project is totally over and above that; none of that would be recovered from what you've identified as secondary --

A. Right.

Q. -- operations?

A. The exhibit prior to this one shows the current decline, and I think it's quite established, and that 3.2 is only the shaded area above that established decline.

EXAMINATION

BY EXAMINER CATANACH:

Q. As I understand it, the waterflood projects as they stand today are essentially being done separately?

A. For the most part they're separately.

We do have some wellbores that are completed in both zones, we have a few injection wells that are dually completed, and we have about 15 to 20 producing wells that are dually completed.

But other than in those cases, the rest is being waterflooded separately.

Where the patterns happen to line up right now, we do have some dual injection wells?

MR. STOVALL: If this Application for the

credit were not approved, would Texaco proceed with this operation?

THE WITNESS: In all likelihood, we would proceed with phase one.

Texaco and its major partners in this unit has investment opportunities around the world, not only in New Mexico and Texas.

But we compete for those investment dollars, and through tax incentives like this it helps us compete against global projects.

And for phase two and three, we feel like the tax incentive will help us compete with our other projects.

Q. (By Examiner Catanach) Within the Jalmat Langlie-Mattix, are we talking about basically the same area that's currently being flooded?

A. Geographically? You mean the --

Q. Geographically.

A. Yeah, the geographic area is the same as far as area.

Q. Mostly all of the project area with the exception of Section 18?

A. Yes. Yeah, the Jalmat is not being flooded in Section 18. It's gas-productive in Section 18.

Q. It looks like the Jalmat's really not being

flooded in Section 13 either; is that correct?

A. It's being flooded somewhat.

That's one thing we want to do with this project. Well Number 146 is a dually completed injection well. And Well Number 115, which is just south of 146, is also completed in the Jalmat. This is kind of the edge of the gas-oil contact.

Water injection over the last 20 to 25 years has pushed oil upstructure, making former Jalmat gas zones oil-productive, and through this project we want to test that gas-oil contact in Section 13.

So we want to -- Like on well 113 in phase one, we plan to open up the Jalmat in 113 to see if we have Jalmat oil production at that level. And if we find oil production in Section 13, that we may have additional infill locations.

But in the project we want to test and find out where that gas-oil contact is, because through years of injection it's been altered from its location under primary production.

Q. In all three phases, what -- How many wells will that involve the drilling of?

A. The infill wells, we plan five in phase one and then eight in phases two and three, so a total of 13 new wellbores.

Q. So really the implementation of this project is really a -- You can do it because of the existence of a substantial number of wellbores?

A. Yeah, you know, because they -- Through the primary phase of these fields, they seemed to drill a lot of separate wellbores, which gave us a large number of wellbores to use, which we'll be able to develop portions of the Jalmat and Langlie-Mattix on the edge of the field, which we would not be able to develop by having to drill wells.

So that's a -- one of the things of the project that makes it economic.

Q. Now, the sands that you've identified within the Yates and Seven Rivers --

A. Yes.

Q. -- that's correct? The sands you've identified are discontinuous between 40-acre locations; is that what you're testifying to?

A. There will be some layers that are continuous because we have had response. You can't -- So we have had some response.

Q. Uh-huh.

A. But there are other layers which are not continuous, and those are the layers that we're shooting for with our 20-acre wells.

Between 40-acre wells there will be carbonate, non-porous carbonate barriers, and there will also be shale barriers. And we see this in cores, not only in the Cooper Jal, but also in the Rose Yates, which is in the same trend.

So it's very common to have these barriers between 40-acre wells.

MR. STOVALL: Have you done any sort of studies at all that show the effective pattern of your flooding at this time, any sort of underground studies?

THE WITNESS: No, we have not. The only kind of studies we have done is to monitor pressures, and the Yates is fairly underpressured for the years that we've been waterflooding. We don't feel like we've effectively pressured up the Yates with the wide spacing.

The Yates is much further down the secondary recovery curve than the Langlie-Mattix.

Q. (By Examiner Catanach) Is the purpose of phasing the project to determine how successful it's going to be?

A. Yeah, there's -- that's one -- You know, probably three reasons, is to look at the performance of phase one to see which areas we want to work on. And also in phase one we're going to get modern open-

hole well logs, which we currently have. And we're also going to obtain one core, which -- We do not have a modern core.

With this data we hope to get a better idea of where our pay is and where our most productive intervals are.

And the third reason we want to is just to phase in the capital cost. It's a costly project, and we'd like to phase that in over three years.

Q. Uh-huh. The area that you'd like to qualify for the EOR, the tax credit, is shown on Exhibit 12?

A. Yeah, this shaded map?

MR. STOVALL: Yes.

Q. (By Examiner Catanach) That's for both of the waterflood projects?

A. Yes.

FURTHER EXAMINATION

BY MR. STOVALL:

Q. You're calling it a single project, but it's for the purpose of the tax credit; is that correct?

A. It's -- Yeah, two pools, but we're considering it a single project.

Q. Is -- You understand how the tax credit works, do you? Let me ask you, do you understand how the tax credit works?

A. I'm --

Q. In terms of how the -- of what you get -- how much credit you get on what, the dollars and cents?

A. From what I understand, you get a 1-7/8-percent savings on that portion which is incremental in the project area.

Q. No.

A. Then I do not understand it.

Q. 1 7/8 is right. We refer to it as a 50-percent tax reduction.

A. Yeah.

Q. In other words, the same number, you've got the number right. But it is on all of the oil produced in the improved area once you receive incremental production.

In this case, it becomes rather complicated because you have effectively right now two waterfloods, right?

A. Yes, they were approved under separate orders.

Q. Right. You're now proposing to institute a new project within the two waterfloods?

A. Yeah, that's kind of our new -- what we felt like qualified for new technology or a significant change in operations.

Q. And so what you would -- If you are successful, presumably you would get incremental production from both formations, but you wouldn't particularly look at which one you're getting the incremental production from, right?

A. From an engineering standpoint, we would like to know where the production comes from, but -- whether it's incremental from the Jalmat or Langlie-Mattix.

Q. Well, one of the problems I see is, let's pick the Jalmat just for now. You're going to drill some additional -- a few additional, five in the first phase --

A. Yes.

Q. How many of those go to the Jalmat? Or they're going to both go to both --

A. All five will go to both zones.

Q. You're also going to open up some additional Langlie-Mattix wells in the Jalmat; is that correct?

A. Yes, and open up -- We're going to open up one additional producing well into the Langlie-Mattix, and we're going to open up one additional producing well into the Jalmat.

Q. These are the new drills?

A. No.

Q. These are wells you're going to --

A. Yes.

Q. -- add a completion to?

A. Yeah, the five wells we're drilling are all going to be dually completed in both zones.

Q. Okay.

A. It's Exhibit 13, I believe.

Q. I guess our question -- the question I've got is, if you're going to look at this thing, is -- Phase one is easy, get yourself certified as a project.

Phase two is tough, proving that you've actually accomplished what you set out to do.

How are we going to be able to measure and determine whether in fact -- or whether -- and I would assume you're going to get some incremental production, that is, your current production levels as shown in, I think -- What is that? Exhibit 16, your curve, decline curve there?

A. It's 18, I think. It's the second last --

MR. CARR: Uh-huh.

Q. (By Mr. Stovall) Second to last one? Is it 18?

A. Yeah, the decline curve is 16 also.

Q. Now, 18 is the one I'm considering.

A. Okay.

Q. That is the combined production. The white

area is the combined production.

A. Right.

Q. When you start getting that incremental production that you're showing on there, are you going to be able to come in to us and demonstrate both geographically and geologically where that incremental production is coming from? Such that we could reduce the area if we find that you're not really getting incremental production from the whole project area?

A. Yes, I think geographical area we will be able to identify.

Q. One of my concerns would be, is, if you take a well that's completed in one formation and you now add a completion in the other formation, that well is, almost by definition, going to produce more, just because it's got access to more reservoir.

A. Yes, as long as it -- you know --

Q. Do you consider that incremental production for secondary recovery purposes?

A. Producing -- I mean, if you're completing a --

Q. -- if you add another zone and you commingle, or dually complete production, you get more --

A. Yes.

Q. -- more oil out of the hole in the ground?

A. Yes, I consider that --

Q. Is that secondary recovery incremental production?

A. Yes, I believe it is, because by doing that you're decreasing the well spacing in that particular reservoir.

Q. But is decreasing the well spacing alone secondary recovery? If you drill an infill program, would that be secondary recovery?

You see where I'm coming from, what the problem is? Is, looking at the pieces of it and how much of the -- Infill drilling is not secondary recovery and would not qualify for the tax credit. Adding another well to a spacing unit would not qualify you for the tax credit.

A. But infill drilling in a secondary project would produce additional secondary reserves.

Q. Because you're defining all the reserves recovered as secondary reserves?

A. To this date, yes, we -- I mean --

Q. You don't have any primary -- I mean, we've seen some projects where they come in and say, We've got some primary left, we're going to count that.

A. In the early stages they may have to get all the parties to agree to a participation factor, but

after 25 years we have no primary remaining.

Q. So you don't have a problem from that standpoint --

A. No.

Q. -- but we may have a problem from the standpoint of giving the credit, of making sure that there really is a secondary process that's doing it and not simply open up the reservoir to a new wellbore. Do you follow what I'm --

A. Yes, I see what you're saying.

But I think it's a combination of the two. You're opening up a wellbore in a new zone, but you're also -- You're opening up, too, a waterflooding.

I mean, if you open up that same wellbore and we're looking for primary production, you may not recover anything.

But by reducing spacing, you're insuring that you have an injection well and a producing well completed in that same reservoir compartment.

Q. So your testimony and your engineering opinion is that if you were to take that well -- the well, whatever well we're talking about, and open it in the second zone and there were not a waterflood, pressure-maintenance-type project, you would probably not recover additional primary because it would be a

depleted zone; is that correct?

A. That's correct. You would -- not only stems from a depletion, from a saturation respect, but also a more important pressure depletion.

MR. STOVALL: I think one of the things you're going to have to look at when you come back, and I -- My sense is that if we ever approve an infill expansion project and a higher density expansion project -- and we haven't done it to date, I don't think yet, have we?

EXAMINER CATANACH: No, we have not.

MR. STOVALL: -- that conceptually it's easy to approve it from a certification standpoint.

I think there's going to be a tremendous burden on the operator of that project to come in and say, Okay, now here is the additional oil that we've actually recovered as a result of this new process.

And it may be on a well-by-well basis; it may not be to take the project area and look at the entire project area and say what's the increase?

So I think that's something that -- I'm not going to ask you to commit any more as far as your opinion at this time, but I think as you go back and talk to your production and engineering people you need to bear that in mind, because -- You've just started

the race; you haven't --

THE WITNESS: Yeah.

MR. STOVALL: -- jumped the first hurdle until you've got --

THE WITNESS: But if that's what -- You know, to satisfy the requirements to qualify both the incremental and the base for the enhanced recovery rate, if that's what's required, we would be able to do that on a well-by-well basis.

MR. STOVALL: I would think that -- yeah, I think you're going to need -- and I suggest that now, because now is when you need the data on what is the baseline for the wells --

THE WITNESS: Yes.

MR. STOVALL: -- for primary recovery and then be able to come back in and put it under very detailed examination at that time.

On the other hand, if we don't grant it, it's not a problem then.

EXAMINER CATANACH: Not at all.

I think at the very least, you guys might have to identify the areas that are going to be affected separately in phase one, phase two and phase three.

In other words, phase one is going to be the

first area that's going to be affected, and you don't want to get credit for the other two areas --

THE WITNESS: Yes.

EXAMINER CATANACH: -- when you haven't done anything in those areas.

So I think we need to really specifically identify the different phases -- areas.

You said you guys were going to have a response in two months, and I believe that that's probably more of an effect of opening up additional pay and not as a result of injecting water into a new zone. Is that your opinion?

THE WITNESS: Yes, I think so.

EXAMINER CATANACH: So I guess the question we're going to have to wrestle with is, do we consider that to be -- to qualify, you know, that quick a response? And that's something that we're going to have to work out.

THE WITNESS: But I think --

MR. STOVALL: Another thing to consider on that line, and I will say, because I don't think we need a response particularly, is, assuming you get a response in two months, two or three months, and there is concern that that question would be raised, if you come to us with a positive production response, you run

a risk of being turned down, because we -- because of the concerns the Examiner has expressed.

If you delay and establish a true positive production response, give yourself time, do so -- remember that you haven't given up anything because the credit goes back to the date of positive production response.

So there may be no risk in delaying the request for certification of the response to insure that you've got a -- you can make a presentation to the Commission that satisfies us that that is, in fact, response and not just a new wellbore that's being opened.

Another thing I've got a question about, I have the same concern about the areal problem. It looks like phase one and phase two and three are overlapping geographically --

THE WITNESS: Yes, they do.

MR. STOVALL: -- and you may need to figure out how to address that.

MR. CARR: Again, if I can jump in and suggest that --

MR. STOVALL: Please do.

MR. CARR: -- we're looking at proving the positive production response well by well, and as we

open these wells up into new zones and if we accurately document what we have when we open the zone, we'll not only be able to tell you what we get by opening a new zone, but when we do get to a point where we truly see the response from the waterflood, we'll be able to use that as our baseline information, and we can come back well by well at that time and tell you exactly what we see happening as a result of this effort.

MR. STOVALL: The real key in this thing, in the certification of the area -- because we can always -- we can certify the entire project area as you've defined it today --

THE WITNESS: Uh-huh.

MR. STOVALL: -- and we may have to, because there may not be another way to do it -- but your production time, your positive response time, is going to be measured from the date of that certification.

So if you've got a three-year phase project, you know, that third year is -- or that -- what happens in those last two years may be critical to what you've done in the third phase.

And Mr. Carr knows the script for what you do from here, as far as getting the certification and that.

I don't have anything else.

You don't happen to have a list of the interest owners in the pool, do you?

THE WITNESS: I do not have one on me. We can supply that --

MR. CARR: We can provide that if you want.

THE WITNESS: I have the -- I know the major partners, if you would like.

MR. STOVALL: No, I'd just like to take a look at a list. It's --

MR. CARR: And you want -- Excuse me.

MR. STOVALL: It is not -- It doesn't have to be entered as an exhibit. It's procedural informational only.

MR. CARR: And you want all interest owners in the project?

MR. STOVALL: (Nods)

So it doesn't require an affidavit or submission or anything else, it just...

MR. CARR: Yes, sir.

MR. STOVALL: Interest.

EXAMINER CATANACH: I think that's all I have at this time.

MR. CARR: We have nothing further.

EXAMINER CATANACH: Mr. Carr, you know some of our concerns. In your draft order you may want to

address some of these concerns.

MR. CARR: Yes, sir, Mr. Catanach.

EXAMINER CATANACH: Thank you, Mr. Carr.

There being nothing further in this case, Case 10,798 will be taken under advisement.

(Thereupon, these proceedings were concluded at 3:45 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10798, heard by me on August 15 1993.

David R. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Court 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 September 11th, 1993.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1994