STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERRVATION DIVISION FOR THE PURPOSE OF CONSIDERING:) CASE NO. 10937

APPLICATION OF BTA OIL PRODUCERS

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: Jim Morrow, Hearing Examiner

March 17, 1994

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on March 17, 1994, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Diana S. Abeyta, RPR, Certified Court Reporter No. 168, for the State of New Mexico.

ORIGINAL

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I N D E X

March 17, 1994
Examiner Hearing
CASE NO. 10937

E X H I B I T S

A P P E A R A N C E S

FOR THE DIVISION:	ROBERT G. STOVALL, ESQ. General Counsel Oil Conservation Commission State Land Office Building 310 Old Santa Fe Trail Santa Fe, New Mexico 87501
FOR THE APPLICANT:	KELLAHIN AND KELLAHIN 117 N. Guadalupe Santa Fe, New Mexico 87501 BY: W. THOMAS KELLAHIN, ESQ.

EXAMINER MORROW: I call case 10937.

MR. STOVALL: The application of BTA Oil Producers for simultaneous dedication, Lea County, New Mexico.

EXAMINER MORROW: Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing today on behalf of the applicant, and I have one witness to be sworn.

(Witness sworn.)

MR. KELLAHIN: Mr. Examiner, if you will permit me, I'll give you a quick preview of what Mr. Salmon and I are trying to accomplish on behalf of his company. Exhibit No. 1 is a nine-section plat. The center plat that you have in front of you is Section 11. The north half of that section is the 320-acre spacing gas unit that's the topic of this case. We're dealing with the Antelope Ridge Atoka Gas Pool. It is not a prorated gas pool.

The original Atoka gas well in the north half is identified as the 1-Y. The second well is the No. 2, identified in the southwest portion of the north half. Those are the two wells. We're seeking approval to concurrently produce gas out of the Atoka pool in those wells. The circumstances are that both wells now exist in the spacing unit.

The original well is the 1-Y. It was drilled and completed and is still producing in the Atoka limestone member of that pool. And in fact, with the exception of the No. 2 well, this Atoka pool produces from the limestone member of the pool.

The No. 2 well was drilled as a Morrow gas well, completed and produced 27,000 mcf of gas. And Mr. Salmon, in examining that well, determined it had an uphole potential in the Atoka. By mud log analysis and other information, he has elected to perforate the No. 2 well in what is a sandstone interval below the limestone member of the pool. And he will demonstrate to you by mud log analysis and reservoir pressure information that those two intervals are not in communication.

He will demonstrate to you that the No. 2 well represents a unique and an unusual circumstance, such that if it is allowed to be produced concurrently with the No. 1-Y well, then it will be in the best interest of the correlative rights of the owners of north half to do that.

In order to keep the spacing unit from being drained, Mr. Salmon has had to shut in the No. 2 well. I got it backwards, Steve?

THE WITNESS: Right. The 1-Y is currently shut-in.

MR. KELLAHIN: He shut in the 1-Y well, and he

has produced the No. 2, but he's caught in the dilemma that if he continues to shut in the 1-Y, those gas reserves in the Atoka lime member, in which that well is capable of producing, are going to be drained to the north by the well in the south half of 2.

Now, while BTA operates a number of these wells, you need to know that the north half of 11 is a separate and distinct state lease. And so as we move between and among the spacing units, we're going to be dealing with different state leases, each of which has got a different trustee or royalty pay. And that's the dilemma he wants to describe for you, and we believe it's unique. As a result of its uniqueness, we believe that his circumstance justifies allowing an exception to the general rule issued by the division director by memorandum that you cannot concurrently produce two gas wells in the same pool unless it's a prorated gas pool. So that's where we're headed.

EXAMINER MORROW: Okay.

STEVE SALMON

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

EXAMINATION

BY MR. KELLAHIN:

Q. For the record, will you please state your name and occupation.

A. My name is Steve Salmon. I'm currently employed by BTA Oil Producers as a petroleum engineer.

Q. Mr. Salmon, on prior occasions have you testified and qualified as an expert petroleum engineer before the division?

A. Yes, I have.

Q. And in that capacity, have you made a technical review of the data and the facts and circumstances surrounding this application?

A. Yes, I have.

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

EXAMINER MORROW: All right, we accept Mr. Salmon.

Q. (BY MR. KELLAHIN) Mr. Salmon, let me ask you, sir, to identify Exhibit No. 1.

A. Exhibit 1 is a map that I made showing the offset ownership to our Hudson State 1-Y lease. Exhibit 1 is a map showing the offset ownership to the BTA Hudson State lease. The scale on the map is 1 inch equals 2,000 feet. The Hudson State lease is located in Section 11, which is in the center of the map. The proration unit consists of the north half of this section.

BTA operates wells north and south of this lease, so we offset ourselves in those directions. To the west and

southwest, Estoril owns leases, and they operate a well, the Estoril Belco Federal No. 2, to the southwest. Amoco Production Company offsets us to the northwest. Yates Drilling has a lease offsetting us to the northeast, and to the east and southeast we have three 40-acre tracts that the people that own those are shown on the map.

Q. Based upon the information shown on this display and other information available to you, Mr. Salmon, are there any differences in ownership between the south half of Section 2 and the north half of 11?

A. Yes, there are. There are also differences between this lease and when we go down to Brian, which is the south half of 11.

Q. The south half of 11 and north half of 11 are different leases with different ownership?

A. Right.

Q. Have you caused notification to be sent to any of the offset operators or interest owners, other than your own company, concerning this application?

A. Yes. We notified the people shown on this map. I think we can go to Exhibit 2 now.

Q. Yes, sir, let's do that.

A. The first page of Exhibit 2 is the notification list that was supplied to the commission with our application. Dorothy Houghton sent these letters at my

request and under my direction.

Q. As part of the mailing, did they get an actual copy of the actual application letter?

A. Yes, they got -- No, they got a letter stating what we were asking for.

Q. And advising them of the hearing date?

A. Right, and advising them of the hearing date.

Q. All right, sir, attached to Exhibit 2 as the first attachment what do we find?

A. These are the return receipts from the post office where each of these people received their notice and signed for it.

Q. In addition to this notice, did you provide any other notifications to any other interest owners?

A. Yes. When we notified William B. Owen, he sent a copy of our letter back. He signed it, but he put a note on there that his lease that he had had in Section 12 had expired. This lease is the southwest quarter of the northwest quarter of Section 12, which offsets our lease to the east.

Q. Let me direct your attention to Exhibit No. 3. Mr. Salmon, would you identify the three pages to that exhibit?

A. Yes. The first page is the letter that we had sent to William Owen. His note down in the left-hand corner

says that they own no leases in the area; that their lease in Section 12 expired.

I contacted Clarence Shelfer by phone, who is the mineral owner. He agreed to give us a waiver to the 21 days' notice, also agreed to give us a waiver for our application, and that is what the next two letters are, are the letters that we sent to him, that he returned to us signed.

Q. On the basis of this notification, have you notified all the interest owners and operators that may be affected by the application, pursuent to division notice rules?

A. Yes, we have.

Q. And have you received any objection from any of those parties notified?

A. No.

Q. Let me direct your attention now to Exhibit No. 4. Would you identify and describe that for us.

A. This is a map that I made, strictly to locate where we are, to scale 1 inch equals 9 miles. The area that we're involved with is noted by the red square with the big red arrow pointing towards it. It's in the Antelope Ridge Field. When you go to the north from the Antelope Ridge, you have the Gramer Ridge, to the south is the Pitchfork Ranch Field. We're about 18 miles southwest of Eunice,

New Mexico. The yellow colors here are just an indication of where a field is produced without designation as to what they are producing from.

Q. Let me have you turn to Exhibit 5. Before we talk about the significance of the data, you have a substantial amount of information on this data sheet. Tell us what we're looking at and where to find the data.

A. Exhibit 5 is a map showing well data on the various wells. Only wells penetrating the Morrow are shown on this map. It's a scale 1 inch equals 2,000 feet. The Morrow producers are indicated by the green color. The Atoka producers are indicated by the yellow colors.

The well data is shown in an A, B, C, D, E format, where "A" is the total depth, "B" is the completion date, "C" are the perforations with the formation in brackets. "A" stands for Atoka, "M" for Morrow, "S" Strawn, "D" is the current status, and "E" is the cumulative production data.

Going to the Hudson State No. 1-Y well, which is the northernmost well in Section 11, there is a line going out to the right connecting it with the data on it on this well. The well was drilled in September of 1981.

Q. One little footnote, the line to the right then subdivides the data, and it's displayed in two different columns?

A. This is true.
Q. Why the separation?
A. Because the well was originally completed as a Morrow well in September of 1981 --
Q. And so if you look along the row that says entry "C," then you'll find in parentheses an "M," and that will indicate the data for the Morrow portion of the well?
A. That's correct.
Q. And then on the far right is the Atoka?
A. Right. The Morrow is indicated there as currently inactive. It was a fairly good well in the Morrow, made 2,454 million cubic feet, plus 27,000 barrels of oil.
Q. On those entries, where you have put Current Status, "D," what is the date of that information?
A. On most of the wells, it's effective through November the 1st. There are a few wells, such as the Hudson State No. 2, where we have updated it beyond that.
Q. This is November of '93, is usually the most recent available data that you have access to?
A. Well, the most -- it was to November the 1st. So the most recent data would have been October. We have, since this map was made, received the November books, but --
Q. Cumulative production is through then the 1st day of November of '93, as well?

A. Right.

Q. Without going through all the detail, give us a general overview of what the issue is and what your conclusions are.

A. Okay. Before I do that, I would like to mention that the 1-Y was recompleted in September of 1988 to the Atoka, has made 2 bcf. When we shut it in, it was still capable of producing 487 mcf per day.

EXAMINER MORROW: Which well is that, sir?

THE WITNESS: This is the Hudson State 1-Y. This well is shown as producing, but it was actually shut in November the -- in November, now due to Administrative Order NSL-3125-A, that allowed us to test the Hudson State No. 2, which is located just to the southwest.

In getting to what the order is about, the Hudson State No. 2, and it came in with a virgin reservoir pressure in December, and this is one of the places where the data is updated.

Q. Well, this is after you have completed it into the Atoka?

A. Right, after we completed it into the Atoka, in December, it averaged 6,144 million cubic feet per day. It has dropped off somewhat from that here the 1st of March, but it's still a very good well.

Q. Have you complied with the division memorandum so

that you're not concurrently producing both of the wells in the pool at the same time?

A. This is true. The Hudson State 1-Y was shut in one day, the Hudson State No. 2 was put on production the next day.

Q. What's the problem?

A. Okay, the problem is that if we have to shut in the Hudson State No. 2, it's going to defer this cash flow out beyond -- defer our cash flow, which is going to impact us adversely economically.

Q. All right. Let's describe that issue for a moment. If you have to leave the No. 2 shut in and produce the 1-Y till total depletion of that well, have you calculated or estimated the period of time involved?

A. It will be in the range of five to six years. It would be trading a very good well for a fairly good well, but if we have that decision to make, we'll take the higher rate.

Q. If you shut the No. 2 well in, produce the 1-Y to depletion, is there any kind of reservoir risk or mechanical problem with shutting down that gas well in for five to seven years?

A. When a well is setting there, there is always a mechanical risk. You know, the well would probably be there when we deplete the Hudson State 1-Y, but things happen, and

it might not be.

Q. All right. So you've taken the choice to shut in the 1-Y?

A. Right.

Q. You're currently producing the No. 2 at what rate?

A. In December, it averaged the 6.1 million cubic feet per day. At the end of February, the first part of March, it was down to between 3 and 4 million cubic feet a day. If we leave the 1-Y shut in for an extended period, we have offset wells that are producing, the State 2 No. 2, which is south half of Section 2, just to the north of our well, was completed in January of '94. The initial Atoka rate was 493 mcf per day. To the south, we have in the south half of Section 11, we have the Brian No. 1, which is making 685 mcf per day, and just to the west in the southeast there is -- yeah, southeast quarter of Section 10, the Estoril Belco Federal No. 2 is producing 298 mcf per day. So we'll really have wells offsetting our lease from two or three directions, draining reserves from that lease.

Q. Let's talk about the risk of drainage. When you look at the 1-Y, how it's completed, if it's not produced, are those gas reserves in the limestone member of the pool going to be produced by any of the other wells?

A. Some of them, yes, would migrate off the lease

and be produced elsewhere.

Q. How do you know that?

A. Well, we get into the pressure data later on that I think shows --

Q. You've got pressure data that confirms that for you; right?

A. Yes.

Q. When you look at the No. 2 well, is that gas interval being produced by the No. 2 well being produced or is it capable of production in any of the offsetting Atoka wells?

A. No.

Q. Why not?

A. It's not well-developed. It's just not well-developed. In some of them, it's not developed at all and the wells that it could be present, it has no porosity.

Q. In the No. 2 well, the Atoka interval is what I've characterized as the sandstone member?

A. Yes.

Q. And that sandstone member is not present or well-developed in any of the offsetting wells?

A. That's correct.

Q. And none of those offset wells have the capacity to currently, or in the future, produce that sandstone member?

A. That's correct.

Q. Let's go and look at some of those details. If you will turn to Exhibit No. 6, would you identify and describe that for us.

A. Is Exhibit No. 6 the bottomhole pressure map?

Q. No, sir, I have a structure map as 6. Is that all right?

A. That's good, the structure map. I had it labeled No. 7. Exhibit No. 6 is a structure map. It's drawn on an Atoka marker that we'll see on the cross section later on from the base of the shale that's the bottom marker for the Atoka limestone.

Now, I've picked this marker because it's consistent through the area. If you map on the top of this shale member or the Atoka, you'll end up with a pretty much similar map, but there would be some differences due to thickening in the Atoka, and in some cases, thickening in this shale.

It covers the same area, same scale, same color convention as was used on the previous map. The Atoka is developed on an anacline, north-south trending anacline. The structure falls off to the east. The structure fails off to the west. As you go to the east, we'll see on a cross section later on, the Atoka thins; you lose most of your lime. You get pretty shaley and pretty ratty looking

with no porosity.

As you move to the west, as we'll see on a cross section later, the Atoka thickens, but you lose your porosity. The better production is situated on the crest of the structure to just off the flank of the structure -- just off the crest on the east.

Q. Have you made a study of the available pressure data from these wells?

A. Yes, and I have a couple of exhibits on this.

Q. All right. Let's turn to the first one I have is Exhibit 7.

A. Yes.

Q. It's the nine-section display plat.

A. Exhibit 7 covers the same area as the other maps. What I have here is the calculated bottomhole pressure based on the most recent shut in tubing pressure that I had available. The numbers that you see on the map, the top number is the shut in bottomhole pressure. The bottom number is month and the year that this was taken. The majority of these pressures came from the 1992 New Mexico annual production book.

There are four exceptions to this. And the first exception is the 1-Y, the Amoco 1-Y "ME" located in the south half of Section 11. This well was drilled, completed in 1984. It was a real poor well. It didn't produce very

long. And the last pressure reported was August of 1985. This calculates out to a bottomhole pressure of 5,312 pounds.

Just to the west of that well in Section 10, is the Estoril Belco Federal No. 2. This well is still producing, but, for some reason, they quit reporting the pressures. The latest pressure they had on that was in June of 1986. That's tubing pressure calculated to a bottomhole pressure of 1,594 pounds.

In the north half of Section 11, on the Hudson State 1-Y, here at the 1st of March, after the well has been shut in since November, so it's been shut in a long time, we took a tubing pressure; it calculates to a shut in bottomhole pressure of 1,330 pounds. In July of '92, that well had a pressure that would have calculated as 1,718 pounds, so it has dropped off since then.

The other pressure that's not in '92 was on the Hudson State No. 2. In November of '93, when we completed the well, we took a tubing pressure and a shut in bottomhole pressure that I'll mention later on, but the calculated bottomhole pressure from the tubing pressure was 9,432 pounds, which I feel is virgin reservoir pressure.

The other wells were all in 1992. And the highest pressures that were calculated were 1,495 pounds. So with almost 8,000 pounds pressure differential, I think

that's the first indication that the Hudson State No. 2 sand has not been affected by the other wells.

Q. If the No. 2 well was being affected by pressure depletion from any of the other wells, what would have been the range of pressure?

A. I think it would have been 1,500 -- in the range of 1,500 pounds or less.

Q. And the difference between the 9,400 and 1,500 is enough pressure differential to cause you, as a reservoir engineer, to say definitively that the producing interval in the No. 2 well is not, in fact, in communication with any of the other wells?

A. Yes.

Q. Have you analyzed the pressure data in any other way?

A. Yes. The next exhibit, which I believe is No. 8, is a graph where I have taken the initial pressures reported in each well and either from the measured pressure or the calculated bottomhole pressure graphed them versus the time that they were taken. The X scale on this would be -- the numbers shown there are the year --

Q. You start in 1972?

A. Right.

Q. And when we go over all the way to '94, and look at the last entry, that's the H. St 2, that's our well?

A. That's the Hudson State No. 2. and the "M" in brackets indicates that I have plotted a measured pressure rather than a calculated.

Q. So when we look at the entry at that point, that is the well in the south half of the spacing unit in question that is currently producing?

A. That's correct.

Q. Where are on the display do we find the 1-Y well?

A. The 1-Y is just after 1988.

Q. Okay.

A. It's just a little bit above 4,000 pounds. It's about, well, roughly, 4,600 pounds. And that was taken when that well was originally, initially completed.

Q. By plotting the pressure data chronologically with regard to each of these wells, what does this show you?

A. Well, it indicates that the later wells show pressure depletion. I want to comment that on the left-hand side of the map, I have -- the first 2 points are from the Texas West Oil & Gas, State 2 Well No. 1 and 2 No. 2. These are located about three miles south of the area that we have mapped. There are in Section 2 of 24 South, 34 East. This is the discovery well for the Antelope Ridge Atoka, and the immediate offset to that well. Both of these wells had shut in tubing pressures that calculate over 9,000 pounds.

The next two points, or the first points that are

on this map, they were taken from the well, the AAA No. 1 is the well in the west half of Section 10. These pressures were taken from a drill stem test. The top pressure is the initial shut in, the lower pressure is the final shut in. It had a good gas rate, but it showed depletion on tests and did not produce from the Atoka due to the completion.

The first two wells in this area, are the next two points, the Antelope No. 1, which is in the north half of Section 2, and the State 2 No. 1, which is in the south half of Section 2.

Q. Why are those two pressure points higher than would be the decline if they were affecting an area that's already being depleted by the earlier wells?

A. They were very far away from any producers in the pool and were really the first wells in this immediate area. And their pressures had not, apparently, been affected from wells way to the south.

Q. As we move past 1982, you pick up some more pressure points?

A. Right. The next one to the right is on the Belco Federal No. 2, which is in the southwest quarter of Section 10, and you can see a drop from the original pressures to this well, which is down around 7,000 pounds.

You go to the right, the Hudson State No. 1-Y then came in down around 4,600 pounds. The next well over

in 1989 is the Brian No. 1, and there we took a Slumber J RFT survey and a pressure build-up once we perforated it. Both of these pressures came out fairly close together. One of them is 3,630 pounds; the other one was 3,709.

And then the second pressure dropping down there's the State 2 No. 2. I feel that the consistent decrease in pressures with time on each of these wells as they were drilled later shows a very good pressure transmissibility in that area in the Atoka. Now, if the Hudson State No. 2 was in communication with these wells, it would have probably been down to about the same pressures as the State 2 No. 2.

Q. Is there geologic data that you've analyzed to provide an explanation as to why there was no pressure effect between the 1-Y and the No. 2 well?

A. Yes. I've made two cross sections that demonstrate this. I also have some mud logs. The cross section trace, as shown back on the well data sheet --

Q. All right. We're going to have to go --

A. -- which is Exhibit No. 5.

Q. Hang on just a minute. Let's unfold the cross section, and then we'll talk about it. A-A' is marked Exhibit 9, and the line of that cross section is shown on Exhibit 5?

A. Correct. This cross section on the left-hand

side starts at the north. It goes from the State 2 No. 2, through the State No. 1, through the Hudson State 1-Y, the Hudson State 2, and then the southernmost well is BTA Brian No. 1.

Q. Before we talk about the cross section, what's the significance of the color code?

A. The red colors in the center tract are the Atoka perforations. The yellow colored in to the left indicates the clean lime or the clean sand, and it's based on a 30-unit cutoff on the gamma ray. The green colors on the right-hand tract on the neutron and density and porosity logs, colored in porosity above 2 percent. On the Hudson State No. 1-Y, which is the second well from the right, I've colored in the porosity red and taken a 6 percent cutoff on it, since in the sand, I feel like the cutoff is probably higher.

Q. You may have misspoken, Steve. The third well from the right is the 1-Y? And the second from the --

A. Oh, I was talking about -- excuse me. I had the wrong well. The Hudson State No. 2 is the one with the red color, it's the second well from the right.

Q. And that's one of our wells in the spacing unit. The 1-Y is the next one to the left?

A. Right. And as you can see, the Hudson State No. 2 is completed in a lower porosity zone that has a shale

zone separating it from an upper zone. The Hudson State No. 2, it appears that the whole unit is pretty much one unit. This is a stratigraphic cross section. It's hung on this Atoka Marker, which, as you can see, is a consistent marker on the base of the shale. You then have a shale interval and then you have the Atoka built up on top of that.

If you'll compare the two wells, the Hudson State No. 2 and the 1-Y, in the Hudson State No. 1-Y, this shale interval thickens quite a bit compared to the Hudson State No. 2, and in fact appears to shale out most of the zone that I think would have been the sand interval.

Q. When we look at the reservoir north to south on your cross section, what's the conclusion you draw from Exhibit 9?

A. I don't see any other wells that have this sand. In the Brian No. 1, which is the well on the extreme right of the cross section, it's the south offset to our Hudson State No. 2, it does have a lower zone that's separated from the upper by a shale; however, as you'll see, with a 2 percent cutoff, there's just no porosity in this interval. The neutron and density also plot on top of each other, which I think is indicating that it's a limestone. So even though it could be the same interval, at best, you have no porosity. At worst, it's a different zone.

Q. In addition to the cross section, have you analyzed the mud logs for the No. 2 well and the 1-Y well?

A. Yes, I have.

Q. Let me have you identify Exhibit 10 as to what well we're looking at.

A. Exhibit 10 is a mud log on the BTA Hudson State No. 2.

Q. Let's take that mud log portion and have you show me how to put it on the cross section so that I have it oriented on the right interval.

A. About midway through the log, at 12,100, there's a blue line on the mud log. If you line this blue line on that, with the blue line shown on the cross section on the Hudson State No. 2, they will be on depthwise. I think there's about a 10-foot shift between the logs where the mud log has to be slid down from that about 10 feet.

Q. Let's come back to Exhibit 10, but let's go to Exhibit 11 now and have you identify what that is.

A. Exhibit No. 11 is a mud log on the BTA Hudson State No. 1-Y.

Q. I'm going to take that one and put it on the cross section and put it on the left side of the log for the 1-Y. Now, show me again how to correlate the depths so that the mud log is located in the right place.

A. You, again, line the blue lines up, and

correlating them, I think that this log probably shifts up slightly, maybe four to six feet.

Q. Let's go back to Exhibit 10 now. Looking at the mud log from the No. 2 well, what does that show?

A. In the top part of the Atoka, the mud log indicates that you're primarily a lime zone. This is indicated by the descriptions on the lithology descriptions. It's also indicated by the graphic lithology where you have rectangles. The top part is indicated to be a lime.

Q. You get down on that track and find a yellow-shaded area?

A. Yes. At 12,200 feet, there is a yellow-shaded interval. The dots in that yellow-shaded interval indicate it's a sandstone. The lithology description indicates it's a sandtone. You have a good drilling break there, indicating it probably has good porosity, which is confirmed by the porosity log. It appears to be a sandstone.

Q. When you move over and look at the mud log, Exhibit 11, for the 1-Y and find equvalent interval to the sandstone member of the No. 2 well, what do you find in mud log shown on Exhibit 11?

A. There is no sand on the mud log. You go directly from the shale into a lime. This mud log was the first indication that we had that we had an unusual situation on the well in that when we were drilling this lime, we weren't

expecting pressures. The other wells in the Atoka had relatively low pressures. We had 9.9 pound mud, which would hold pretty much a normal gradient.

When we hit the sand, we took a big gas kick; we had to increase the weight in the mud. It took 15.1 pound mud to drill through the sand. And this was the first -- probably pretty exciting if you were on the well, but pretty mundane here, you just weighed up to 15.1 pound and let it hold the higher pressure.

Q. What does this tell you?

A. It tells me that this sand is definitely not in communication with the lime zone up above here. And it's also not, I don't think, in communication with the offset well.

Q. In order to effectively and efficiently drain the north half of Section 11, this spacing unit, what is your recommendation?

A. I think we have to produce both wells, the one that's completed in the lime and the one that's completed in the sand.

Q. Is there any opportunity to cause reservoir waste if that is approved by the division?

A. If you shut one well or the other in and you had a mechanical failure and you didn't get to produce the reserves later on, that would cause waste. If we're not

allowed to produce -- if we were to shut in the Hudson State No. 2, it would have a very serious negative impact, cash flow wise, both to our royalty owners and to BTA. And if we shut in the Hudson State 1-Y, based on the pressure transmissiblity that we have seen here, I think it would affect the correlative rights of this lease by the loss of the gas off lease.

Q. Are both wells necessary as they are currently completed in order to produce the gas reserves in this pool from this spacing unit?

A. Yes, they are.

Q. And if this is approved, will there be any reservoir waste that occurs?

A. No.

Q. The correlative rights issue, do you see -- you've described the impairment of BTA's correlative rights and its interest owners in that spacing unit. Conversely, do you see any impairment of correlative rights for any of the offsetting interest owners?

A. No, I don't.

Q. Now, let's take one more look at the reservoir. Let's look east-west and have you look at that cross section, it's Exhibit No. 12, and see if there's any reason to reach any other conclusions.

A. Okay, Exhibit 12, is a cross-section B-B'. It's

an east-west cross section, starting on the right on the Knox Industries well in Section 12. It's Knox Industries on the log. I think that it's called the Mid-America Well on the map.

Looking at the Atoka interval in this well, the well is off structure, as shown by a structure map previously. The Atoka lime zone appears to be pretty shady. There's no porosity. The well didn't make a well there.

Moving to the Hudson State No. 2, the Atoka lime cleans up, and then as you move farther west to the Estoril Belco Federal No. 2, you get a lot thicker Atoka lime interval. The porosity doesn't appear to be quite as good as it is on the BTA well, but you do have some porosity zones noted at about 12,050 and 12,080 feet.

The bottom shale on the Estoril Belco Federal No. 2 thickens, may have replaced this sand. It does have a lower zone, it does have purse in it. But again, with a 2 percent porosity cutoff, there is no porosity, and I don't feel that any perforations down in that interval are effective.

As you come on to the last well on the cross section, it's the Adobe Federal "AA" 1-X on the map. This well was re-entered by J.C. Williamson, and when he re-entered it he called it AAA No. 1. It did have drill stem test that show depletion on the pressures and did not

produce from the Atoka. Again, you don't see any -- you see very little to no porosity on that well.

Q. When you look at Exhibit 12 and analyze the reservoir east-west, is there anything on this information to change your conclusions or opinions?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Salmon. We move for the introduction of his Exhibts 1 through 12.

EXAMINER MORROW: 1 through 12 are admitted into the record.

EXAMINATION

BY EXAMINER MORROW:

Q. Now, the new well, the No. 2, produces from a sand; is that correct?

A. That's correct.

Q. You said everything else produces from lime?

A. From lime, yes.

Q. Even though it correlates across there, you say it's still line?

A. When you have a bottom section like this, on the other wells where I've seen it, it's been very tight and pretty much plotted as a lime. The our mud logs that I've looked at on the BTA wells show it to be a lime.

Q. You did show it perforated in that last cross

section?

A. Right. In the Belco Federal -- or in the Estoril Belco Federal well, yes.

Q. Did you consider requesting a new pool be established for this well?

A. We did. We consulted with our attorneys, who also talked to some of the people at the commission and were told that the commission probably would not want to split the Atoka up into separate pools in this area. But we did consider that, yes.

Q. Now, the north half and south half are different ownership of working interest; is that -- as well as different leases, state leases?

A. Yes, I think Amoco and the Brian.

Q. In 11, I'm talking about.

A. Yes, in the south half of Section 11, in the Brian No. 1, the -- I think Amoco has a 25 percent working interest in that well. Yes, or excuse me, they have a 12 1/2 percent working interest in the south half of the Section 11. In the State 2 lease, BTA has 100 percent working interest, and in the Hudson State lease, BTA has 100 percent working interest. The State 2 lease would be in the south half of Section 2.

Q. When the two Morrow wells produced in the north half of 11, did they produce concurrently?

A. No. No, the 1-Y, the Morrow was plugged prior to the recompletion to the Atoka in 1988, and we did not drill the Hudson State No. 2 -- it was not completed till 1983. No, they didn't produce concurrently.

Q. Are there any pool rules for the Atoka Ridge or Antelope Ridge Atoka?

A. I don't know if there are pool rules. It is on a normal 320-acre spacing. And it's just -- if there are pool rules, it's just the standard spacing rules. But I couldn't swear whether there are pool rules or not. There may be.

MR. KELLAHIN: Mr. Examiner, there are no special pool rules. Here's the Byrom's sheet that shows the nomenclature and shows you the size of the pool and lists all the orders, but this is a statewide gas basing.

Q. (BY EXAMINER MORROW) What are the GORs? Looked like some fairly high liquid producing rates?

A. Yeah, the GOR's will probably run, initially, anywhere from 30,000 to 50,000. Yeah, and take on the Hudson State 1-Y, it has produced 2,082 million cubic feet, with 31,000 barrels of oil. That's a GOR of 67,000 cubic foot per barrel.

Q. That's on the No. 2?

A. Excuse me. That's on the 1-Y.

Q. It's what? 60,000?

A. Right. That's on the cumulatives.

Q. How about the No. 2?

A. On the No. 2, that would be 25,000. Generally, the GOR's will go up a little bit with time.

Q. What would it take to make a gas well? More than that, doesn't it?

MR. STOVALL: I forget, but it's a gas pool, so it's gas one.

EXAMINER MORROW: Another reason to keep it in there, I guess.

Q. Were all the bottomhole pressures calculated from tubing pressures, or were some of them measured?

A. No. On the first map that I showed you, all of them were calculated. They were all calculated in a consistent manner. On the graph that I showed you, it was a combination of calculated and measured. On the graph, anyplace I had a measured pressure, I used it.

And on Exhibit No. 8, I had measured pressures from the DST on the AAA No. 1. I had a measured pressure on the Antelope No. 1, the Belco Federal No. 2, the Brian No. 1, the State 2 No. 2, and the Hudson State No. 2. So on the initial pressures, I had quite a few measured pressures.

Q. Which one was calculated?

A. On the graph, the ones that have the "C" on them were calculated. The ones that have the "M" were measured.

Q. Did you calculate those or were those reported?

A. On the calculated, I calculated them on the same manner that I calculated the pressures for the other --

Q. What kind of gradient did you -- did you think that high liquid production would affect your choice of gradient there?

A. Yes. I took Craft & Hawkins -- it shows calculations that recombine the condensate with the liquid -- and then use this changed gas, use the gas gravity from that combination to then calculate the bottomhole pressures. And I used a computer program that we got sometime ago from the SPE to calculate these.

I do have a tabulation to go with that graph that shows several of the wells where I have the measured bottomhole pressure and a shut in tubing pressure and then the calculator bottomhole pressure to compare, and they compare fairly well. You know, there are differences, but they are relatively minor.

MR. KELLAHIN: Mr. Examiner, this tabulation is not marked as an exhibit. It might assist you in analyzing the case, so we would propose to mark and introduce this as Exhibit 13.

MR. STOVALL: Do you have one more, Tom?

MR. KELLAHIN: Yes, sir.

Q. (BY EXAMINER MORROW) What did you tell me about Exhibit 7? Are those --

A. All of those are calculated in the same manner that these pressures shown on Exhibit 13 were calculated.

Q. But you've got one for your No. 2 there that's measured on the next exhibit, that's in fairly close agreement, I guess?

A. Right, right. The map that I made, I tried to be consistent and show all calculated so that they would all be comparable. On the next exhibit, since I came out with fairly close agreement on the calculated and measured, I used measured where I had them to try to be as accurate -- you know, that's obviously a better number.

Q. Okay. You didn't encounter any resistance at all from offset operators as you discussed this with them?

A. No. That Clarence Owen that notified us that the lease had expired was the only response that we got.

Q. And you got a waiver from the next guy?

A. Right.

EXAMINER MORROW: That's all we have, sir. Thank you, Mr. Salmon.

THE WITNESS: Thank you.

MR. KELLAHIN: Mr. Examiner, if it might aid you, I have made copies of two orders from the division, one in a Mitchell case, and one in a Phillips case that deal with the simultaneous dedication and approval of multiple gas wells in a nonprorated situation. I've also given you a copy of

the exhibit in the Mitchell case because of the locator map. Without the locator, it's hard to read the order.

EXAMINER MORROW: Did we approve that?

MR. KELLAHIN: Yes, sir, both orders approved the similar concept of what Mr. Salmon is seeking. I think the Phillips case dealt with oil wells, but the concept was the same. They had oil production in that pool. That concludes our presentation.

EXAMINER MORROW: Case 10937 will be taken under advisement.

CERTIFICATE OF REPORTER

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

I, Diana S. Abeyta, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that I caused my notes to be transcribed under my personal supervision, and that the foregoing transcript is a true and accurate record of the proceedings of said hearing.

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, March 28, 1994.

DIANA S. ABEYTA
CCR No. 168

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10937, heard by me on March 17 1994.

Examiner
Oil Conservation Division