STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

23 August 1989

EXAMINER HEARING

IN THE MATTER OF:

Application of Meridian Oil, Inc. for the vertical contraction and redesignation of an existing Delaware Oil Pool and for a new pool creation, Eddy County, New Mexico. CASE 9718

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

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MR. CATANACH: Call next Case Number 9718.

MR. STOVALL: Application of Meridian Oil, Inc., for vertical contraction and redesignation of an existing Delaware oil pool and for a new pool creation, Eddy County, New Mexico.

MR. CATANACH: Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin, Kellahin & Aubrey. I'm appearing on behalf of the applicant.

MR. BRUCE: Mr. Examiner, my name is Jim Bruce from the Hinkle law firm in Albuquerque, appearing on behalf of Santa Fe Energy Operating Partners, L. P..

MR. CATANACH: Any other appearances?

Can I get all the witnesses in this case to stand and be sworn in at this time?

(Witnesses sworn.)

MR. KELLAHIN: Mr. Examiner, we'd call as our first witness Mr. Lee Catalano. He spells

his last name C-A-T-A-L-A-N-O.

LEE CATALANO,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q For the record would you please state your name and occupation?

A My name is Lee Catalano and I'm Senior Staff Geologist with Meridian Oil in Midland, Texas.

Q Mr. Catalano, as a geologist have you previously testified before the Oil Conservation Division?

A Yes, sir.

Q Would you describe for us what geologic study you have made of the Parkway Delaware Field in Eddy County, New Mexico?

A I've made a series of cross sections and maps describing what we believe are two separate Delaware pay zones, which are horizontally and vertically separated from one another.

Q How long have you been employed as a geologist for your company?

A Eight and a half, eight and a half

years.

Q And how long have you been involved in studying the Parkway Delaware Field?

A About a year now.

Q How old a field is that?

A I think it's a little over a year old.

Q Are you satisfied now that there is sufficient information from which you as a geologist can reach geologic opinions about the separate reservoirs that you're going to describe to the Examiner?

A Yes, sir.

MR. KELLAHIN: At this point, Mr. Examiner, we tender Mr. Catalano as an expert petroleum geologist.

MR. CATANACH: He is so qualified.

Q In analyzing the Parkway Delaware Field, would you describe for us what the existing vertical limits are for the current Parkway Delaware Field, in terms of the gross formation?

A It's a -- I'm not sure I understand what you're getting at.

Q All right. The vertical limits for the Parkway Delaware Field, do they include all of the Delaware formation?

A That's correct.

Q Do you have on the cross section that we have shown on the wall, which is Exhibit Number One, do you have sufficient portion of the log of any of those wells to show the total Delaware zone or the total Delaware formation?

A Yes, sir.

Q Okay. Let me have you go to that display.

A So far, to date, most of the wells, all the wells except one in the field have produced from this zone in here, which we call the Delaware A Zone.

Q And on your Exhibit Number One that is identified by the area shown as the colored portion of it in yellow as the Delaware area?

A Right, it's the lowermost yellow colored zone, shown right in here.

Q Let's take that second well on the cross section, the Meridian 1-A Apache Federal Well, do you see that one?

A Yes.

Q Can you show us approximately what the Commission is using as the top and the bottom of the Parkway Delaware Pool?

A To date it's included as this -- this

entire interval would be part of the Parkway Pool.

Q Give us the top. What's the footage?

A From approximately 3940 feet through 4300 feet in this particular well.

Q The index map that is shown over in the far left margin of the display, does that show all of the Parkway Delaware Field?

A No, it does not. There is additional wells that were drilled by Santa Fe and Strata up -- Strata has a well to the north and Santa Fe has drilled several wells off to the east of this section.

Q You have other displays that will show the entire pool?

A Yes, sir, right.

Q In examining the production or the logs of wells in the Parkway Delaware Field, do you find any of the current producing Delaware wells that are producing out of any other zone than you have identified as the Delaware A Zone?

A Yes. In the Apache Federal No. 1-A Well the zone -- it's producing from an upper member, which we call the Delaware B, B Zone.

Q Are there any other instances where there is a well that is perforated and producing out of what you've identified as the Delaware B Zone?

A No. This is the only well that we know of.

Q We don't have a pool that has commingled production, then, between the two reservoirs?

A No, sir, we don't.

Q Describe for us what you see when you prepare an east/west cross section such as this in terms of whether or not you are satisfied as a geologist that you have a Delaware B Zone that is a separate and distinct common source of supply or reservoir that is separate and distinct from the Delaware A Zone.

A Okay. Starting from the lefthand side of the cross section, what I've used to group this sand out here, there are a couple of hot gamma ray markers shown here and here on this log, approximate depth, I guess, in this 4-A Well would be at 3950 feet and the base would be 4005 feet.

I've been able to trace these two gamma ray markers across the field in wells shown here on this east/west cross section. Other, which I'll show you in a minute, other wells in the field, these two markers are readily correlative through the field.

Q In examining the wells in the field for which you have logs, have you satisfied yourself that you maintain that separation throughout the entire proposed

pool area, to keep the Delaware B reservoir separated from the Delaware A reservoir?

A Yes.

Q Describe for us the nature of the rock that separates the Delaware B from the Delaware A reservoir.

A Again this is interbedded sandstone and siltstone and little strands of dolomite in between the Delaware B Zone and the Delaware A Zone.

Q What other wells have you put on your cross section, Mr. Catalano?

A The Apache, Meridian Oil Apache No. 4-A Well is our far lefthand side.

The previously mentioned Apache No. 1-A, the Meridian No. 2-A Apache Federal, and the Meridian Oil No. 3-A Apache Federal.

Q If you had prepared an east/west cross section through any other portion of the reservoir, are you going to see a similar display of the two reservoirs as you've seen here with your Exhibit Number One?

A Yes.

Q There will not be a material significant difference in the positioning of the reservoirs as they relate one to another?

A No. I can carry these correlation marks

of the B Zone and then down in the A Zone across the field comfortably.

Q In terms of continuity of the B reservoir from one well to another, how would you describe the degree or the character of continuity as you map the B reservoir from well to well?

A I've found that within the Parkway Field area that I've been able to isolate these two gamma ray markers and isopach the sand interval within those gamma ray markers very comfortably and I'll show you some isopach maps here shortly.

Q Let's look at the Delaware A Zone. Your proposal is to contract the vertical limits of the existing Parkway Delaware Pool. To what vertical limits, then, would you propose to contract that pool if you used the 1-A Apache Federal as a type well?

A Okay. Approximately 4110 feet in the No. 1-A would be the top, down to the existing -- let's see, it would be 4220.

Q All right, so if we use the 1-A as the type well and we're looking at the A reservoir, which is the lower one, the top of the vertical limits for that pool is going to be what did you say, 4110?

A Approximately 4110, that's correct.

Q And the base is going to be --

A 4220.

Q -- 4220. What is the geologic basis for using that as the pick of the top and the bottom of the vertical limits for the A reservoir?

A The base of the Delaware A Zone, there's another gamma ray kick which can be traced throughout the field area, which is very easily -- easy to correlate.

The upper boundary, you can see it on here, I call it the 3-finger silt, but you can see these, 1, 2, 3 gamma ray markers right in here. They can be readily identified, 1, 2, 3; 1, 2, 3; 1, 2, 3; that can be readily identified throughout the field, also.

Q What does the gamma ray tell you when it kicks like that? What are you seeing, what kind of rock is it?

A Increasing radioactivity to the right is what it's telling me. It really doesn't tell you what the rock is. It's just describing radioactivity.

Q Is that a useful means by which you as a geologist can -- can separate out one reservoir from another?

A Yes.

Q And why do you say that?

A It's -- the only way you can, in this particular geologic setting, to (unclear) packages of sand

and make regional type correlations, as well as field correlations.

Q When you look at the Delaware A Zone, how have you satisfied yourself that using those two gamma ray kicks as the top and the bottom of your reservoir, that you have included then the sand in the A reservoir that is going to constitute that separate source of supply?

A I'm very comfortable with the picks that I've made in the field.

Q Do you see anything between those two kicks within the A reservoir that would constitute a barrier within the interior of the A reservoir as you propose to define it --

A No.

Q -- that would separate out production within an individual wellbore?

A No, I've seen no barriers within the Delaware A Zone, as we've defined it here in the 1-A Well.

Q In terms of picking a geologic marker to give yourself a base for the A reservoir, have you shared that information with other operators that operate wells in this reservoir?

A Yes, indirectly.

Q Have you received any objection from any of the operators to using that gamma ray kick as the base

for the A reservoir?

A What we call the A reservoir, no.

Q All right. Are you aware of any disagreement among any of the operators about redefining the Parkway Delaware Pool to contract it to define it now as you've shown it to be in your type log for the 1-A Well?

A No.

Q Is there any dispute among the various geologists as to picking the top of the A reservoir, as you've shown it?

A The top -- the top of the A, basically, no.

Q Okay. Let's go now to the B reservoir, which is the upper one. Do you see any evidence that the B and the A reservoirs are going to be in communication by further production or further perforations based upon any of the log analyses?

A No, sir.

Q Okay. What have you used as the marker to satisfy yourself that you have the base of the B reservoir?

A Okay, again there's a gamma ray marker shown right here, here, here, and here, which I've defined as being the base of the Delaware B sand.

Q In your opinion is that a readily iden-

tifiable geologic marker that geologists can find from log correlation interpretation to satisfy themselves that they've found the base of the B reservoir?

A Yes, I believe it is.

Q Do you see any other alternative means by which you can as a geologist find a suitable marker to give you the base of the B reservoir?

A No, I think this is the easiest and best approach at trying to group this sand package as one zone out there.

Q Can you consistently correlate that gamma ray marker as the base of the B reservoir from well to well?

A Yes, I was able to do it for all the wells in the field.

Q Do you find that B gamma ray marker, base of the B, that gamma ray marker present in all the logs for all the wells?

A I've been able to define it in every well, yes.

Q What have you used for the top of the B reservoir as a marker?

A Again there's another gamma ray spike. You can see it, in fact, this is interesting because it shows up where some of the sand is already pinched out,

this gamma ray is still present and it's right there, it's right there, and right there, and I can follow that gamma ray marker again throughout the field area.

Q Give us, using the 1-A Apache Federal Meridian Well as a type well, give us the footages for your proposed vertical limits of the B reservoir.

A Okay. The top of the B zone would be at 3945. The base would be at 4015, we'll call it.

Q Can you consistently map and locate the top of the B reservoir using that gamma ray kick that you've found in the 1-A Apache Well?

A Yes.

Q Okay. Let's go to a north/south cross section. Have you prepared a north/south cross section?

A Yes, I have.

Q Describe for us, Mr. Catalano, how you have constructed and prepared the north/south cross section, which is marked as Exhibit Number Two.

A Okay. This is a north/south cross section which pretty much runs right through the heart of the Parkway Delaware Field.

Both of these, by the way, are structural cross sections hung on a -1000 foot datum, and again the same color scheme which was shown in the first cross section, same breakout is -- is on this cross section here.

One thing we failed to point out was the color, what these colors represent in the wellbores on these cross sections.

Blue represents water; green, oil production; and red, gas production. The same color scheme holds true down here and again up here in the B sand we have water and oil above gas.

This is the tie well right here, the No. 1-A Apache Well is the second well from the left on this cross section.

Q Do you see anything different when you construct the north/south cross section in comparing it to an east/west cross section?

A Basically no. The correlations are -- are fairly simple concerning the Delaware B sand interval. Again I can trace two gamma ray peaks in a north/south direction in the field and isolate this Delaware B sand.

Q Based upon your construction of the cross sections and your further study of the Parkway Delaware Field, do you have any reservations at all as a geologist that in fact you're dealing with two separate and distinct sources of supply when you address the B reservoir and the A reservoir?

A No, absolutely, they're different.

Q When we -- have you shared with other

operators your proposal for the vertical limits on the B reservoir?

A Yes.

Q Is there any disagreement or dispute among the various geologists for the companies as to your pick of the top of the B reservoir?

A No, not the top.

Q Is there any difference of opinion among the geologists as to how the base of the B reservoir is to be picked?

A Yes. The geologist for Santa Fe, Steve Johnson, in three wells within the field we differ on a basal pick.

Q Does Mr. Johnson for Santa Fe Energy have a different pick for the base of the B zone in anything other than the three wells that's there's a difference?

A Not as far as we know, that's correct.

Q Using his methodology and your methodology, in all but three of the wells that have been examined, you and he have reasonably close agreement?

A That's true. That's right.

Q Identify any of the three wells that are shown on any of your cross sections for which there is a difference of opinion.

A Okay. The Apache No. 1-A Well; the 2-A Well. Then the Strata Production No. 2 Elcon State Well.

Q Let's use the type well, which is the 1-A?

A Right.

Q All right. As best you understand it, Mr. Catalano, describe for us what Mr. Johnson for Santa Fe has used to determine the base of the B reservoir.

A Okay. He has taken a dolomite stringer with an approximate depth of 39 -- the top of it would be at 3975 and the base of it at 3985 in the Apache No. 1-A Well. He feels that that is the base of the -- of the B sand.

Q All right. Can you, as a geologist, take that dolomite marker that Mr. Johnson has found in that well and consistently and reliably map that from well to well within the reservoir?

A I cannot do that.

Q In your opinion is the use of Mr. Johnson's dolomite marker in that type well a reliable, readily identifiable base for the B reservoir?

A I don't believe it is.

Q And why not, sir?

A It's not as continuous as the two gamma ray peaks which I've used over the width of the field.

Q Let's look at the next well that Mr. Johnson has a difference with you on picking the base of the B reservoir. I think that's the 2-A Apache Federal?

A That's correct.

Q Again, within the Delaware B zone he has picked a point that is not as deep as you have for the base of that reservoir?

A You'll have to refresh my memory on that. I think the base of it would be at 4000 feet, is that correct? 3998, okay, 4000 feet.

Q He's approximately how many feet higher up in the log section than you are in picking the base of the B reservoir?

A 25 feet, approximately.

Q And your understanding of that is that based upon the presence of a dolomite marker?

A That's correct.

Q Can you look at --

A It seems to be in the same dolomite marker as what's in the No. 1-A Well.

Q Do you see any other dolomite markers in the 2-A Well that might also represent a way to correlate that dolomite marker?

A Within the -- what I've defined as the Delaware B Zone interval I see two dolomite stringers here

-- I'm sorry --

Q Identify the approximate footage where that occurred.

A Yeah, it's at 3965 to 75 and then the one that he's using, from 3985 to 4000 feet.

Q Which are you going to pick, Mr. Catalano?

A You could just as easily, I suppose, go to the upper one or to the lower one.

Q What -- what, in your opinion, then, for the 2-A Well is the appropriate means to locate and identify the base of the B reservoir sand?

A I believe that, again go back to what is reliable, the rest of the field and stick to these two gamma ray markers, here and here. I must point out that in this particular well the lower marker is not as high, but I think it's readily apparent that that's the same marker running through here in this well.

Q Can you take on your cross section and look at the last log, the 3-A Apache Federal Well?

A Yes.

Q Do you and Mr. Johnson agree, using your various methods of picking, do you agree approximately on the base of the B reservoir in that well?

A Yes, we do.

Q Do you find a dolomite marker at the approximate location you find the gamma ray kick in the base of the B zone for that well?

A There is a gamma ray marker right here, that's correct.

Q Well, where's the dolomite?

A Well, it's not readily apparent on this particular cross section, you can't see it. There may be a little, very small stringer of dolomite down here at 4085.

Q How thick is this dolomite marker as you find it in the 2-A and the 1-A Apache Federal Well shown in the center of your cross section?

A It's approximately 10 feet thick. Again going back to what you mentioned, here, also within this interval that I've defined as the Apache B zone in the No. 3-A Well, there's another dolomite stringer which occurs at 4010 to 20, and again I think that it is reasonable to correlate, perhaps, one of these dolomite stringers, this upper one, in the 3-A Well.

Q Do you have an opinion as a geologist as to whether or not if this dolomite marker that Mr. Johnson has proposed is adopted by the Division as the method by which we locate the base of the B sand, whether that is going to lead to ambiguities in picking out the base of the B reservoir?

A Yeah, I think it would be a lot simpler to stick with these gamma ray markers.

Q Have you picked an interval that's large enough to include all of the porosity above a certain level that would be contributive of reservoir for the B Zone?

A Yes.

Q You don't see any opportunity for a difference of opinion that there is B reservoir below your marker that ought to be dedicated to the B reservoir?

A No.

Q Let's go to the Strata Production Company 2 Elkan State?

A Yes.

Q That was the third of the wells in the pool that you and Mr. Johnson had a difference about.

A That's correct.

Q All right, where is -- where is your understanding of his pick of the dolomite marker as the base of the B reservoir in that log?

A He's picking it at 4050 feet.

Q Do you agree with him at that point?

A No, I have it down at approximately 4090 feet, again on this gamma ray marker.

Q As to all other wells, though, in the reservoir, there is no disagreement with you between the

two geologists about how to find the vertical limits of the reservoir?

A That's correct.

Q All right. There is no inconsistency. All right.

Let's go to -- did you prepare the structure map on either of the reservoirs?

A I have prepared the structure and isopach map of both of these zones.

Q All right. I think you did the A zone first, did you not?

A We'll work from the bottom up.

Q All right, let's do that. You might return to your seat. I think these are small enough to work with from the table.

Let me ask you to look at Exhibit Number Three, Mr. Catalano.

This, as well as all the other geology, is work that you have personally done yourself?

A That's -- that's correct.

Q What's the control point for your structure? What -- what have you mapped this on?

A This is the structure on the top of the Delaware A pay sand. Let me point it out on the cross section to give you a depth for that.

In the Apache Federal No. 1-A Well it would be at 4135 feet.

Q What do you conclude as a geologist from examining the structure in terms of the likely horizontal limits of the A reservoir?

A It looks to me that the -- from the drilling that I have logs and information from, access to at this point, that the horizontal limits of the A sand are pretty much confined to Section 35 and perhaps the west half of Section 36, in 19 South, 29 East.

Q The initial producing well out of the A sand is the well in unit letter C in Section 35. That's your 1-A Well, is it not?

A Out of the B sand.

Q I'm sorry, out of the B sand.

A Right.

Q The rest of them, then, are noted as producing out of the --

A Now, what --

Q -- A sand.

A Now, what this map shows, there's green circles on it and it shows all the wells producing out of the A sand.

Q All right, let's go to the isopach for the A sand. That's shown as Exhibit Number Four?

A Right, Exhibit Four.

Q What do you conclude from an examination of the isopach of the A porosity?

A Well, what this map describes, first off, it's a density -- I use a density porosity cutoff of 18 percent to make this -- this isopach map, and it's showing, again, the horizontal limits of the -- of the A sand, due to lateral pinchout of porosity.

Q All right, let's compare those now to your mapping of the structure and the -- the thickness of the sand for the B reservoir.

We will turn to Exhibit Number Five. Would you identify and describe that exhibit for us?

A Sure. This is a structure map on top of the B sand and let me get you a top from the log here.

In the 1-A Well it would be at 3935 -- 45, I'm sorry, 3945.

This map, again, the green circle around the No. 1-A denotes that it's the only well that's producing from this particular reservoir in the field.

The half circles shown in 1, 2, 3, 4, 5, 6 wells, 6 additional wells within Section 35 appear to be productive from this zone.

Q In mapping both the structure and the sand thickness on the B reservoir, Mr. Catalano, do you, as

a geologist find a reservoir of adequate size and thickness that, if produced, it ought to be able to stand alone as a reservoir?

A Yes, the B sand could stand alone as its own reservoir.

Q Do you see sufficient horizontal extent and vertical thickness to it that it is more than simply an isolated stringer of Delaware production?

A Yes.

Q Do you have any recommendation to the Examiner as to whether or not there needs to be, or should be at this point, any difference with regards to spacing or well locations for each of the pools?

A No.

Q I believe each of the -- the Parkway Delaware is currently being developed on 40-acre spacing?

A That's correct.

Q Do you see any reason to do anything other than that with the B reservoir if it's adopted by the Examiner as a new reservoir?

A No, 40 acres would be fine.

Q Do you see any special requirements with regards to either reservoir in terms of special rules and procedures?

A No, sir.

Q Statewide rules will work for both, as you understand them?

A Yes.

Q Am I correct in understanding that in summary, Mr. Catalano, that as best you can determine there are no operators that oppose the contraction of the A reservoir and the creation of the new B reservoir?

A That's correct.

Q And the only difference of opinion is on three wells there's a difference as to what the base of the B reservoir ought to be?

A That's correct.

Q Summarize for us as a geologist why you believe your method of locating and identifying the base of the B reservoir is one the Examiner should accept.

A I believe the -- those two gamma ray picks that I can correlate across the field, which I can demonstrate on the two cross sections, which I did show, are easily correlative and they can bracket where the B sand reservoir is.

MR. KELLAHIN: That concludes my examination of Mr. Catalano.

We would move the introduction of his Exhibits One through Six.

MR. CATANACH: Exhibits One

through Six will be admitted as evidence.

MR. BRUCE: No questions.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Catalano, in the Apache Federal Well, is that currently -- it's just currently produced or being produced from the B, is that correct?

A The No. 1-A Apache Federal is being produced from the 1-A -- let me give you a little history on that particular well.

We attempted to complete -- we attempted to complete in the Delaware A zone but unfortunately when we fraced the well we fraced into the gas cap in the reservoir and subsequently we squeezed that off and went in and made a completion up in the B zone.

MR. CATANACH: Is your next witness an engineer?

MR. KELLAHIN: Yes, sir.

MR. CATANACH: That's all the questions I have of the witness at this point.

MR. KELLAHIN: Mr. Examiner, my next witness is Mr. Bret Herring. Mr. Herring is a petroleum engineer.

BRET HERRING,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Herring, would you please state your name and occupation?

A My name is Bret Herring. I am a reservoir engineer for Meridian Oil.

Q Mr. Herring, on prior occasions have you testified on behalf of your company before this Division as a reservoir engineer?

A Yes, sir, I have.

Q And pursuant to that employment have you made an engineering study of the Parkway Delaware Pool?

A Yes, sir, I have.

Q And are you familiar with the production out of the 1-A Apache Federal Meridian well that's been described thus far this afternoon?

A Yes, sir.

MR. KELLAHIN: We tender Mr. Herring as an expert reservoir engineer.

MR. CATANACH; He is so qualified.

Q Mr. Herring, let me have you take what is marked as Exhibit Number Seven and before we describe the details of that information identify it for the Examiner.

A Yes, sir. This is a plat that I have constructed that depicts all the producing wells within Section 35 and one producing well within Section 36 that we have available production information on.

Q In examining the available production information for the Parkway Field, do you find any well other than your Apache A Federal 1 Well that has been perforated and produced from the B sand?

A No, sir, I don't.

Q What have you studied, Mr. Herring, to satisfy yourself as a reservoir engineer that you in fact are dealing with two separate and distinct reservoirs when you talk about the A reservoir and the B reservoir?

A Mainly the geologic correlation that has already been presented. Going into a little bit of the production information that we do have, this plat depicts IP's and also current production out of the A zone. There are 14 wells currently producing from that. Of that, 12 are top allowable or within 2 to 3 barrels of being top allowable wells. Our Apache A No. 1 Well is currently a top allowable well. It had initial IP, 289 barrels of oil

and 269 MCF and 82 barrels of water.

Q How long has the A reservoir been produced?

A For approximately two months.

Q The A reservoir, the lower reservoir?

A Oh, I'm sorry. I'm sorry. The first well was completed, I believe, in August of 1988, so it's going on a year right now.

Q Okay. Do you have any pressure information to draw any comparisons or reach any engineering opinions on between pressures in the two reservoirs?

A No, sir. We do have pressure on the upper reservoir, the B sand reservoir.

The lower reservoir, the A sand, we don't have any pressure information on.

Q Let me ask you to identify Exhibit Number Eight for us, Mr. Herring.

A Exhibit Number Eight is an analysis that we had performed on both the A sand and the B sand. What it is is a -- what's commonly called in the industry, a GPC fingerprint analysis, a GPC abbreviation for gel permeation chromatograph.

Q Why -- why is it referred to as a fingerprint, Mr. Herring?

A What it does is it takes the stock tank

oil of each of a sample of reservoir fluid and then it runs it through this chromatograph to determine the various components of that liquid.

What you get if you compare one reservoir to the other is a distinct and very accurate fingerprint of each -- of each liquid.

If you'll turn to the two following pages, the first page, I believe, is the A sand and the second page is the B sand, you'll see two fingerprints. The fingerprint on the B sand has its highest peak around the C-7 component. The highest peak on the A sand has its highest peak around the C-18 component.

Q What does this tell you as a reservoir engineer about whether or not the two reservoirs are in fact separate?

A This tells me that you have two distinct fluids; two separate reservoirs.

Q The fingerprints of each are significantly different enough to you to tell you by looking at that that they are separate sources of supply?

A Yes, sir. If you look at the top of each you'll have a molecular weight. The molecular weight of the A sand is about 217 grams per MOL. The molecular weight of the B sand is -- the liquid from the B sand is 194 grams per MOL.

Q And that's enough for you as a reservoir engineer to tell that they are different reservoirs?

A Yes, sir.

Q All right. If they were the same reservoir what would happen to the MOL weight?

A You would have an identical fingerprint. The molecular weight would vary maybe 1 gram per MOL. It's very accurate.

Q And how about the next entry? It says "higher mass"? That "higher mass", what is that?

A Yes, sir, what they do is they take 10 percent of the highest mass within that sample. It's compared to molecular weight but they just section out the highest components of that sample and determine a -- a molecular mass from that.

Q And the magnitude of difference between the two is sufficient for you as a reservoir engineer to conclude they're in fact separate reservoirs?

A Yes, sir.

Q And how about the API gravity, is there enough difference there?

A No, sir, I would rely on the molecular weight and the 10 percent higher mass as totally sufficient.

Q What other reservoir engineering infor-

mation have you examined to satisfy yourself that these are in fact separate reservoirs?

A That's about it.

Q Is there any information derived from the log analysis and the cross sections that you as a reservoir engineer can use to support your conclusion that these are in fact separate?

A Yes, sir, just in the vertical separation between the two zones.

Q How about the -- how about the relationship of the fluids one to the other?

A Yes, sir, down below in the A sand we have seen a distinct gas cap on top of oil. In the upper sand we have seen -- we have not seen a distinct gas cap, but, of course, we had the oil column.

Q The type well, the 1-A Apache Federal, shows what is colored in to be water above the gas cap of the A reservoir.

A Yes, sir, normally that --

Q Is there water present in that -- in that well?

A We are producing water out of that well, yes, sir. Normally you do not have gas on oil, or you normally have gas on oil on water and your gas should migrate up hole if there was no separation.

Q In terms of operation of the Parkway Delaware, why can't we simply perforate all the porosity stringers, whether it's A or B, and produce it out of the same tubing string as commingled reservoirs?

A To properly manage both reservoirs, if you were to perforate the A sand, bring it down in reservoir pressure to whatever, come up, shoot your upper zone at the virgin pressure, you would have cross flow problems, mechanical, as far as initial production goes there wouldn't be a problem. You have to contend with on primary production, your cross flow between the two reservoirs.

Q All right. I was going to ask you, have you satisfied yourself as an engineer that the B reservoir, the upper reservoir, has sufficient volumes of producable oil within that reservoir that it can stand alone as a reservoir?

A Yes, sir, I did.

Q Okay.

A Another problem that you do have is the permeability variations between the two zones.

The A zone, from core analysis we've seen permeabilities in the 3 to 4 millidarcy range.

Permeabilities in the A sand -- excuse me, the B sand, are a magnitude of 10 higher, 20, 30 millidarcies.

So that would also contribute to your cross flow problems. The B sand would have a tendency to flow more readily than the A sand.

Q Is there any doubt in your mind as a reservoir engineer that you're dealing with two separate and distinct sources of supply when you look at the A reservoir and the B reservoir?

A No, sir, they are two distinct, separate sources of supply.

MR. KELLAHIN: I have no further questions of Mr. Herring.

We would move the introduction of his Exhibits Seven and Eight.

MR. BRUCE: No questions.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Herring, if you don't have any data on the pressure in the A zone, how do you know if there is going to be cross flow?

A I'm basing that primarily on permeability variations between the two sands. We did do a dip in on the lower sand which had been shut in for approximately three weeks. Mr. Catalano had brought that information, or asked me about pressure information. We did not have a

sufficient build-up. We had three weeks of shut-in pressure.

The two reservoirs pressurewise based on those dip-ins are essentially identical; 1663 was the pressure that we recorded on the dip-in.

But as far as a build-up on the A sand, no, sir, we don't have a detailed build-up.

Q What's the top allowable for this pool currently?

A 80 barrels a day.

Q And tell me how, if we split this reservoir up, tell me how it's going to be produced. Are you going to have to drill -- are you going to drill more wells?

A Yes, sir.

Q You are?

A Yes, sir.

Q Is that not going to be somewhat unnecessary, in your opinion, drilling unnecessary wells?

A No, sir, it isn't. If you go in, not only will you have cross flow -- cross flow problems down the road between the two sands, if you get into secondary and tertiary recovery, utilizing the same wellbore will be, in my opinion, totally inefficient to flood both zones.

Q Is it -- is it not currently feasible to

dually complete these wells?

A Based on the wellbore configurations that we have out there, no, sir, you've got too much mechanical downhole components that you would have to use, that you would have to use elaborate downhole production equipment to do such.

Q What's the approximate cost to drill one of these wells?

A The last well, supposedly you're supposed to be getting more efficient as you go along, the last well we completed for approximately $386-or-87,000. That included facilities.

Q Have you calculated the recoverable reserves in the east half?

A I've calculated the original oil in place based upon log calculations. I'm estimating it to be about 10.3-million barrels.

As far as recoverable reserves go, a lot is dependent upon if you have an initial gas cap, which we haven't seen yet, if you have water influx, natural, and then of course you're getting into secondary and tertiary recovery from that.

MR. CATANACH: I believe that's all I have of the witness.

Anything, any other questions?

MR. LYON: May I ask a question?

MR. CATANACH: Yes, sir, Mr. Lyon.

QUESTIONS BY MR. LYON:

Q I'm Victor T. Lyon, Chief Engineer for the Oil Conservation Division.

Mr. Herring, where did you take your samples for your fingerprint?

A They were taken right at the wellhead.

Q At the wellhead?

A Yes, sir.

Q Which wells?

A The No. 1-A Well and also the 2-A Well.

Q 1-A and 2-A, and 1-A is the one from the B zone?

A Yes, sir.

Q And 2-A then is the A zone.

A Yes, sir.

Q Have you taken samples from any other A zone wells?

A No, sir, that was the only one.

Q Do you have the API gravity on the --

A Yes, sir, as reported by flow patrol

(sic) the API gravity for the A sand from the No. 2-A Well is 34.7 degrees API and from the B sand, is -- which was taken from the No. 1-A Well, is 37.8.

MR. LYON: I believe that's all I have. Thank you.

MR. KELLAHIN: Any other questions of this witness?

He may be excused.

MR. KELLAHIN: Mr. Examiner, we have our notice of hearing that we sent to all the operators in the pool about the proposed contraction in the vertical limits in the pool.

With the notice provision, Mr. Examiner, that concludes our presentation. We numbered it as No. 9.

MR. CATANACH: Exhibit Number Nine will be admitted as evidence.

Mr. Bruce?

MR. BRUCE: Yes, sir.

MR. CATANACH: What have you got?

GARY GREEN,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q Mr. Green, would you please state your full name and city of residence?

A Gary Green. I live in Midland, Texas.

Q And what is your occupation and who are you employed by?

A I'm employed as a landman by Santa Fe Energy Operating Partners, L. P..

Q And have you previously testified as a landman before the OCD?

A Yes, I have.

Q And are you familiar with the land matters involved in Case 9718 in the area generally surrounding the application?

A Yes, I am.

MR. BRUCE: Mr. Examiner, are the witness' credentials acceptable?

MR. CATANACH: Yes, sir.

Q Briefly, Mr. Green, what is Santa Fe's position in this hearing?

A Santa Fe supports Meridian's position that there are two or more distinct and separate pools. We support that concept. I think we have somewhat of a dis-

agreement on correlations, which will be addressed later, and that, also, that we would propose that Section 36 also be included in any new pool designation.

Q Well, referring to Exhibit A, which I realize is marked as a structure map, but I believe it's also indicated by shading to indicate different land ownership in this area, would you please discuss what interest Santa Fe does own in this area and the reason why you propose that Section 36, or at least part thereof, be included in the new pool designation?

A Santa Fe, over in Section 36 in the southeast quarter of the northwest quarter, Santa Fe drilled the Parkway State No. 1. The well was completed in February of 197 -- 1987 as a Delaware Sand producer. I believe this is the discovery well for the field.

The wells, four -- other four remaining producing wells in Section 36 Santa Fe owns 100 percent of.

In Section 35 the Long Knife (sic) in the southeast of the southeast quarter, Santa Fe owns 100 percent of.

The Osage Lease, as you can see designated there with Wells 1, 2, 3, 4 and 5, Santa Fe owns 16.67 percent of.

The wells on the Renegade Lease just to the north, Wells 1, 2, 3, Santa Fe owns 25 percent of.

Santa Fe owns an interest in 14 of the 21 producing wells in this field.

Q I believe the other two major interest owners in this area are CFA Oil & Gas and Meridian?

A That is correct.

Q And you indicated the Parkway State Well was the discovery well, is that correct?

A Yes, that well was drilled and completed in February of 1987.

Q And what was the second well drilled in the field?

A The second well was the -- was drilled in Section 35 in the northwest quarter of the southeast quarter of Section 35. Siete was the operator. It was completed in August of 1988.

Q So basically the purpose of your testimony is to propose the inclusion of Section 36 --

A That's correct.

Q -- in the pool. In your opinion is the granting of this application subject to Mr. Parker's subsequent testimony, in the interest of conservation and the prevention of waste?

A Yes, it is.

MR. BRUCE: At this time, Mr. Examiner, I would move the admission of Exhibit -- or, ex-

cuse me.

Q Mr. Green, were the land matters on Exhibit One, were these taken off of company records at Santa Fe Energy?

A Yes, they were.

MR. BRUCE: We move the admission of Exhibit Number -- or Exhibit A.

MR. CATANACH: Exhibit A will be admitted as evidence.

MR. BRUCE: No further questions.

MR. CATANACH: Any other questions of this witness?

MR. KELLAHIN: I have no questions.

MR. CATANACH: He may be excused.

TIM PARKER,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q Mr. Parker, will you please state your

full name and city of residence?

A My name is Tim Parker. I live in Midland, Texas.

Q And what is your occupation and who are you employed by?

A I'm a petroleum geologist, current title Exploration Manager for Santa Fe Energy Operating Partners, L. P.

Q And have you previously testified before the OCD?

A I have not.

Q Would you please briefly describe your educational and employment background?

A I have a Bachelor of Science in geology from Stanford granted in 1976; a Master's of Science in geology, also from Stanford in 1977.

I went to work for our predecessor company, Oil Development Company of Texas, in Amarillo in 1977; have subsequently worked in Amarillo, then Denver, have been in Midland for five years.

Q And are you familiar with the geological matters related to Case 9718?

A Yes, I am.

Q And does your area of responsibility include the Permean Basin in southeast New Mexico?

A The staff who works for me is responsible for that area, yes.

MR. BRUCE: At this time, Mr. Examiner, I propose Mr. Parker as an expert geological witness.

MR. CATANACH: He is so qualified.

Q Mr. Parker, referring to your -- well, first of all, let's -- let's clarify. I believe Meridian's geological witness testified that the main area of disagreement is picking out the base of the B zone, is that correct?

A That's correct. We have no problem whatsoever with the A zone as designated by Meridian and support that application in full.

Q And you have no particular problem with the top of the B zone, either, is that correct?

A No, sir, I do not.

Q Now, in particular I believe there is a dispute with the base of the B zone on the Apache Federal A-2, the Apache Federal A-1, and the Halcon Fed No. 2 Wells, is that correct?

A That's correct.

Q What are the figures for the base of the B zone which Santa Fe proposes and let me refer you to

Exhibit Number B to discuss that issue?

A That point on the three logs in question, or the three wells in question, on the Apache A-2 Santa Fe proposes that 4025 is a more appropriate boundary.

For the Apache Fed A-1 we believe that 4013, 4013 is a more appropriate number.

Excuse me. I am sorry, I was given an error. We would -- we would -- for the A-2 we believe that 3998 is appropriate; for the A-1 the 3984; and for the Strata Halcon Fed 2, that 4060 is appropriate.

And if you'll let me walk you through this I can show you why.

Q Please do so.

A We have provided as Exhibit B a stratigraphic cross section at expanded scale so that you can really see that these correlations are not as controversial as you might believe.

First a few words about differences in methodology.

The point that Mr. Catalano made earlier that the gamma ray kicks have relatively little to do with lithology, we accept, and believe that what we need to be focused on for reservoir boundaries are tight intervals which -- through which fluid cannot flow, and consequently, that's been our basis for our correlations, and you can see

as we run across, we have -- this is a stratigraphic cross section. It is on the base -- our proposed base of the B interval and this is not a difficult correlation running across here.

It is a continuous marker. Core data which we had in other parts of the field showed that it is tight and likely a reservoir boundary, and that marker, we have no problem carrying throughout the field.

So that, to us, is the kind of markers that you ought to have in this kind of situation, kind of real reservoir boundaries necessary.

Q What, in particular referring to the Meridian 2-A Well and the offset well I believe is the Siete --

A Uh-huh.

Q -- Renegade Fed No. 2 Well, what is the practical effect in the difference between the base proposed by Santa Fe and the base proposed by Meridian?

A Well, as we previously stipulated, Meridian's proposed base of the B in the Meridian 2-A is at this point at 4025, and you see that this interval does fall within a reservoir interval.

Their next point we find ourselves in agreement. You can see that this interval, which we bring across here as a continuous reservoir interval, gets split.

Where it is present within their B interval to the -- on their well, it is not within the reservoir interval here, and it gets to be a very significant point because we would also disagree with these water designations. Our analysis of the logs in this area, we've spent considerable effort on log evaluation, suggests that that interval is also oil bearing.

So this is not a moot point. We do have an interval which does have an economic impact for us and which we think does need to be within the B interval.

Q So, in other words, taking Meridian's markers, or their cutoff points could potentially allow, say, the Meridian Fed 2-A Well to produce from a certain zone but the Siete well could not produce from what they have --

A That's correct.

Q And it could adversely affect Siete's and Santa Fe's correlative rights.

A That's how I would understand it to be.

Q Now you mentioned the water. Is there a difference between you and Meridian regarding the pay and the non-pay in the B zone?

A Yes, there is. As I pointed out just a moment ago, Meridian would hold that this interval on their F-F' cross section, centered about 4000 feet to be more

precise from 3985 to 4012 or 4013, would be water bearing. Our well calculations would suggest that that is oil bearing.

Q To clarify one point, Meridian's witness talked about Steve Johnson. Does he report directly to you?

A Yes, he does. He's done this work under my direct supervision and, additionally, this is an area of more than casual interest to us, so I have worked each one of these logs, correlated them all myself.

Q And, to verify one point, in your opinion, using the dolomite stringers to determine the base of the B zone is reasonable and can be done with reasonable accuracy throughout this field.

A Yes, sir, and I think the accuracy of the methodology is demonstrated by noting the overall parallelism, which is exactly what you'd expect overall in this kind of a setting, suggesting you don't have any big divergences. It seems to us to be a very reasonable and proper methodology.

Q And, using your methodology, you do agree with Meridian that there is a reservoir separation between the A and B zones.

A Absolutely. Absolutely.

Q Now, in your opinion is the granting of

this application in the interest of prevention of waste?

A Yes, it is.

Q And could you give a few concrete examples on that?

A Well, it looks to us like, it's very early in the life of this field, but it looks to us that -- as if the average well life in currently producing zones will be on the order of 8 to 10 years minimum, and that is not making any allowances for secondary or tertiary recovery.

We would agree with testimony of Mr. Herring that secondary recovery operations would be significantly compromised by having multiple zones open, so we have two separate instances where we're either not going to produce reserves for the foreseeable future, and secondly, where we are going to have significant mechanical complication.

We are in the same position as Meridian in that our currently production wellbores are not configured such that we could dually complete.

Q And in your opinion will the granting of the application as requested, as with the modifications, maybe we can say, proposed by Santa Fe, will be in the interest of the protection of correlative rights?

A Yes, it is.

Q Was Exhibit B prepared by you or under your direction?

A It was.

MR. BRUCE: I move the admission of Exhibit B, Mr. Examiner.

MR. CATANACH: Exhibit B will be admitted as evidence.

MR. BRUCE: That concludes my direct testimony, or my direct presentation.

MR. CATANACH: Mr. Kellahin?

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Parker, where is Mr. Johnson today?

A Mr. Johnson's in Midland.

Q How come he didn't come in your place?

A Mr. Johnson is working on other projects today.

Q Am I correct in understanding that there is no practical difference between the use of the dolomite marker as the base of the B reservoir and Mr. Catalano's use of the gamma ray kick as the base in all the wells in the proposed pool area with the exception of the 3?

A That's correct.

Q We find that this dolomite marker is

generally contiguous with Mr. Catalano's gamma ray kick on the base?

A Generally so, yes.

Q And yet in three of the wells we find that the dolomite marker is somewhat above Mr. Catalano's gamma ray pick.

A That's correct.

Q All right. And two of those wells are Meridian operated wells.

A Yes, sir.

Q The third well is the Halcon Federal No. 2 Well. That's operated by Strata?

A Correct.

Q Is that one of your wells?

A No, sir.

Q Did I understand you to tell us that based upon the log analysis you thought there might be some hydrocarbons below the dolomite marker in the Meridian well and yet above the gamma ray kick that Mr. Catalano finds in that well?

A No, sir, you understood that incorrectly. I found -- we believe there are hydrocarbons below Mr. Catalano's marker and above our dolomite marker.

Q All right. Between -- between that interval, between the above Mr. Catalano's gamma ray kick and

below your dolomite marker, you believe there's hydrocarbons.

A We do.

Q Why shouldn't that be included in the B reservoir?

A We believe that the reservoir limiting factor is that dolomite marker; that that is what separates -- that that separates the proposed Delaware B reservoir from reservoirs which are below it.

Q Has anyone yet produced that portion of the B reservoir that's below your dolomite marker?

A Yes, sir. The Siete Osage Federal No. 5 is completed in that interval.

Q In that interval alone, or is it also completed in the area above the dolomite marker, as well?

A No. No, it is completed by our correlations within the A zone and above the A zone but not as high as the B.

Q The general thickness of this dolomite marker is approximately 10 feet, is it not?

A That's correct.

Q As you find it in the Meridian well.

A As we find it throughout the field.

Q All right, are you willing to tell us that that is a consistent, uniform impermeable barrier that

will separate out the upper B from the lower B throughout this reservoir?

A We find it so, yes.

Q And you find it of consequence in only three of the wells that have been drilled through this area.

A We find that we disagree with Meridian on only three of the wells, yes.

Q It only makes a difference on three wells, none of which you have an interest in.

A That's correct.

MR. KELLAHIN: No further questions.

MR. BRUCE: Can I ask one?

REDIRECT EXAMINATION

BY MR. BRUCE:

Q However, that difference, as we said before, or you said before, I believe, could have an adverse effect on the Siete Renegade Well.

A Yes, it could. We believe it could.

Q There is potential of the Meridian Well draining the --

A That's the situation as we see, yes.

MR. BRUCE: I have nothing

further, Mr. Catanach.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Parker, explain to me how that's going to adversely affect the Siete Well?

A The B zone as designated by Meridian would be in -- in this well would be from this point up, and note that in both cases the reservoir quality sand indicated that in our opinion is hydrocarbon bearing.

When we move to the Renegade No. 2, this point is -- their point has jumped up to this point. Our correlation brings this reservoir, hydrocarbon bearing, in our opinion, directly across to here, and consequently, we have a zone which is continuous from a reservoir point of view, being divided by a designation -- by their designation.

Q I see.

MR. CATANACH: Are there any other questions of the witness?

He may be excused.

Is there anything further in this case?

Case 9718 will be taken under advisement. Oh, I'm sorry.

MR. BRUCE: We did request that the application be expanded, if you will, we'd like to keep the record open, if necessary, if granted by the Examiner, to file the appropriate application or to send the appropriate notices to offset operators, maybe readvertise the case.

MR. KELLAHIN: Maybe there's another way to do that and I'm not sure how to make it work but I think if the initial pool area as noticed and advertised is approved, then all Santa Fe needs to do is file the notices and because they're in such close proximity to the initial area, it would automatically get expanded and included and they can take in as many of their wells as they want to.

MR. STOVALL: Through a nomenclature procedure.

MR. KELLAHIN: Through a nomenclature procedure administratively, and it really would, it would expand immediately to the area that you want to ascribe to the pool. I really do think it would work that way.

MR. STOVALL: I have a concern, Mr. Bruce, that I don't think this -- keeping this record open for that purpose is appropriate. Now what Mr. Kellahin suggested may be a way to do it or maybe, you

know, you need to file an application, but I don't think that changes what you've got to do, but I don't see any reason to keep this record open.

I think you've got a notice problem in keeping this record open, a notice and application problem to take this case further.

MR. BRUCE: There's one other gentleman who'd like to make a statement.

MR. EDDIE RODRIGUEZ: Okay, this is on the record.

Siete Oil & Gas -- my name is Eddie Rodriguez for Siete out of Roswell, and the only information that I knew prior to coming to this hearing was what was submitted to me in the mail. This information has brought me back to what exactly Meridian is asking for and it also brought to me the fact that we might be jeopardizing the Renegade Pool reserves.

As a prudent operator it is my obligation to make sure that those reservoir reserves are not -- they have to accounted for, so what I would probably ask is a package of the information that was presented by Meridian today so I can take it back to my office for further evaluation.

MR. KELLAHIN: You can have it right here. I didn't know you were here, I'm sorry. Here

you go.

MR. CATANACH: Well, does that alleviate your concern, Mr. Bruce, that these can be done administratively or through a nomenclature hearing?

MR. BRUCE: Yeah, I think Mr. Rodriguez would like a chance to comment once having reviewed.

MR. STOVALL: Mr. Rodriguez, now you did not enter an appearance at the beginning of the case so we'll bring you in as a participant, do you have some sense that Siete would want to add additional testimony or evidence to this case?

MR. RODRIGUEZ: There is a possibility that might occur. Again, not knowing any more than what was given to me off the one well delineating the vertical limits of the Delaware, some new information has been brought up to make that might make us want to add some information to this (not clearly understood.)

MR. STOVALL: Are you -- are you -- do I interpret that to mean that you are requesting a continuance in this case for a period of time to review the information?

Do you understand what I mean by a continuance?

MR. RODRIGUEZ: Yes, sir,

sure.

MR. STOVALL: Well, I think -- I think leaving the record open creates a little bit of a problem because we don't quite know when -- when to close it in this particular situation.

Mr. Kellahin, do you have any --

MR. KELLAHIN: Well, with all due respect to the gentleman, we've continued the case once at the request of Mr. Bruce on behalf of his client and we've noticed Siete. I really would like to bring an end to the proceeding. I think leaving it open for a comment period leaves us in the predicament of not being able to respond or cross examine the commentator.

I have no objection if Mr. Bruce will extend the courtesy to Siete to enter an appearance for them today and preserve their right to ask for a de novo if they think that the outcome is adverse to their interest and maybe that is the safety net we need to extend to Siete, and I certainly would not object to doing that, and that would give them the opportunity to another hearing if they are disturbed with the outcome of this one.

MR. BRUCE: All right, if you will allow it, I will enter an appearance on behalf of Siete Oil & Gas Corporation.

MR. KELLAHIN: We will have no objection.

MR. CATANACH: We will allow it.

And apparently we're in agreement to close the record in this case at this time?

MR. BRUCE: Sure.

MR. CATANACH: Okay, this case will be taken under advisement.

And the hearing is adjourned.

(Hearing concluded.)

C E R T I F I C A T E

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

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9718, heard by me on August 23 1985.

David R. Catanach, Examiner
Oil Conservation Division