STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

FEB 3

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:	CASE NOS. 11,207 and 11,208 (Consolidated)
APPLICATIONS OF MERIDIAN OIL, INC.	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

February 16th, 1995

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, February 16th, 1995, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

February 16th, 1995
Examiner Hearing
CASE NOS. 11,207 and 11,208 (Consolidated)

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E X H I B I T S

	Identified	Admitted
Exhibit 1	29	30
Exhibit 2	14	30
Exhibit 3	25	30

(Continued...)

E X H I B I T S (Continued)

	Identified	Admitted
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A P P E A R A N C E S

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By: W. THOMAS KELLAHIN

* * *

WHEREUPON, the following proceedings were had at 9:20 a.m.:

EXAMINER STOGNER: Hearing will come to order at this time.

At this time, at the request of Counsel for Meridian, I will call both cases, 11,207 and 11,208.

MR. CARROLL: Application of Meridian Oil, Inc., for a unit agreement, Lea County, New Mexico.

Application of Meridian Oil, Inc, for a waterflood project and qualification for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act", Lea County, New Mexico.

EXAMINER STOGNER: At this time I'll call for appearances.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have three witnesses to be sworn.

EXAMINER STOGNER: Are there any other appearances in this matter or -- matter or matters, I should say?

There being none, will the witnesses please stand at this time?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Examiner. I have placed in front of you a set of the exhibits. They're right next to the microphone. There are a couple of preliminary matters to direct your attention to.

First of all, we're dealing with the West Corbin-Delaware Pool. It is an oil pool on 40-acre oil spacing and subject to general statewide rules. The depth bracket oil allowable for wells at this depth is 107 barrels of oil a day, and we're working with the standard 2000-to-1 gas-oil ratio.

I'm going to hand you the *Byram's* summary of what the description is for the West Corbin-Delaware Pool so that you'll have that available if you need it.

EXAMINER STOGNER: Thank you.

MR. KELLAHIN: We're dealing with only a portion of the pool. These are oil wells that are operated by Meridian Oil, Inc. In addition, there's an interest by Southland Royalty, Inc., but for purposes of this Application we are considering it to be under one operatorship.

The original application, which I would like to draw your attention to -- and if you might look at Exhibit 1 of the exhibit package, I can explain to you some changes.

You'll see the shape of the unit as presented on

Exhibit 1. When this Application was originally filed before the Division, as well as filed to the State Land Office and the Bureau of Land Management, it included three additional 40-acre tracts. I've checked in red those three tracts. For the record, they are: In Section 16 it's unit letter J; in Section 21 it's unit letter E; and in Section 22 it's unit letter F.

Those three tracts were deleted based upon the recommendation of the Bureau of Land Management. Their criteria for exclusion was that no portion of any of those three tracts was included within the zero line on the pore-volume map that you will see during the course of the presentation.

Based upon their request, we are excluding those three tracts. The exclusion has been approved by the Commissioner of Public Lands, and we believe the Application is now approvable by the Bureau of Land Management.

For purposes of your work, you need to decide if those changes are of any significance in terms of notice. I think not, but that's certainly your call and not mine. That is a change.

EXAMINER STOGNER: Before we go on to something else, let me make sure I understand this. The three 40-acre tracts were three tracts which the BLM requested to be

removed?

MR. KELLAHIN: Yes, sir, as part of the preliminary review, they recommended those three tracts be excluded for the reason that when you look at the pore volume distribution of the reservoir, it will be positioned so that no portion of the pore volume is included in those three tracts.

EXAMINER STOGNER: Okay. Now, that's fine, but there's two of them that I see that are clearly in federal areas.

MR. KELLAHIN: That's right.

EXAMINER STOGNER: But the one in Section 16 is right in the middle of the state area, but still the BLM requested that one be removed?

MR. KELLAHIN: That's right. And the State Land Office concurred.

EXAMINER STOGNER: Okay, so you have -- I know that will be part of the evidence to be presented, but I'm assuming that preliminary approval has been given by the BLM and the State Land Office of this new, revised area; is that correct?

MR. KELLAHIN: I have a written letter from the State Land Office approving those changes. I do not yet have the letter from the BLM, but in talking to their personnel yesterday, I believe we've satisfied all their

conditions now for preliminary approval, and I believe that letter of approval to be forthcoming.

EXAMINER STOGNER: Okay. Anything else, Mr. Kellahin?

MR. KELLAHIN: Yes, sir, there is another item I need to bring your attention to.

The original application sought to convert three producers, and on your Exhibit 1 I have outlined in red triangles the three producers. Those show up on the advertisement.

In addition, we had requested in the northeast quarter of Section 21 the drilling of an additional injector which unfortunately is not in the advertisement, but I'm not sure that's critical.

I bring it to your attention because when you look at Exhibit 1, the well involved is the 11-MA well. On Exhibit 1 it is mis-spotted. The correct footage location for that new injector is 1340 from the north line and 990 from the east line, which will put it in unit letter H, approximately spotted below the letter C when you look at the lease number described within that 160 acres. So it's mis-spotted on the display, but it's also admitted from the ad.

Now, it's a well location that's internal within the unit, and I guess we can decide whether to process that

administratively or whether or not you want to readvertise it. But I think we can put that aside for a moment. I simply bring it to your attention.

EXAMINER STOGNER: As far as your first problem that you brought up, there won't be any need to readvertise the unit, since this is less of an area than what was originally proposed.

And as far as the drilled well, I will admit, I remember this very clearly now. I thought I had included it, but evidently I did not, and that is definitely my mistake.

MR. KELLAHIN: I'm not sure it's critical, Mr. Examiner. We have provided notice, actual notice, to everyone that could be possibly affected by it, and you'll have to decide -- and I don't think you have to decide now; you can hear the evidence and see if it's important -- I think not -- but it is an omission from the advertisement.

EXAMINER STOGNER: If for some reason it might be easier to readvertise this case, it wouldn't be readvertised until March 16th, and that would just be to simply correct everything.

Would a 30-day extension between today and the time an order was issued -- would that be of any harm in this particular instance?

MR. KELLAHIN: I'm not certain, and we'll simply

have to discuss it with Meridian.

EXAMINER STOGNER: I'll tell you what, let's just go ahead and leave that problem alone at this time, and we will either address it before today is over, or we'll make a decision, and your idea of just applying for it administratively may be the best thing. But either way, we'll take care of it.

Again, that particular instance, I remember it very clearly, and I was the one that fouled up on that, and I apologize. I remember it very clearly now.

MR. KELLAHIN: That's all right, Mr. Examiner, it happens.

We're ready to proceed with our presentation.

EXAMINER STOGNER: Mr. Kellahin?

MR. KELLAHIN: Mr. Examiner,I'm going to call my first witness. He's a petroleum geologist with Meridian. He resides in Farm- -- in Midland, Texas, as opposed to Farmington.

EXAMINER STOGNER: Are there two offices in New Mexico?

I'm sorry, go ahead.

MR. KELLAHIN: Last recollection, Midland is still in Texas.

Adam Szantay, and his last name is spelled S-z-a-n-t-a-y, Szantay.

ADAM SZANTAY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Szantay, for the record would you please state your name and occupation?

A. My name is Adam Szantay, and I'm a petroleum geologist with Meridian Oil, Incorporated.

Q. Mr. Szantay, on prior occasions have you testified before this Division?

A. No, sir, I have not.

Q. Summarize for us your education.

A. In 1986 I received a bachelor's degree from the State University System of New York. And in 1990 I earned a master's degree from the Colorado State University in Fort Collins, Colorado.

Q. In what fields did you obtain those degrees?

A. The bachelor's degree was in geology and the master's degree was in geology with a specific emphasis on sedimentary geology.

Q. Subsequent to obtaining your degrees, have you been employed as a professional geologist in the industry?

A. Yes, I have.

Q. Summarize for us and describe your employment

experience.

A. In 1990 I gained employment with Meridian Oil and have worked in such capacity with them ever since.

Q. Have your duties as a geologist included any portion of southeastern New Mexico?

A. Yes, they have.

Q. Describe generally what it is that you do.

A. Geology, exploration and development in both Lea and Eddy Counties, New Mexico.

Q. The Application today is to have various approvals by the Division for what we've identified as the East Corbin-Delaware unit. It's located in the West Corbin-Delaware Pool. Are you familiar with that project?

A. Yes, I am.

Q. How are you familiar with it?

A. I've been the geologist responsible for it since 1992.

Q. What is it that you've done?

A. Analysis of geological data for the purposes of extracting hydrocarbons.

Q. As part of that analysis, have you formulated any geologic opinions concerning the feasibility of initiating secondary recovery operations within this area we've described as the East Corbin-Delaware unit?

A. Yes, sir, I have.

MR. KELLAHIN: We tender Mr. Szantay as an expert petroleum geologist.

EXAMINER STOGNER: Mr. Szantay is so qualified.

Q. (By Mr. Kellahin) Give us a general geologic description of the type of reservoir that we're dealing with here, Mr. Szantay.

A. Okay, we're dealing with sandstone reservoirs, two of them, so designated "A" and "B" reservoirs on the displays, at a depth of approximately 5200 feet.

Q. When we look at this particular area, is there a trapping mechanism within the reservoir that explains the accumulation or the occurrence of hydrocarbons in the Delaware?

A. Yes, sir, there is.

Q. What is it?

A. It's a combination stratigraphic-structural trap.

Q. When the Examiner begins to look at the details of your work, give us a sense of where you're taking us with your conclusions in terms of how you have defined a logical, reasonable boundary configuration for this unit.

A. Okay. If I may, Mr. Examiner, I'd like to refer to Exhibit 2 and Exhibit 6.

Q. All right, we're going to look at them at the same time?

A. Yes, sir.

Q. All right, let's do that. Give us a moment, and let's find Exhibit 2, and then let us go through and look at Exhibit Number 6. Give us a second to unfold those displays.

A. Sure.

Q. All right. First of all, for the record, let's identify both Exhibits 2 and 6. First, what is Exhibit 2?

A. Exhibit 2 is a conventional structure map on top of the "A" sandstone reservoir.

Q. Does that represent your work product?

A. Yes, it does.

Q. Exhibit 6 is what, sir?

A. Exhibit 6 is a structural cross-section over the Delaware sandstones in question today.

Q. All right. And again, does that represent your work product?

A. Yes, it does.

Q. Let's look first at Exhibit -- Well, let's start with Exhibit 6 for a quick moment --

A. Okay.

Q. -- and have you help us understand the relationship --

A. Sure.

Q. -- between what you've identified as the Delaware "A" sandstone and the Delaware "B" sandstone.

A. Sure. I'd like to direct Mr. Examiner's attention to the yellow on these cross-sections, which is sandstone. The blue is impermeable dolomite.

The reservoirs that we're going to be talking about today are so designated "A" sandstone and "B" sandstone on Exhibit 6. And Exhibit 6, I believe, clearly shows the structural and stratigraphic nature of both those reservoirs.

Exhibit 6, the cross-section goes from the south part of the unit to the north part of the unit. And if you look at the "A" and the "B" sandstone reservoirs you can see how both the porosity and the sandstone pinch out updip, and --

Q. Why have you taken the Delaware and subdivided it into an "A" sandstone and a "B" sandstone?

A. For ease of communication, and because they are distinct sedimentary units within the Delaware.

Q. Prior to any production out of either one of these Delaware intervals, were they separate, within a geologic context?

A. Not to my knowledge, no.

Q. All right. Do you see any permeability barrier between the "A" and the "B" sandstone as we move from log to log?

A. In its natural state, yes, the blue in between

the "A" and the "B" sandstone would provide a permeability barrier.

Q. As developed, though, with these Delaware wells, what has happened to those two different sandstone members?

A. There's a high likelihood that both those sandstone members have been communicated through mechanical stimulation.

Q. As part of the project, then, what is intended to be the flood interval for the waterflood project?

A. Both the "A" and the "B" sandstone intervals.

Q. When we look at your cross-section, can you show us a way to illustrate whether or not the "A" and the "B" sandstone members are confined vertically so that they're isolated above and below from any other source of supply or freshwater aquifer?

A. I believe both Exhibits 6 -- and I'd like to direct Mr. Examiner's attention now to Exhibit 5, a similar structural cross-section over the "A" and the "B" sandstone interval.

Q. Okay, let's take a moment and unfold Exhibit 5 and then have you speak to that specific issue.

A. Yes, sir.

Q. Exhibit 6 is taking us north-south through the unit area?

A. That's correct.

Q. And when we look at Exhibit 5, what direction are we seeing?

A. Exhibit 5, on the locator map contained on the cross-section, is cross-section E to E'. It's an east-west structural cross-section through the unit.

Q. Again, this is your work product?

A. Yes, sir.

Q. Help us see how you have concluded that there's isolation of the "A" and the "B" sandstone of the Delaware from any other formation.

A. The logs represented on this cross-section are standard density-derived porosity logs. The blue, again, is going to be impermeable dolomite and the yellow is going to be permeable sandstone.

I believe that both cross-sections, using the same color code, clearly show that the only permeability exists in the sandstone.

Q. How were these wells completed after they were drilled?

A. Through conventional mechanical hydraulic fracturing techniques.

Q. Are those stimulation or fracturing techniques such that you would fracture the formations that are confining the "A" and the "B" sandstones?

A. Not to the point that they would communicate out

of zone.

Q. So we still maintain good geologic integrity of the ceiling formations above and below the "A" and the "B" sandstone?

A. Yeah, I'm wholly confident of that.

Q. Before we leave the cross-sections, give us your conclusion about the geologic continuity as we move laterally through the "A" and the "B" sandstones.

A. Okay. Mr. Examiner, if you'd look at cross-section E to E', or Exhibit 5, which is the east-west cross-section through there, I've colored in red porosity greater than eight percent, and I've correlated the "A" and the "B" sandstone again in yellow, and I believe that it's clear that significant porosity is developed in both zones and is continuous from wellbore to wellbore.

Q. What does that tell you as a geologist about the potential feasibility of subjecting this portion of the Delaware to waterflood operations?

A. That such procedures conducted are very feasible.

Q. All right, sir. Take me back to the structure map now, which is Exhibit Number 2, and tell me why the structure map is of any significance to you as you begin to formulate a plan for the configuration of acreage for the unit waterflood project.

A. Okay. The structure map on the top of the "A"

sand, Exhibit 2, is mapped on the interface between the top of the "A" sandstone and the overlying impermeable dolomite.

You might want to refer to Exhibit 6.

You can see that there is a -- there is an anticlinal nature to the structure within the unit boundary, providing the updip trap for hydrocarbons in both the "A" and the "B".

Q. What is the drive mechanism in this reservoir, Mr. Szantay?

A. It's a gas solution drive mechanism.

Q. Do you see an active water component to affect recovery in the reservoir?

A. No, sir, we do not.

Q. There is a water component in the reservoir, but it's not an active water drive?

A. No, sir, it is not.

Q. All right. There is water present?

A. Yes.

Q. Okay. But it doesn't support pressure or provide a drive mechanism for oil production?

A. No, sir, it does not.

Q. Are there any other geologic components to the trapping mechanism, other than structure?

A. The porosity as present in both the "A" and the

"B" reservoirs and as they are draped over this anticlinal feature, yes.

Q. What is it?

A. Please rephrase the question.

Q. Well, if there's another component to the reservoir, other than structure, I assume it's some kind of reservoir limit; you simply lose porosity sufficient to give you oil productivity in the reservoir in some direction?

A. Yes, sir, that's correct.

Q. All right. When we look at Exhibit 2, then, we are only looking at the structural portion of that analysis?

A. Yes, sir, that's correct.

Q. When we look at Exhibit 2, there is a dashed or a hashed black boundary which conforms to the proposed current unit boundary, right?

A. Yes, sir.

Q. Help us use the structural part to explain the boundary as you propose to have it approved.

A. Okay. The north part of the boundary, as presented on Exhibit 2, coincides with the updip porosity sandstone pinchout in both the "A" and the "B" horizons. So there is no significant porosity available for exploitation north of the north boundary.

Q. All right. Before we leave Section 16 on the north boundary, tell me if there's a geologic basis for the exclusion of that 40-acre tract which is in unit letter J of Section 16. It's the northwest of the southeast.

A. Yes, sir, there is.

Q. Tell me why.

A. I would need to refer to Exhibit 3 and Exhibit 4 if I may.

Q. All right, we'll come to that in a second, then.

A. Okay.

Q. So if you're looking only at structure, you might include that 40-acre tract?

A. Yes, sir.

Q. When you look at the well control in Section 16 along that boundary, starting with the well that's labeled "absent", tell me what that means. Do you see it? It's in the southeast northeast of 16 --

A. Yes, sir.

Q. -- unit letter H. It says the word "absent".

A. Yes, sir.

Q. What does that mean?

A. The formation, the "A" and the "B" sandstones, are absent in that wellbore.

Q. No reservoir at all there?

A. No reservoir.

Q. So that appears to be a logical point to draw a boundary difference if you put the boundary south of that absence of reservoir as located in that wellbore?

A. Yes, sir, that's correct.

Q. When you move over to the well in the southeast of the northwest, which is unit letter F --

A. Yes, sir.

Q. -- it's the deep gas well, apparently; it's 12,500 feet?

A. Yes, sir.

Q. Is there any log indication there in that well that the Delaware "A" and "B" have any reservoir?

A. No, sir, there is not.

Q. So it's a good control point for that boundary?

A. Yes, sir, it is.

Q. When we dip down into the 40-acre excluded tract, there is a well there?

A. Yes, sir, there is.

Q. What does that information tell you?

A. That there were no significant -- I should say that analysis shows, and the logs from that well indicate, that there were not sufficient hydrocarbons present in the reservoir in that tract for economic exploitation.

Q. So if the BLM requests that tract as being deleted, it's certainly consistent with the geologic

opinion that you could reach?

A. It would be.

Q. All right. Let's take now -- In addition to the structure map, show me the next exhibit that integrates reservoir porosity or pore volume into helping establish the boundary.

A. The next exhibit that does that, if we go counterclockwise around the boundaries to the west boundary, please allow me to refer to Exhibit 4.

Q. Okay, let's look at Exhibit 4. Identify for the record, Mr. Szantay, what we're looking at when we see Exhibit Number 4.

A. Exhibit 4 is a hydrocarbon pore-volume map of the "B" sandstone interval.

Q. All right. Before we discuss the importance of that display, help us verify your opinions about the accuracy of the distribution on this pore-volume map. How did you prepare it and what degree of confidence do you have that it is accurate?

A. Hydrocarbon pore volume is an integration of the oil concentration in the formation and the porosity in the formation, simply oil saturation times porosity times feet or unit foot.

Q. Are you satisfied that you had sufficient well control and other geologic data by which to draw this map?

A. Yes, sir, I am.

Q. In addition, have you had this information verified by your reservoir engineer as to distribution and volume?

A. Yes, sir, I have.

Q. You also have a similar pore-volume map for the "A" sand, which is Exhibit Number 3?

A. Yes, sir.

Q. All right. Let's stay with Exhibit 4, though, and have you use that in combination with Exhibit Number 2. We've talked about the north boundary of the unit. Help us use those two displays as we move counterclockwise around the boundary and give us your justification for that boundary.

A. Okay, because, before any drilling took place, these two reservoirs were separate entities, we felt it necessary to map their hydrocarbon pore volumes separately.

Exhibit Number 4 shows that the western boundary of the unit is defined by the western extent of economic hydrocarbons in the "B" sandstone interval.

Q. All right, let's demonstrate to the Examiner how you were able to reach that conclusion. If you'll take the structure map, Exhibit 2, as a point of reference, let's look in Section 16 at the two wells that are in the west half of the southwest quarter.

A. Yes, sir.

Q. They'll be in unit letter L and unit letter M.

A. Yes, sir.

Q. Give us the information on those wells that helped you pick the western boundary of the pore volume.

A. Okay, the wells we're referring to are numbered 3 and 4. And if you look at the dashed line on Exhibit Number 2, that represents our interpreted oil-water transition zone in the reservoir.

Well number 3, we believe, was encountered to the lower side or the more -- the wetter side of that oil-water transition zone. And in wellbore number 4, the Delaware was encountered on the updip side of that oil-water transition zone.

Q. You're confident that you have approximate -- geologic data in close proximity to this line to give you confidence that you've accurately located the boundary?

A. Yes, sir, to the best ability of my interpretation.

Q. All right, sir. Let's continue to have you move counterclockwise and have you continue to describe your justification for the boundary.

A. Okay. Again, I'd like to refer to Exhibit Number 3, also a hydrocarbon pore-volume map on the "A" sandstone interval now.

Q. All right, just a minute. You've moved to another display?

A. Yes, I have.

Q. All right. You're looking at Exhibit 3, which is the "A" sand pore volume-map, right?

A. Yes, sir.

Q. What is it that you want us to see on that display?

A. Okay, the southern boundary of the unit needs to include the four tracts -- four 40-acre tracts across the southern part of the unit, because in both the "A" and the "B" sandstone hydrocarbon pore-volume intervals, there are significant hydrocarbon deposits in both the "A" and the "B" intervals that need to be exploited.

Q. All right, because there's pore volume in both the "A" and the "B" that extends down into those 40-acre tracts, you have concluded it's logical to have them in the unit?

A. Yes, sir, I have.

Q. How do you reconcile that with the fact that on Exhibit Number 2 you show an approximate oil-water contact?

A. It's because it's not a knife-edge-sharp contact in the Delaware sands. It is a transition zone and it is interpreted, and rather than take the chance of leaving any hydrocarbons out of the unit, we feel that it is prudent to

include those tracts.

Q. Describe for us why this approximation of an oil-water contact on Exhibit Number 2 is not a hard line that you can specifically locate in the reservoir.

A. Because of the general dips involved here and the thickness, approximately 80 feet of interval, it has to be a transition zone. It can't be a -- We're not dealing with a graduated cylinder here; we're dealing with a porous sandstone, gently dipping.

Q. What is your geologic opinion about the best way, then, to identify hydrocarbon oil reserves in place that ought to be attributed to the unit? Is that the pore-volume map, or simply some oil-water contact that's inferred?

A. I believe the pore-volume maps are our best tool for interpreting where there are economic amounts of hydrocarbons.

Q. Okay. On the Examiner's copy, and I think on your copy as well of Exhibit Number 1, I've identified four triangles that represent the three wells to be converted to injection and then the new-drilled injector. The new-drill injector obviously is slightly mis-spotted.

But from a geologic perspective is there any logic to why these four wells are proposed as injection wells?

A. Yes, sir, there is.

Q. What is it?

A. Those locations were picked because they would most efficiently exploit the porosity and hydrocarbon deposit trends in the reservoirs.

Q. What causes you to say that?

A. Analysis of the porosity and hydrocarbon deposits in the reservoirs.

Q. Sometimes we see a reservoir that is positioned such that you would want the injection wells on the fringe or downstructure point of the reservoir, to drive oil upstructure?

A. Yes, sir.

Q. This obviously is not that case. Why not?

A. Because over millions of years, hundreds of millions of years, hydrocarbons will migrate up such a gentle dip and collect.

Over the span of time that we're considering injecting into the reservoir, the gentle dips in this reservoir will not affect where we're driving our hydrocarbons.

We're most concerned with injection pressures and, in locating injection wells, to most efficiently exploit a porosity we can affect in a reasonable span of time.

Q. I believe you've covered, Mr. Szantay, all your geologic exhibits. Exhibit 1 is simply a locator map, and Exhibits 2 through 6 represent your work product?

A. Yes, sir, that's correct.

Q. All right. Summarize for us your geologic conclusions about the feasibility of the project.

A. In summary, I believe it's very feasible, it's prudent, and -- that in order to recover hydrocarbons that would not normally be recovered, it only makes sense to undertake secondary recovery procedures at this time.

Q. Do you see any remaining opportunity within this unit area to drill further development, primary oil-producing wells?

A. At this time, I believe it's only prudent to leave that option open to us, as we gather more data during the waterflooding procedures.

Q. At this point you don't have any plans for, or do you see the opportunity to go out and drill any more primary oil wells?

A. No, sir, I do not.

Q. Do you see any adverse consequences to any of the offsetting interest owners if this project is approved?

A. Absolutely not.

MR. KELLAHIN: That concludes my examination of Mr. Szantay, Mr. Examiner.

We move the introduction of Exhibits 1 through 6.

EXAMINER STOGNER: Exhibits 1 through 6 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. In referring to Exhibit Number 6, which you utilized, I believe, to -- Sorry, that would have been Number 5, and specifically the well that shows the cores, now, that well, I would assume, the "A" and the "B" and the impermeable layers were communicated directly because of that coring; is that correct?

A. The coring procedure itself would not inherently communicate the zones behind pipe. It would...

Q. You're just saying that the perforation intervals that will show was the ones that communicated the wells --

A. Right, the --

Q. -- mechanically?

A. -- mechanical stimulation, the frac'ing of the sand, fracturing the formation would do that.

Q. And you're not saying that any of these wells are open-hole completed through that interval?

A. That's correct, sir.

Q. Okay. Have you had a chance to take a look at those cores?

A. Yes, sir, I have.

Q. Is there any inherent difference between the "A" sand and the "B" sand?

A. No, sir, not to the naked eye. And as far as depositionally and sedimentologically, no.

Q. And what kind of a deposition are these sands, the "A" and the "B" in particular?

A. It would be a marginal -- a basin margin environment.

Q. I'm sorry, a basin marginal --

A. A basin margin environment.

Q. Are there any fractures in either of those sands? Are they naturally fractured?

A. No, they're not naturally fractured.

Q. They're just a good -- Would you consider them a good consolidated sand?

A. Yes, sir, I would.

Q. I do show a few wells that have perforations up -- and I don't show that interval on your cross-sections identified. It's between the "YZ" sand and the "A" sand. Some of those have been perforated?

A. Yes, sir, it's a stray sandstone interval that is not continuous, even within the unit boundary.

Q. And I'm assuming that that is not an interval of your subject here today; is that correct?

A. That's correct, sir.

EXAMINER STOGNER: I imagine that your reservoir engineer will probably tell me about how the completions of those particular wells will be handled?

MR. KELLAHIN: Yes, sir.

Q. (By Examiner Stogner) Were you the one that presented this information, this geological information, to the BLM?

A. Yes, sir, I was.

Q. I can understand the two corners, but I'm still having a problem with that one little quarter section coming down in the south half of Section 16.

A. Their statement to me -- and I'm paraphrasing, close to quoting -- was that if the combined hydrocarbon pore-volume contours do not intersect a 40-acre proration unit, they would strongly recommend deleting from the unit.

Q. In your opinion, is that a wise decision? Just your opinion.

A. Of course, I would like to have my initial recommendation to include it in the unit, because as we learn more we may find out that it has potential. I don't have a real problem with deleting it from the unit as we stand right now.

MR. KELLAHIN: A footnote, Mr. Examiner: We have conceded the point to the BLM for two reasons. One, Meridian will still control the 40-acre tract and can then

expand the unit later to include the 40-acre tract.

In addition, the participation formula for the unit does not include an acreage component, so acreage is not a factor. It's simply pore volume is the critical control parameter. And because acreage is not a factor, we waive disputing it.

EXAMINER STOGNER: That might have had some reason why the State Land Office --

MR. KELLAHIN: That's exactly right, it didn't cut into their share.

EXAMINER STOGNER: Or rolled over, as I was going to say.

I have no other questions of Mr. Szantay.

MR. KELLAHIN: I have a follow-up question on a different topic. Mr. Szantay has been on the surface of the property. I want to ask him his questions about the location of freshwater sources.

EXAMINER STOGNER: Yes, sir.

MR. KELLAHIN: Let's take a moment and have you do that.

FURTHER EXAMINATION

BY MR. KELLAHIN:

Q. First of all, have you been on the surface of the project area?

A. Yes, I have, a number of times.

Q. What purpose did you go there for?

A. Specifically looking for windmills and freshwater wells.

Q. And what did you find?

A. We saw one windmill, and that would appear on --

Q. We have it on one of the displays?

A. On one of the exhibits. It also appears on conventional government published topo maps.

And there was another water well to the south of the unit boundary, significantly far away, that did not have a windmill. Data from the State Engineer indicated that it produced from the Ogallala formation, from a depth of less than 400 feet. The windmill was producing from 40 feet out of tertiary alluvium -- I'm sorry, quaternary alluvium.

Q. We have those -- You've examined the displays that Mr. Babin will utilize, and have we correctly located, according to your information, the position of those freshwater sources?

A. Yes, they are correctly located.

Q. In addition to an examination of the surface, did you conduct any other examinations of records or information kept by any agency?

A. Yes, I did.

Q. And what did you do?

A. I came to the conclusion that --

Q. No, no, what did you do? Where did you go to get the data?

A. I don't recall the name of the publication. The State Engineer was one source, and he had a record of every freshwater well drilled out there, whether it be for human consumption, stock or for subsequent drilling of other oil wells. And a publication from the New Mexico Institute of Mining and Technology covering all freshwater aquifers in the Querecho Plains and surrounding areas.

Q. All right. When we look at the deepest known freshwater source within a half mile of this area, what is the deepest source? Is that the Ogallala?

A. It would be the tertiary Ogallala formation at a depth of 400 feet.

Q. Okay. Other than those two sources that you've identified, you found no other source either by inspection of records or a visual inspection of the surface?

A. That's correct.

MR. KELLAHIN: That concludes my examination.

FURTHER EXAMINATION

BY EXAMINER STOGNER:

Q. This is ten miles west of Buckeye. Is this on the caprock or off the caprock area?

A. It's immediately off the caprock area.

Q. Is it your recollection that the Ogallala extends off that caprock area, the Ogallala water-bearing interval?

A. According to the New Mexico Institute of Mining and Technology publication, yes, it is present.

EXAMINER STOGNER: I have no other questions along those lines of this witness.

MR. KELLAHIN: We'd like to excuse this witness and call at this time Mr. Chet Babin.

EXAMINER STOGNER: You may be excused.

Mr. Kellahin, I was --

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: -- just talking to Mr. Rand Carroll here about Case 11,208, and the pertinent information is all covered to institute a waterflood project in the unit located in portions of those sections, and I did get site-specific of the injection wells in this particular instance, and all that would have been included would be -- the inclusion of three existing wells to be converted from oil producers and one additional well to be drilled. That's all that would have been stated or changed in that particular ad.

And considering that's not site-specific and that all the other pertinent information is carried, I don't -- in discussing with Mr. Rand Carroll, I don't see the need to readvertise it. So when we're concluded here today, if

we can take it under advisement subsequent to the admission of evidence, if that would be the appropriate action, I don't see any need to readvertise, either instance.

MR. KELLAHIN: I appreciate that, sir.

EXAMINER STOGNER: And again, I apologize for excluding that.

So I'll turn it back over to you.

MR. KELLAHIN: All right, sir. I've called Mr. Chet Babin. Mr. Babin spells his last name B-a-b-i-n, and he's a reservoir engineer. He resides in Midland, Texas.

CHET A. BABIN,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Babin, for the record please state your name and occupation.

A. My name is Chet Babin. I'm a reservoir engineer for Meridian Oil in Midland, Texas.

Q. Summarize for us your education, sir.

A. In 1984 I received a bachelor of science in mechanical engineering from the University of Houston, and in 1993 I received a master of science in petroleum engineering from the University of Texas at Austin.

Q. Summarize your employment experience as a

petroleum engineer.

A. In the summer of 1992 I worked for Amoco Production Research in Tulsa, Oklahoma. And in January, 1993, I began my career with Meridian Oil in Midland.

Q. What are your engineering duties insofar as it applies to what we've identified as the East Corbin-Delaware unit?

A. My duties were to determine injection pattern and assign reserves and estimate production figures from the...

Q. Are those activities within your expertise?

A. Yes, sir.

Q. And based upon that work, did you find that you had enough engineering data and information by which to make accurate forecasts of the feasibility of this waterflood project?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Babin as an expert petroleum engineer.

EXAMINER STOGNER: Mr. Babin is so qualified.

Q. (By Mr. Kellahin) Let's talk about the history of this portion of the unit, insofar as it deals with the Delaware production, Mr. Babin.

Can you give us a general summary of what has been the extent of primary depletion in this portion of the reservoir?

A. Yes, sir, this lease is in its mature stage of primary production.

Q. There's background noise in the room. I'm having trouble hearing you, and the microphone is not going to amplify your voice, so you have to speak up.

How many active producers do you currently have in the unit area?

A. We have eight active producers.

Q. And what current rate of oil production do they achieve?

A. Leasewide, we're producing approximately 90 barrels of oil a day.

Q. What has been the current cumulative oil production under primary operations?

A. Under primary operations, the cumulative production has been 409,000 barrels of oil.

Q. Have you forecast as an engineer what you think to be the remaining primary oil to be produced?

A. Yes, sir, I have.

Q. And what is it?

A. 526,000 barrels of oil.

Q. That's the ultimate primary oil recovery?

A. Yes, sir.

Q. All right. What portion of that remains to be future primary oil?

A. Approximately 110,000 barrels.

Q. All right. If we continue without secondary operations, we're going to get another 110,000 barrels of oil?

A. Yes, sir.

Q. Have you analyzed to determine what additional oil you might recover under secondary operations?

A. Yes, I have.

Q. And what is that number?

A. 510,000 barrels of oil under secondary operations.

Q. What is the method you utilized as an engineer to come to that conclusion?

A. We performed decline-curve analysis on the current wells to determine the primary production.

Referencing that to the calculations of the original oil in place -- that would be leasewide -- we would be getting 8.5 percent of the original oil in place recovered.

And by analogy fields, one in particular, the Parkway-Delaware field of which Meridian is a partner in, we've estimated a one-to-one primary-to-secondary recovery.

Q. If the project is successful as forecast, then, what will be the percentage of total recovery in relation to original oil in place?

A. Leasewide, about 17 percent.

Q. All right. So you get to double your recovery?

A. Yes, sir, that's correct.

EXAMINER STOGNER: Along this line of questioning, I have one.

You said the secondary will recover 510,000 additional barrels; is that correct?

THE WITNESS: Yes, sir.

EXAMINER STOGNER: Is that on top of the 110,000 future primary, or --

THE WITNESS: Yes, sir, that's correct.

EXAMINER STOGNER: -- is that in addition? Oh, it includes it?

MR. KELLAHIN: No, sir, it's in addition.

THE WITNESS: No, sir, it does not.

EXAMINER STOGNER: It's in addition. Okay. So we're looking at, from today's date, if the thing was approved, it would be 620,000 barrels of oil would be recovered from this area, 110,000 of it primary, 510,000 of it through secondary?

THE WITNESS: That's correct.

EXAMINER STOGNER: Okay. Thank you, Mr. Kellahin.

Q. (By Mr. Kellahin) To achieve that opportunity, what have you recommended in terms of the location of

injection wells in relation to producers?

A. Would you rephrase the question, please?

Q. Yes, sir. You've figured out how to recover another 510,000 barrels of oil, and you're going to do that by the location of some injection wells in order to have a production response.

A. Yes, sir, that's correct.

Q. How did you decide where to put the injection wells?

A. We chose the injection wells to be such that it would provide a sweep through the largest hydrocarbon pore-volume areas.

Q. All right. Why did you choose to use that as the criteria for determining the efficiency of the injection wells?

A. Because that pattern would show the most efficient -- the quickest response, as well as most efficiently recovering oil from the reservoir under secondary conditions.

Q. All right, sir. Have you estimated the capital cost of these additional activities in order to initiate and operate the project?

A. Yes, sir, I have.

Q. Break them out for us. What are the numbers?

A. To drill and equip the proposed Federal MA Number

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 11207
ORDER NO. R-10317

APPLICATION OF MERIDIAN OIL, INC. FOR A UNIT AGREEMENT, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on February 16, 1995, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 27th day of February, 1995, the Division Director, having considered the record and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) At the time of the hearing Division Case Nos. 11207 and 11208 were consolidated for the purpose of testimony.

(3) The applicant, Meridian Oil, Inc. ("Meridian"), seeks approval of the East Corbin Delaware Unit Agreement for an area comprising 760 acres, more or less, of State (360 acres, 47.37%) and Federal (400 acres, 52.63%) lands in Lea County, New Mexico, as further described in Exhibit "A" attached hereto and made a part hereof.

(4) Within the East Corbin Delaware Unit Area, the applicant proposes to initiate secondary recovery operations in the West Corbin-Delaware Pool (being the subject of companion Case No. 11208).

(5) The "Unitized Formation or Interval", although not finalized at this time should essentially include the corresponding interval known as the West Corbin-Delaware Pool or a portion thereof.

(6) At the time of the hearing Meridian had obtained preliminary approval of the East Corbin Delaware Unit from the Commissioner of Public Lands for the State of New Mexico.

(7) No interested party appeared and objected to the proposed unit agreement.

(8) All plans of development and operation, and creations, expansions or contractions of participating areas, or expansions or contractions of the Unit Area should be submitted to the Director of the Division for approval.

(9) Approval of the proposed unit agreement should promote the prevention of waste and protection of correlative rights within the Unit Area.

IT IS THEREFORE ORDERED THAT:

(1) The application of Meridian Oil, Inc. ("Meridian") for the East Corbin Delaware Unit Agreement and Area comprising 760 acres, more or less, of State (360 acres, 47.37%) and Federal (400 acres, 52.63%) lands in Lea County, New Mexico, as further described in Exhibit "A" attached hereto and made a part hereof, for the purpose of establishing a secondary recovery project is hereby approved.

(2) The "Unitized Formation or Interval", although not finalized at this time shall include that interval known as the West Corbin-Delaware Pool or a portion thereof.

(3) The plan contained in said unit agreement for the development and operation of the unit area is hereby approved in principle as a proper conservation measure; provided however, notwithstanding any of the provisions contained in said unit agreement, this approval shall not be considered as waiving or relinquishing, in any manner, any right, duty or obligation which is now, or may hereafter be, vested in the Division to supervise and control operations for the unit and production of oil and gas therefrom.

(4) The unit operator shall file with the Division an executed original or executed counterpart of the unit agreement within 30 days after the effective date thereof; in the event of subsequent joinder by any other party or expansion or contraction of the unit area, the unit operator shall file with the Division, within 30 days thereafter, counterparts of the unit agreement reflecting the subscription of those interests having joined or ratified.

(5) All plans of development and operation, all unit participating areas and expansions or contractions of the unit area, shall be submitted to the Director of the Oil Conservation Division for approval.

(6) This order shall become effective upon the approval of said unit agreement by the Commissioner of Public Lands for the State of New Mexico and the Director of the appropriate agency of the United States Department of the Interior; this order shall terminate ipso facto upon the termination of said unit agreement; and the last unit operator shall notify the Division immediately in writing of such termination.

(7) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

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

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY
Director

Exhibit "A"

CASE NO. 11207

DIVISION ORDER NO. R-10317

MERIDIAN OIL, INC.

EAST CORBIN DELAWARE UNIT AREA

TOWNSHIP 18 SOUTH, RANGE 33 EAST, NMPM
LEA COUNTY, NEW MEXICO

Section 15: S/2 SW/4
Section 16: SW/4, NE/4 SE/4, and S/2 SE/4
Section 21: NE/4, N/2 NW/4, and SE/4 NW/4
Section 22: N/2 NW/4 and SW/4 NW/4.

Comprising a total of 760 acres, more or less, 400 acres which are Federal (52.63%) and the remaining 360 acres (47.37%) which are State.

11 --

Q. That's the new-drill injector?

A. Yes, sir.

Q. Okay, what's that going to cost?

A. $301,000.

Conversion of three other wells to injection would be $127,000.

To upgrade the battery and facilities in order to inject water, $108,000.

That's a total of $536,000 for the project.

Q. Have you put a present value, either discounted or undiscounted, on the additional 510,000 barrels of oil to be recovered under secondary operations?

A. Yes, sir, I have.

Q. What is that number?

A. One minute, please.

To the best of my recollection, it was about $9 million.

Q. The Application that we filed said $9.5 million. Is that within the range of what your expectation is?

A. Yes, sir, that's correct.

Q. How did you make that calculation?

A. The oil from the lease is currently selling at $15.60 a barrel, and so using that price and escalating it at three percent per year over the life of the project

would realize the $9.5 million.

Q. And you didn't otherwise risk or discount that value?

A. That's correct.

Q. All right. Give us a sense of the timing of the project. How long have you forecasted the life of the project to be in order to recover this volume of additional oil?

A. Project life is an estimated ten years.

Q. Let's turn to some of those projections. If you'll look with me at what is marked Exhibits Number 7, 8 and 9, and they are the production plots plus the forecast, they're on the 8-1/2-by-11 sheets, and let's start with 7. Again, this represents your work product?

A. Yes, sir.

Q. Let's look at 7 and have you describe for us what you're showing.

A. Okay, if I could bring to the attention of Mr. Examiner Exhibit Number 7, this represents the historical as well as projected production for crude oil.

The projection begins in January of 1995 with a response showing in January of 1996, which brings a peak production in the year 2001, with a dropoff beginning in the year -- sometime in 2002.

Q. Your verification of this forecast is your

analogy to that Parkway-Delaware waterflood operation that I believe Siete is operating?

A. Yes, sir, that's correct.

Q. In which your company has an interest?

A. Yes, sir, that's correct.

Q. Approximate for us the length of time after initiation of injection where you will then see a first positive production response.

A. We estimate that to be in less than 12 months.

Q. All right. Let's go on to the next display and have you identify for us Exhibit Number 8.

A. Mr. Examiner, Exhibit Number 8 is the historical as well as projected production for the casinghead gas for the lease.

This projection begins -- The projection begins in January of 1995. We expect a steady slow decline of casinghead gas.

The sharp dropoff beginning in the year 2003 is due to the decline in the oil production at that time.

Q. All right, sir. And Exhibit 9, identify and describe that display.

A. Exhibit Number 9 represents a historical as well as projected produced water. The projection begins in January of 1995.

We expect somewhat of a flat production of

produced water, and beginning in January of 1997 we estimate that there will be water breakthrough and there will be increased water production.

Q. The way the injection wells are located in reference to the remaining producers, that would give us six remaining active producers in the unit after you make these conversions?

A. Yes.

Q. Is that the right number? You've got six producers, right?

A. Yes, sir.

Q. All right. Are these producers going to be open in both the "A" and the "B" sandstone?

A. Yes, sir, that's correct.

Q. And the injection wells would be also open in both of those intervals?

A. Yes, sir.

Q. What will you do with those wellbores that may currently have perforations outside of the injection interval? Are there any?

A. No, sir.

Q. All right. One of the logs in the cross-section showed a perforation that was outside the injection interval. I guess that no longer exists? It's the Federal MA Number 1, it's well 4 on the cross-section. Let me show

it to you, and you can tell me what's going to happen to that wellbore.

A. Which well did you want to discuss first?

Q. Well, I don't know. You pick one. There are some wells that appear, unless the status has changed, to currently have perforations that are outside the future flood zone. And if so, what are you going to do?

A. Okay, for the proposed injection wells, we'll be setting a Guiberson packer that will be approximately 15 feet above the perforated interval, which is in the "A" and "B" sandstones.

Q. All right. So in each instance, there is a plan to isolate off any zone that is not attributable to the "A" and the "B" zone within the flood interval?

A. Yes, sir.

Q. Okay. In terms of reservoir engineering analysis, do you see the probability that each of the six remaining producers are going to each receive some positive production response as a direct result of water injection into any of the four injection wells?

A. Yes, sir.

Q. So as you see it, then, we don't have any producer that would not receive a positive response?

A. That is correct.

Q. All right. Let's go through some of the aspects

of the participation in the production.

As part of the submittal to the State Land Office and the Bureau of Land Management, there was a participation formula as well as participation parameters submitted. Does that represent your work product?

A. Yes, sir.

Q. All right. Without describing the specific details, tell us generally what you looked at in terms of potential parameters.

A. The parameters were original oil in place, remaining primary oil and gas, and the figures and usable wellbores.

Q. As a result of those parameters, did you make a recommendation as to a participation formula?

A. Yes, sir, I did.

Q. All right, and that formula has been submitted to both the State Land Office and the Bureau of Land Management?

A. Yes, sir, it has.

Q. And what comment or reaction did they have to the participation formula?

A. They were amenable to the formula.

Q. What is the source of the formula? Where did you get this formula?

A. The formula was based on, again, the Parkway-

Delaware waterflood. Similar parameters were used and approved by the agencies, so we used that as our go-by.

Q. Is there an acreage component to the formula?

A. No, sir.

Q. So you didn't use an acreage factor in allocating percentages or shares of production?

A. No, sir.

Q. All right. I'm going to ask you to double-check your calculation for me. I'm going to show you what we are going to introduce as the unit agreement form, and here is the participation formula submitted to the agencies on that, and here is the formula as submitted in the supplemental information to the State Land Office. Am I looking at the same calculation?

A. Yes, sir, this is the correct calculation. There is a typographical error on this exhibit.

MR. KELLAHIN: All right. So I don't confuse the Examiner, I'm going to submit to you, Mr. Examiner, a revision to the Exhibit C attached to Exhibit 12.

Exhibit 12 is a copy of the unit agreement.

On the back of that is an Exhibit C, the bottom portion of which has got a typographical error, and after the hearing I'm going to substitute the corrected formula, but I'm going to hand you a copy of the corrected formula now, which is located on the bottom of this letter.

EXAMINER STOGNER: And you handed me a letter dated February 9th, 1995, to the Commissioner of Public Lands from your office?

MR. KELLAHIN: Yes, sir, and I simply need to make some extra copies of that letter. But that letter contains the corrected participation formula as approved by the State Land Office and as pending approval with the Bureau of Land Management.

Q. (By Mr. Kellahin) Now, that represents your calculation in your formula?

A. Yes, sir, that's correct.

EXAMINER STOGNER: Now, that Exhibit C, your different one, it also makes some changes up there in the tract allocation; is that correct?

MR. KELLAHIN: Yes, sir, we have a preliminary letter from the Land Office to submit to you, and they asked us to re-organize the tract identifications, to re-number the wells in accordance with the rules, and so all that clerical work is being done and will be submitted to all the agencies.

EXAMINER STOGNER: Okay, you may continue.

Q. (By Mr. Kellahin) Do you have an opinion, Mr. Babin, as to whether the proposed participation formula as revised is a fair and equitable way to distribute production from the wells dedicated to this unit?

A. Yes, sir.

Q. And what is that opinion?

A. My opinion is that this protects correlative rights.

Q. Let's go now and turn to the subject of the wellbore integrity, if you will, the filing requirements of the Oil Conservation Division for the C-108. Are you with me?

A. Yes, sir.

Q. It's marked as Exhibit Number 10. Again, did you prepare the submittals and sign off on the Division Form C-108?

A. Yes, sir, I did.

Q. Did you accompany Mr. Szantay when he went on the surface to make a surface inspection of the project area?

A. Yes, sir.

Q. And did you agree with his location of any freshwater wells or sources that you could see by a surface inspection?

A. Yes, sir.

Q. In addition, did you also undertake an examination of the records of the State Engineer to find any sources of fresh water?

A. Yes, sir, I did.

Q. And do you agree with the opinions he expressed

earlier as to surface location and depth of groundwater in those wells?

A. Yes, sir.

Q. Okay. When we look at the information tabulated in the C-108, did you identify all wells at any depth within a two-mile radius of any injection well?

A. Yes, sir.

Q. And they will be on one of the displays, right?

A. Yes, sir.

Q. In addition, do you have a tabulation of all wellbore data for wells that penetrated to or through the Delaware within a half-mile radius of any injection well?

A. Yes, sir.

Q. Have you examined that information to determine whether or not there were any currently producing wells, either to or through the Delaware, which have not been adequately cemented so that their casing is protected from the Delaware formation?

A. I did not identify any wells that were inadequately protected.

Q. So based upon your search, we believe all those wells are adequately cemented?

A. Yes, sir, that's correct.

Q. Did you find any plugged and abandoned wells?

A. Yes, sir.

Q. How many?

A. There was one.

Q. And when you look at the plugging reports and information on that well, do you find in your opinion that that well is adequately plugged?

A. Yes, sir.

Q. Do you see any indication or evidence of any hydrologic connection between the injection interval and any groundwater?

A. No, sir.

Q. Describe for us your plan of operation insofar as injection pressures initially in the project area.

A. We estimate an injection pressure at the surface to be 1050 p.s.i.

Q. How did you make that calculation?

A. That's based on a calculation of .2 p.s.i. per foot from surface to the top perforation.

Q. All right, and that gives you slightly over 1000 pounds at the surface, and that would be your initial maximum injection rate?

A. Yes, sir, that's correct.

Q. All right. Have you forecasted or approximated the total volume of water you propose to dispose of in the project area initially?

A. Yes, sir.

Q. And how much?

A. Leasewide, 1800 barrels per day.

Q. When you tabulated the wellbore information, did you find any records for which the only information was reported volumes of cement utilized in those wells?

A. Yes, sir, I did.

Q. For any well for which there was simply sacks of cement reported, did you make a calculation to determine fill-up?

A. Yes, sir.

Q. And what method did you utilize to make that calculation?

A. That calculation was based on 1.32 cubic feet per sack of cement, assuming a 7-7/8 hole and the annulus there of -- also estimating -- a 100-percent excess factor, our calculations determined that the cement sufficiently covers the perforations, at least to 100 feet above the top perforation.

Q. All right. You took the calculation, got the standard yield per sacks of the class of cement utilized normally in this process, and then reduced it by 50 percent?

A. Yes, sir.

Q. And you still obtain a fill-up of at least 100 feet above the top of the Delaware in all instances?

A. Yes, sir.

Q. Have you included any water analysis in the report or the C-108? And if so, what have you included?

A. I've included from Martin Laboratories in Midland, Texas, a compatibility study.

Q. The page numbers of the C-108 are numbered. Can you help us find within the numbers of the C-108 where we'll find the water analysis?

A. Yes, sir, on page 28 is the cover letter from Martin Water Laboratories, and on page 29 is the specific chemical and physical properties of those waters.

Q. All right. Did you have Delaware-produced water by which to conduct an analysis?

A. Not solely.

Q. All right. So how did you make the comparison?

A. I'm sorry, I misunderstood. Yes, we did have Delaware-produced water.

Q. All right, and you got an analysis on Delaware-produced water that gives you a signature for that water that's in the formation?

A. Yes, sir, from two wellbores.

Q. What's to be the source of the injection water?

A. The source of the injection water will come from our West Corbin tank battery.

Q. Okay, that is water produced from what formations?

A. That water is from the Bone Springs, Delaware and Wolfcamp formations.

Q. Do you have an analysis of those combinations of the source water?

A. Yes, sir, I do.

Q. And did you run a compatibility test between the source water and the Delaware formation water to see if they were compatible?

A. Yes, sir, I did.

Q. With what results?

A. The results from Martin Laboratories was that they were compatible.

Q. Do you propose to utilize fresh water as make-up water or injection water for this project?

A. No, sir.

Q. When we look at the injection wells -- Let's look at a schematic that gives us the typical injection well, and you pick one that you want to talk from. Just tell us the page number.

A. I could direct your attention to page 14 --

Q. Okay.

A. -- of the C-108.

Q. We're Looking at the -- what's identified as the West Corbin Federal 21 Well Number 4 in Section 21. It's the one over in the southwest southwest? I'm sorry, I've

got the wrong direction. Where is this well?

A. This well is in the northeast of Section 21.

Q. Oh, yeah, this is unit letter C of 21?

A. Yes, sir.

Q. All right. Tell me what the configuration will be of the wellbore after you get it set up for injection purposes.

A. Okay, what we propose is to set a Guiberson packer, which would be protected by plastic. We're going to use 2-3/8-inch tubing, which will be internally plastic-coated.

Q. How do you monitor the annular space between the tubing and the casing?

A. Between the tubing and the casing, we'll have nine-pound brine and sufficient surface facilities to determine the integrity of the casing.

Q. To set this well up for injection, is the wellbore subject to any further stimulation?

A. We will -- We propose stimulating with 15-percent acid.

Q. Just an acid cleanup job on the well?

A. Yes, sir.

Q. Identify for the Examiner how you have organized the plats, which are compiled together and shown as Exhibit Number 11. I don't want you to describe them in detail,

but just tell the Examiner how you've organized these displays.

A. Mr. Examiner, the exhibits that begin with E, there has been a two-mile radius, a scaled two-mile-radius circle scribed around each proposed injection well.

For the exhibits that begin with F, there's a scaled half-mile-radius circle drawn around each proposed injection well.

And Exhibit J indicates the location of the freshwater wells known in the area.

Q. As a result of notification to the interest owners at the surface of any injection well and to the two offset operators within the half-mile radius, have any objections to approval of this Application been received by Meridian?

A. There have been no objections.

MR. KELLAHIN: That concludes my examination of Mr. Babin, Mr. Examiner.

We would move the introduction of Exhibits 7 through 11.

EXAMINER STOGNER: Exhibits 7 through 11 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Babin, you said that there are presently

eight producing wells?

A. Yes, sir.

Q. And then after the conversion there would be six producers; is that -- Did I hear correct?

A. Yes, sir, that's correct.

Q. Okay. I guess I'm miscounting here, but which -- Now, refer to Exhibit Number 1. I don't know if that's the easiest one, unless you have one that you'd like to refer to that shows all the producers.

A. I need a copy of Exhibit 1.

MR. KELLAHIN: Sure. See if we've miscounted here.

Is that temporarily abandoned?

THE WITNESS: Maybe I misspoke. Once the Federal MA 11 well is drilled, the proposed unit will have 10 total wells. There will be six producers and four injectors. The six producers are in Section 15, the Percha 15 State Number 1; in Section 16 is the State 16 5 and 6; in Section 21, Federal MA and 6 and 7; in Section 22, the Aztec 22 Federal Number 3.

Q. (By Examiner Stogner) I'm assuming these wells will be re-named once the unit gets formed?

A. Yes, sir, that's correct.

Q. Okay. In referring to Exhibit 11, in particular the plat marked F-2 -- this is for the -- called the State

Well Number 8, to be converted into -- as an injector.

Now, within the half-mile-area radius of review, I show three of the plugged and abandoned wells; is that correct? Is that what you count?

A. Yes, sir.

Q. Okay, and they're all described here in the C-108?

MR. KELLAHIN: No, sir, I think two of those are too shallow. If I remember correctly, the BTA Federal Well Number 1 in the northwest of the southwest is the only well deep enough; is that right, Chet?

THE WITNESS: That's correct.

MR. KELLAHIN: And the other two wells are P-and-A'd wells, but they're too shallow.

EXAMINER STOGNER: In fact, one shows a TD of 4271 and the other one has a TD of 2910, okay.

Q. (By Examiner Stogner) In your testimony, you were talking about anywhere from $9 to $9.5 million. That is what you're estimating the total income off the project would be over the years?

A. Yes, sir.

Q. With an initial up-front investment of $536,000; is that correct?

A. Yes, sir.

Q. And as far as the injection water, that was --

and the source was, you had determined, to be from the Wolfcamp, Delaware and the Bone Springs produced water that's in that battery there.

Is there a possibility that you will need any make-up water, or is this going to be enough to supply the 800 barrels a day that you're going to be requiring once the project is up?

A. The West Corbin tank battery will provide sufficient water.

Q. So no fresh water will be needed?

A. That's correct.

Q. This is all re-injected produced water?

A. Yes, sir.

Q. What will be the typical completion of an injection well, as far as the tubing goes?

A. We'll use 2-3/8-inch tubing that will be internally plastic coated.

Q. On all four wells?

A. Yes, sir.

Q. Now, it was clear to me that you were going to seal off or -- not seal off, isolate -- the injection interval to just the "A" and the "B" sands on these wells.

How about the present producing wells? Will those wells be isolated, or do you know if they are isolated to just the "A" and "B" sands? Or are there any

perforations in the upper portions of any of those producing wells?

A. I believe those perforations have been squeezed off.

Q. And for some reason or not, you will, Meridian Oil, have those squeezed?

A. Yes, sir.

EXAMINER STOGNER: Mr. Kellahin, who should I direct this question on the unitized formation described in the unitized agreement?

MR. KELLAHIN: I don't know. The unitized interval is that -- That's off of the log --

(Off the record)

MR. KELLAHIN: I see where you're headed, and perhaps Mr. Szantay is the best one to take a log that you have before you on one of these wells and give us a footage so that we would know his pick of an interval on a type log that will cover the "A" and the "B" sand. And I think that's perhaps the most specific way to do it.

EXAMINER STOGNER: Okay, let me see if I have any other questions of this -- of your engineering witness before I release him, and then I'll ask Mr. Szantay that question on the unitized formation.

You're going to provide me with an additional copy of these letters?

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: That will be Exhibit C.

Q. (By Examiner Stogner) Your formula that's utilized to find the top of cement, you essentially used twice the safety factor of 100 percent; is that correct?

A. Yes, sir.

EXAMINER STOGNER: Mr. Kellahin, I really have no other questions of this witness at this time.

MR. KELLAHIN: All right, sir.

EXAMINER STOGNER: A lot of information here to be digested. But I've exhausted any questions I may have at this time.

MR. KELLAHIN: All right.

Before I call the landman to go through some of the land matters, let me recall Mr. Szantay and let's put on the record, then, the specific interval that's to be subject to waterflood.

EXAMINER STOGNER: Okay.

MR. KELLAHIN: Why don't you take a seat up there, Adam?

EXAMINER STOGNER: Thank you, Mr. Babin.

MR. BABIN: Thank you.

EXAMINER STOGNER: Mr. Szantay, I remind you you're still under oath.

MR. SZANTAY: Yes, sir, understood.

EXAMINER STOGNER: Mr. Kellahin, I'll turn that over to you.

ADAM SZANTAY (Recalled),

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Szantay, if you'll identify for us the exhibit that you have before you as to number, what is that, sir?

A. It is Exhibit Number 5.

Q. All right, let us all get Exhibit Number 5 out. If you'll find Exhibit 5, then, and locate for us a well that you would recommend as a type well by which we can then describe in terms of a footage an interval that's sufficient to encompass the "A" and the "B" sands so that when you get approval for injection of water, we will have the proper interval identified on a log.

A. I believe that the Meridian Oil, Incorporated, Federal MA Number 6 is an adequate type log. That would be well number 3 on Exhibit Number 5.

Q. All right, sir. Find for us the footages as you would recommend them.

A. I'm not sure I understand which footages you would like.

Q. All right, go down to a subsea depth on the log --

A. Okay.

Q. -- and find a point at the top of the "A" sandstone --

A. Okay.

Q. -- with enough margin of error so that we are staying within the approved flood interval, and give us that number as the top number for the flood interval.

A. The top of the "A" sandstone is present in the Federal MA Number 6, at a drilled depth of 5189 feet.

Q. All right. And is that a number that shows on the log?

A. Yes, sir, it is.

Q. All right. Now, take us down to the base of that flood interval and identify for us that footage.

A. The base of the "B" sandstone, also the base of the flood interval, is present in the Federal MA Number 6 at a drilled depth of 5260 feet.

Q. Are those sufficient depths at which we have now encompassed the entire potential flood zone?

A. Yes, sir, in that particular wellbore.

Q. All right. And so that's our type well --

A. Yes.

Q. -- and by correlation, then, we can find that

same interval by looking at the other logs?

A. Yes, sir.

MR. KELLAHIN: All right, sir. No further questions.

EXAMINATION

BY EXAMINER STOGNER:

Q. Okay, let me make sure I got the top straight. What did you say the top was again?

A. In the Federal MA Number 6, 5189 feet.

Q. 5260 feet, right?

A. Yes, sir.

Q. Would you supplement me, Mr. Szantay, a -- the information off this particular well log, the date it was run, all the other pertinent information that's really not on here, could you supplement that for me as reference for this particular MA well number 6, this particular log that's represented here?

A. Yes, sir, I believe the information you're requesting is contained in typical header information on the log.

Q. Yes --

A. Okay.

Q. -- if you can make a copy of that --

A. Yes, sir.

MR. KELLAHIN: We'll take care of that.

THE WITNESS: I certainly can.

EXAMINER STOGNER: And I don't think we'll need to name it, Mr. Kellahin, or show it as an exhibit, just for additional information.

Thank you, Mr. Kellahin.

MR. KELLAHIN: All right, sir.

EXAMINER STOGNER: Thank you, Mr. Szantay.

THE WITNESS: Thank you.

MR. KELLAHIN: I have a few questions for our land witness from Meridian, Mr. Examiner, so at this time I'll call Mr. Trey Shepherd. He spells his last name S-h-e-p-h-e-r-d.

TREY SHEPHERD,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Shepherd, for the record would you please state your name and occupation?

A. My name is Trey Shepherd. I'm a landman with Meridian Oil in Midland.

Q. On prior occasions, Mr. Shepherd, have you testified before the Division?

A. No, I have not.

Q. Summarize for us your education and employment

experience.

A. I received a bachelor of business administration in petroleum land management in 1979 from the University of Texas, went to work for Atlantic Richfield Company in 1979, working in Tyler; Tulsa, Oklahoma; Lafayette, Louisiana. (Witness coughs) Excuse me. I went to work for Southland Royalty Company in 1983, have worked for them since that period of time until the present time.

Q. As part of your duties as a landman for your company, are you familiar with the land title matters surrounding this Application in the proposed East Corbin-Delaware unit?

A. Yes, I am.

MR. KELLAHIN: We tender Mr. Shepherd as an expert landman.

EXAMINER STOGNER: Mr. Shepherd is so qualified, and also reacts the same way when I remember my days in Lafayette.

MR. KELLAHIN: Sort of chokes you up, doesn't it?

EXAMINER STOGNER: Yes.

Q. (By Mr. Kellahin) Let's simply go through the rest of the exhibits in the order I've handed you, what I believe is marked Exhibit -- Is it 12?

A. Twelve, that's correct.

Q. And what is that, sir?

A. It's the state, federal and fee waterflood unit agreement.

Q. All right. Is this a form that has been supplied to us and approved by the Commissioner of Public Lands for the consolidation of lands controlled by the Commissioner of Public Lands with lands controlled by the Bureau of Land Management?

A. Yes, it is.

Q. In addition to the form itself, has Meridian caused the exhibits to be prepared and attached to that unit agreement?

A. Yes, we have.

Q. Exhibit A identifies the original tract configuration as originally supplied to the regulatory agencies?

A. That's correct.

Q. And it is to be amended and replaced to conform to the exhibit that we've submitted to this Examiner?

A. Yes, it will.

Q. With the exclusion of those three 40-acre tracts?

A. That is correct.

Q. All right. In addition, you are going to amend what is identified as Exhibit B, and you will show the ownership information with regards to each of the tracts?

A. Yes, we will.

Q. The tracts are identified, at least on this display, as tracts 1 through 5?

A. That's correct.

Q. Have you examined this information on all supplemental information to make sure that they're accurate and correct?

A. Yes, we have.

Q. Do we have a commitment for the voluntary participation of all the working interest owners within this unit on a voluntary basis?

A. Yes, we do.

Q. And you will circulate the necessary forms for approvals by the various royalty and overriding royalty owners?

A. Yes, we will.

Q. The status of approvals of the various agencies, Mr. Shepherd, if you'll turn to Exhibit 13, identify that document for me.

A. It is a letter from the State of New Mexico, Commissioner of Public Lands, dated February the 15th, 1995, directed to your attention, giving us preliminary approval for the East Corbin-Delaware unit.

Q. The conditions for final approval are set forth in the letter?

A. Yes, they are.

Q. You've understood and read those conditions?

A. Yes, we have.

Q. Are we able to satisfy or conform to those additional requirements?

A. Yes, we will.

Q. What is the status of approval with the Bureau of Land Management at this point?

A. We expect to receive a letter from them in our conversations with them yesterday. The letter should be forthcoming.

Q. The preliminary approval meetings have been attended by representatives of Meridian and the offices of the Bureau of Land Management in Roswell?

A. Yes, they have.

Q. And at this point we believe that we've satisfied their conditions and requirements for obtaining preliminary approval?

A. That's correct.

Q. All right. Are you aware of any land title problems that are unresolved with regards to the approvals of this unit?

A. No, I'm not.

Q. Let me direct your attention now to the last exhibit, which is a certificate of notice. It's got my signature on it.

If you'll turn to the second page, have we correctly identified the owners of the surface for each of the injection wells to be either the Commissioner of Public Lands or the Bureau of Land Management?

A. Yes, we have.

Q. In addition, have we correctly noticed that the offsetting operators within a half mile of any injection well are either the Harvey E. Yates Company, I believe it is --

A. Yes.

Q. -- and BTA is the other one?

A. That's correct.

Q. Are you aware of any other interest owner or operator within the half-mile radius other than Southland and Meridian?

A. No, I'm not.

Q. And so notification to Heyco and to BTA would satisfy all requirements for notification of other interest owners?

A. Yes, it should.

Q. Are you aware of any objection to the approval of this Application by either the surface owners or the offset operators?

A. We've received no objection.

MR. KELLAHIN: That concludes my examination of

Mr. Shepherd.

We move the introduction of Exhibits 12, 13 and 14.

EXAMINER STOGNER: Exhibits 12, 13 and 14 will be admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. I understand it that you have a commitment from all the working interest owners. And of course, the royalty interest owners in this instance are both the federal government, BLM and the State Land Office --

A. That's correct.

Q. -- or the State of New Mexico?

What kind of overriding royalty interests -- how many, what percentage, what -- How is that broken down?

A. There are approximately nine different owners. If you look on Exhibit B of the unit agreement itself, we have those broken out for each lease, for each tract.

Q. What would happen if all of them or none of them or one or two would not sign onto this? How does that affect the agreement?

A. I don't know that we have to have their approval for unitization. I can't imagine any reason they would oppose it, since we are going to recover an additional 500-plus-thousand barrels of oil.

MR. KELLAHIN: We'll do them the additional courtesy of contacting them, but I think as a legal matter, Meridian and Southland as the operators and lessees can commit, under federal and state leases, those overriding royalty owners.

EXAMINER STOGNER: That would not necessitate a statutory unit agreement then?

MR. KELLAHIN: We believe it does not.

EXAMINER STOGNER: Okay.

Also, Mr. Shepherd -- and this is not a question, just a statement. And my question to Mr. Szantay -- and I know you were here when I was asking about the unitized formation -- I believe the formation described on page 2 of the unit agreement is a little bit different than what he had given me, but what I needed was a type log for the waterflood, and I believe the way I've asked it was the unitized area.

THE WITNESS: Okay.

EXAMINER STOGNER: I do recognize there's two different things and two different items set up here, and I'll so note that on any order issued. But I'd appreciate the type log information on the waterflood.

Q. (By Examiner Stogner) Were you present at those preliminary meetings?

A. No, sir, I was not.

EXAMINER STOGNER: You were not.

Mr. Kellahin, help me here. As far as the information we need supplemented after today's hearing, is the -- I had it written down here. Header for the log. The working interests have all volunteered. Is there any written documentation on that?

MR. KELLAHIN: We will supply as a condition of final approval to all the agencies the final executed unit agreement.

EXAMINER STOGNER: Okay, that's not an issue here?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: The new Exhibit C --

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: -- or a revised one.

And a BLM preliminary letter; is that correct?

MR. KELLAHIN: That is correct.

EXAMINER STOGNER: And I assume that the unit agreement -- What portion of the unit agreement will be changed?

MR. KELLAHIN: All the exhibits on the tail end of the agreement have to be altered, either --

EXAMINER STOGNER: But not the agreement itself?

MR. KELLAHIN: The agreement itself, I think, is accurate. The corrections are clerical changes to the

exhibits that are appended to that unit agreement, and we will submit to you the revised corrections when they've been completed.

EXAMINER STOGNER: What kind of a time frame are we looking at?

MR. KELLAHIN: We figure within the next ten days all that's done.

EXAMINER STOGNER: I don't think it would be proper to take this case under advisement at this time, but to hold the record open, pending that additional information that would cover.

Do you see anything wrong with that, Counselor?

MR. CARROLL: No.

EXAMINER STOGNER: So --

MR. KELLAHIN: I think that's appropriate. I think we always leave the record open to get the BLM and the Land Office preliminary approval letters.

We have one and not the second, and so we will get that to you, as well as the other information.

EXAMINER STOGNER: Okay. I have no other questions of Mr. Shepherd.

Are there any other questions of him?

MR. KELLAHIN: No, sir. That concludes our presentation.

EXAMINER STOGNER: Okay, you may be excused, Mr.

Shepherd.

And with the supplemental information to be provided, I hold the record open pending that information.

And with that, we conclude any further formal presentation on either Cases 11,207 or 11,208.

(Thereupon, these proceedings were concluded at 10:58 a.m.)

* * *

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 February 19th, 1995.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 11207 and 11208 heard by me on 16 February 1995.

, Examiner
Oil Conservation Division