NEW MEXICO OIL CONSERVATION COMMISSION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NOS. 10446, 10447, 10448, 10449

Consolidated

IN THE MATTER OF:

The Application of Yates Petroleum Corporation for Authorization to Drill, Eddy County, New Mexico.

VOLUME III

BEFORE:

CHAIRMAN WILLIAM LEMAY

COMMISSIONER GARY CARLSON

COMMISSIONER BILL WEISS

FLORENE DAVIDSON, Senior Staff Specialist

State Land Office Building

September 11, 1992

REPORTED BY:

DEBBIE VESTAL
Certified Shorthand Reporter
for the State of New Mexico

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

ROBERT G. STOVALL, ESQ.
General Counsel
State Land Office Building
Post Office Box 2088
Santa Fe, New Mexico 87504-2088

FOR YATES PETROLEUM CORPORATION:

LOSEE, CARSON, HAAS & CARROLL, P.A.
300 American Home Building
Post Office Drawer 239
Artesia, New Mexico 88211-0239
BY: **ERNEST L. CARROLL, ESQ.**

FOR NEW MEXICO POTASH CORPORATION:

KEMP, SMITH, DUNCAN & HAMMOND, P.C.
Post Office Drawer 2800
El Paso, Texas 79999
BY: **CHARLES C. HIGH, JR., ESQ.**

KEMP, SMITH, DUNCAN & HAMMOND, P.C.
500 Marquette, N.W., Suite 1200
Post Office Box 1276
Albuquerque, New Mexico 87103-1276
BY: **CLINTON W. MARRS, ESQ.**

FOR POGO PRODUCING COMPANY, SANTA FE ENERGY OPERATING PARTNERS, L.P., and PHILLIPS PETROLEUM CORPORATION:

THE HINKLE LAW FIRM
217 Montezuma Street
Post Office Box 2068
Santa Fe, New Mexico 87504-2068
BY: **JAMES G. BRUCE, ESQ.**

FOR BASS ENTERPRISES PRODUCTION COMPANY:

KELLAHIN & KELLAHIN
Post Office Box 2265
Santa Fe, New Mexico 87504-2265
BY: **W. THOMAS KELLAHIN, ESQ.**

FOR KAISER-FRANCIS OIL COMPANY:

CAMPBELL, CARR, BERGE & SHERIDAN, P.C.
110 N. Guadalupe Street
Post Office Box 2208
Santa Fe, New Mexico 87504-2208
BY: **WILLIAM F. CARR, ESQ.**

* * * * * * *

I N D E X

E X H I B I T S

CHAIRMAN LeMAY: We shall resume. For those of you that haven't been here for the last two days, this is the Oil Conservation Commission. And we are hearing de novo cases concerning oil and potash: 10446, 10447, 10448, and 10449. My name is Bill LeMay. To my right, Commissioner Gary Carlson; to my left, Commissioner Bill Weiss. We are continuing with the Yates presentation.

Mr. Carroll, do you want to continue with Mr. Hutchinson, who has been sworn in?

MR. CARROLL: Yes, sir.

GARY L. HUTCHINSON

Having been previously duly sworn upon his oath, was examined and testified further as follows:

EXAMINATION (CONTINUED)

BY MR. CARROLL:

Q. Mr. Hutchinson, yesterday at the close of the day, we had just gone through your economic presentation. And I think the last question that I asked that we really did not get into is that now, after having seen the presentation about the potash industry as a whole, what have you learned with respect to the New Mexico Potash operation and in turn more to

the area in the case at hand?

A. All right. I need to explain Exhibits 51, 52, 53, and 54. You have blue-lined copies. I have a base map and some transparencies. After I've been through it, you'll get more out of this than you will out of the ones you have because you can't see through them.

If you would tell me what you would like -- I've never appeared here before, so I have prepared my presentation for the best demonstration of what I thought we would have. And I will prepare whatever you would like after that.

Before I get into this, after reflecting last night, I don't know if Walter Case will testify later, but Walter Case is the mine manager. Dick Lane is recently retired from New Mexico Potash after being there many years, chief engineer and mine manager and everything, I understand. Ernie Szabo, you've met, who testified earlier, and I think Mike Stogner, of the OCD.

I would like to say that I would like to apologize to those people for using their information. I thought I was doing it properly.

I'm sure I did it properly. And I'm sure that -- and I'm aware that the mine people have been chastised for letting that information get in here. Mike Stogner gave it to me. He thought he was doing the right thing. I apologize for any discomfort I may have caused him.

And, to me, those four gentlemen were acting in the spirit of R-111-P, trying to get this thing worked out. I didn't recognize their things as any economic life of mine reserves, but they were just merely showing what was barren and what wasn't or what was uneconomic -- obviously uneconomic, and they were sure of that.

And Bill Lane, going to Ernie Szabo's office, trying to explain when Ernie was looking for more information how the costs were taken care of, I think, is in the great spirit of R-111-P. I think other people, Mr. High, hides behind it and uses it to manipulate things, and that's unfortunate. That's not the spirit of how it came about in my view. At any rate, my apologies, and I'll go on.

This is the base map. Here's the New Mexico Potash shaft. The red outlines with the dots is what we've already heard about as first

mined areas. Functionally they are entries that are kept open so that you can get back to different areas of the mine and mine what they call second mined areas, which are panels that come off of here and a room and pillar system, and then eventually the pillars are pulled back towards these entries which are maintained and kept open and not allowed to collapse.

As of 1/7/92, this is where the mine was as reported on the required mine opening information that was submitted as required. The black line is the lease boundary as of 1/7/92. The green areas are what I interpreted to be barren areas into which they had no intention of mining ever. They just were not -- they were sub-economic by any stretch of the imagination.

I'd like to point out that the lease line as of 1/1/90 was down here. So between 1/1/90 and 1/1/92, New Mexico Potash took that lease. A good move, they've obviously found some good ore in there. This dashed green line here shows the change of the barren line from the solid -- or excuse me, the dash line was 1/1/90. They've moved it in here and moved it out here, I'm sure, as a result of doing some exploration

drilling.

Also over here, 1/1/90, the barren line was here. 1/1/92, they moved it out here, outside their lease line. Again I think the result of some exploration efforts, which for mining they have to go on all the time, find out where you're going to go next year or five years from now.

Also the barren line, 1/1/90, was here, and it was taken out and extended down here. This remained dashed on their map. I interpret that to mean that they're not sure about this area. And they brought the -- on 1/1/92 they brought the barren line out here, extended it down again near the WIPP area and into some acreage off their lease line, which this is also, as is this.

Q. Mr. Hutchinson, from the maps that you viewed, were you able to tell where the most recent mining is occurring?

A. Yes. Let me put up another.

Q. This most recent map mining would actually occur, would be the overlay or your Exhibit No. 53; is that correct?

A. This will be -- the Commissioners will

have a -- is that okay?

MR. STOVALL: Yes.

A. All right. The blue areas here were mined from the date of the first map that was turned in after R-111-P was enacted and effective October 1988. So from October 1988 through 1990, when the next map was submitted that I saw of the mine workings, they came off of this entry, developed up into here, over to here, mined this. They had developed this -- they had developed this panel here, and they completed mining it, second mine.

They came down this entry. They hit a barren zone and came up along this section line and developed some entries here, I'm sure a good mining practice, looking for minable reserves down here. They apparently didn't know this was there, which is often the case in potash mining. This is most likely a salt horse. They drove into it, came down, came across, hit it again. And so they have concluded, and I certainly agree, that this is a pretty good-sized salt horse.

Same thing happened -- excuse me. I'm jumping ahead here. The red is the mining that

they did from the end of 1989 -- or from 1/1/90 to 1/7/92, approximately a two-year period. Keep in mind that their shaft is here through which all the ore, supplies, everything has to move.

They continued mining here with an entry back towards this entry. That shows very good practice to me. It looks like they're going to develop this ore block. They came south, looks like they found something here because they were here at the end of -- they were in Section 23 at the end of 1990. And then in the next two years, they drove over, hit a barren area, may have caused them to do some exploration. The same in the same two-year period they hit this one.

Then they drove north and back towards the shaft. About that time they took this lease. That leads me to believe that they have some good ore in there. They've done their exploration. They've got it blocked out. They're heading back towards the shaft, I assume, to cut down on their conveyor capital requirements.

This ore now -- or at the end of this period had to come all the way in that torturous

route to get back to the shaft. But these poke through here perhaps, at least that's what I would do, I would shorten this conveyance distance back here.

I may have failed to mention that the blue crosshatched lines are second mining where all the pillars have been pulled, and I don't have any idea the dates of that because, when I first got involved, that had already been done with the exception of taking out this panel and completing this panel.

Now, they had developed down here with their entries, and they mined this area in that period from 1990 to 1992.

Q. Well now, Mr. Hutchinson, from this material that you have gleaned from the files of the Division, are you able to in any way determine the rate of mining that has been going on at the New Mexico Potash mine?

A. Yes, I have. I took that 39-month period, and I broke it down into the two periods that I knew about. And I read all of the public information, USGS, et cetera, that I could find about the thickness of the tenth ore zone in this area. It averages about 6 feet from the

information that I was able to find.

I took -- I calculated the net acres. By net acres, the way I did that was to say that in their first mining, whether it was development work, or even going into a panel like this, they were extracting approximately 50 percent of the ore in place during that first mining.

During the second mining, they add approximately 35 to 38 percent of the ore in place. So that where they had mined both first and second, I would give them credit for 90 percent of the -- approximately 90 percent of the net acres that they had mined.

From that I calculated that over that 39-month period, they had been mining a 6-foot seam at the rate of about 136 net acres per year.

Q. Now, based on that information, Mr. Hutchinson, and all the other information that you've been discussing with us, were you able to come up with a mine plan for this mine?

A. Yes.

Q. Could you also kind of describe or define for the Commissioners what you mean by "mine plan"? What's the purpose of it? What is it used within the industry?

A. Well, every mine has to have a mine plan, or it's not going to be in business very long. And I'm sure as long as this mine has been around and knowing the professionals that run it, they do have a mine plan. I'm sure they keep it confidential, as they should. I know the mine plans that I've done, put together, administered, change from time to time, as you get more information and more exploration data.

When you know what the price of your product is going to earn, it changes your grade up or down. So if the prices are high, you can mine a little bit lower grade; prices are low, you have to go to those areas where you know you have good reserves and mine those until things get better.

In the potash industry, because all of the ore has to be milled and the mills need to run at a fairly constant grade of input to get the product coming out the other end at a consistent rate, they have to balance the product that goes up the shaft.

And they do that, not only with exploration, but everyday geologists are most likely at those working faces taking samples.

They don't wait to see what comes into the mill and sample it. They're most likely down there taking samples. That's how they found this. That's how they found this.

And this is a very sophisticated mine. They're using continuous miners so they can vary the width of their mining to keep their grade to the mill constant. It's quite a balancing act. But, as far as I can see, they do a terrific job of that.

This is a hypothetical mine plan, and it isn't in anywhere near the detail a real mine plan would be because I don't have the costs and the production data and the grades, et cetera. But --

Q. For the record, Mr. Hutchinson, the exhibit which depicts your mine plan is Exhibit No. 54, is it not?

A. Yes. I have to refer to my notes to get some of these sections straight here. It became apparent to me that New Mexico Potash has a conveyor constraint. They're staying very close to the shaft. If you'll recall the last overlay, they were operating here, which is close to the shaft. They were trying to develop a new

ore zone down here, which is quite a ways, but they're working back towards the shaft. And they were working on this area and this area.

So now seeing the areas that I thought never to be mined because of their grade, salt horses -- they mined all the way around this one. I don't think that's ever going to be mined; you can't get to it now. Here is one. And here is one that they found. So there, by trying to get back to the shaft, I think they're trying to take care of a transportation problem.

It's also the matter of paying the men from the time they get on the skip in the morning, or at the beginning of their shift, to transport them all the way back to the faces. They're having to bring these men all the way down around back into here. And last year they were taking them over into this area. So that's a consideration. There's no production, and you're paying those guys. It's expensive.

Also, the line loss for electricity that goes to these continuous miners is considerable. And every now and then you have to put in transformers or drill a hole from the

surface, as Mr. Muncy described, I think, to put down electrical cables. I think the example was the AMAX mine at the time. Then they can take electrical power on the surface. They don't have to worry about the headings collapsing or anything on it and get it to the areas that they need to have it.

This overlay with the orange areas I've depicted as those areas that have some chance of being mined. I don't know what their grade is, but they weren't included in the barren areas on the map that I saw. So I just surmised, okay, they're going to be able to mine that.

The red lines are those first mining or panel development areas to get back to the different blocks of ore that I perceived to be there with the information I have. I tried to come up with a mine plan that would provide them the flexibility to work in at least two blocks at the same time, giving them a chance to vary their grade and maintain the feed grade to the mill.

As you can appreciate, the bottleneck is this shaft. They can only hoist so many tons. That capacity is balanced with the mill. The next constraint is how fast they can get it

from the headings back to the shaft. As they get further from the shaft, it's obvious that it's going to take longer. And that will become more and more of a constraint and again take more conveyors.

I concluded that blocks D -- up in this area, here and here, are D, and blocks E, right here, they're closest to the shaft. They have entries developed to them. Those should be mined first because of their relative proximity to the shaft. And that should be followed by blocks F and A, right in that area. As you can remember, this is all developed. I mean, all the entries are in there, really on four sides of this big block. And it looks like a well planned, well developed block of ore.

I was puzzled as to why management was avoiding these areas. I began looking for an economic reason why they weren't mining in those. And instead they're mining down in blocks L. Remember this development that was there, I've named that L. G, where they have obviously found some good ore, but they're way far away from the shaft compared to D or A. Area H, again I've separated this entry here. I've separated L

from H for later analysis. But they're down in that area.

So I was puzzled by why they were down here, down here, had finished up, up here, but they didn't continue up into those areas. I began to look for an economic explanation and decided to look. The only thing I could come up with is that given I don't know their grade, I see what they've developed.

I looked to another significant cost in mining, and that might be royalty. So I examined who owned the minerals. And these are all federally owned minerals except for this exhibit, which is Exhibit No. --

Q. 55?

A. -- 55.

Q. Excuse me. I was listening.

A. It's real captivating stuff.

Now, these shaded areas that you can see, they're outlined in yellow, are state-owned potash. This gave me a little bit of an explanation as to what was going on. It's apparent that New Mexico Potash has been avoiding mining state owned potash.

I can only conclude that those state

leases carry a higher royalty. I don't think the grade of the potash knows whether it belongs to the state or the feds. But it could be that the royalty structure on state land is higher than on the feds or that the feds are giving the mining companies, or this mining company, some preferential encouragement to mine the federal potash first.

If you look at Section 32 in block D, which is -- I mean it's just up the street from the shaft, that's state land. Block 36 -- or Section 36 in block C is right here. Now, this is developed all the way up to here. And that entire section that they have mined to in the past, gone up to the lease line here with this big second mining block, and there is state land in Section 36, as well as up here, that is a little closer to the shaft coming all the way down around and up into here. But it's state land.

Those are all closer to the shaft than the current operations in Section 20, which I call block L and F, this block here where they have to come all the way around to get back up there. In fact, it appears that is only a narrow

main development here through state land in order to get to federal land.

So, as I was just saying, they developed this over here. This is on a state block, but they're obviously driving through it, I presume to get into this federal potash over here. It appears on their maps to be quite narrow. They can go faster if they don't make the entries so wide. They did a similar thing in this area.

And here we see a state owned block, but I don't think -- my thought is that they didn't make this narrow because it's state potash. They had to drive through a barren zone to get to the other side, and they had to hoist that material up the shaft or put it as gob into an old working, which they don't generally practice in potash.

The most obvious state land avoidance, however, is in Section 18, right here. I can't really explain. You can see that this is state land, entire Section 18, plus the southeast quarter of Section 13 in the next township.

In their second mining in the past, they mined right up to the state lease line and

stopped, not just on one side but on three sides. In addition, just in the past two years, they took out this little area here.

Now, gentlemen, this is all subject to collapse, if it hasn't already. That means that, even though they did find a salt horse in here, that they found this after they stopped mining here apparently, according to the sequence of the maps they submitted, that's going to be real tough to mine. It's all state potash.

I don't think the grade, as I said before, changed at the lease line. It doesn't make sense to me anyway.

Q. Mr. Hutchinson, if they can't get back in to get that ore, in your opinion would that be wasted?

A. No question about it.

Q. And it would have been wasted by the mine's own mining practices or mine plan?

A. I'm sure they have a logical reason, and I would guess because it's my reaction to most things, it's economical.

I feel some of Ernie Szabo's frustration. I don't know that he has the knowledge, as I do, to look at something like

this. But certainly if these open mine workings are submitted to the state, the state should take a look at whether or not their potash is going to be mined or wasted and when.

If your royalty is out of line or if your leases allow for overriding royalties that prevent this from being mined, it should be -- I would certainly, as a minerals management expert, want to get those overriding royalties, as well as the state together, to see if you couldn't provide the mines with state leases some encouragement to mine your potash.

Q. Mr. Hutchinson, just as a matter of information, how do over -- if you will recall, and I think it was Exhibit 12, the letter from IMC to New Mexico Potash that was talking about the trade of Section 2 to them that occurred in December, and it said from the letter that it provided that there was going to be a 1 percent overriding royalty.

I know the Commissioners are probably very well attuned to what a 1 percent overriding royalty, how that works in oil and gas and its magnitude. Can you give us a comparison or compare that 1 percent overriding royalty in the

minerals business to the oil and gas?

A. Yes.

Q. And is there a significant difference in your mind?

A. Oh, there definitely is. Many of the western states that have large coal deposits in the past 20 years have tacked on royalties equal in percentages to oil and gas royalties. They've caused many, many coal mines to shut down.

The difference between mining oil and gas is that the risk in oil and gas is in finding the product. You drill, you take the risk, you get a lot of dry holes. But once you find the product, the real risk dollars have been spent. It's a matter of good science and engineering to get it out of the ground.

When you find a deposit, a minable deposit, your risk has just begun. The risk really take place after you've spent $100 million, 1991 dollars, which is probably what this mine might cost today, and you're down there and you start producing. How many tons can you produce everyday? It's a materials handling situation. And what does it cost per ton?

Those are so important. And those

coupled with the grade, and you better have your exploration holes close enough together to know -- to be able to predict your grade and your recovery rates and the mining costs. Because after spending 100 million bucks on a mine like this, if you can't recover that, that's tremendous risk.

So a 1 percent royalty in my experience, and I've done dozens of very detailed feasability studies for both mining oil and a gas, a 1 percent royalty in the mining business is equal to a 4 or 6 percent net profits interest. So if you get up to a 5 percent royalty, as a landowner in the mining business, you've got about a 25 to 30 percent net profits interest.

Now, oil and gas is different than that. You can pay a 12-1/2 or a 1/6 or a 3/16 royalty, but you've taken your risk dollars. And if that royalty is too high, you're not going to produce that well unless you can reduce the royalty.

But usually there's so much product there, if you've got a good well, that you can bring the landowner in as a partner and share the

wealth because the risk is down for you.

Does that answer your question?

Q. Yes. I appreciate it. If you would continue on, I think you were trying to get into the area to utilize your mine plan in predicting where this mine would go and over how many years.

A. Well, I revised my mine plan to reflect that blocks D and E would not be mined first. As you can see, I've got my E block coming down into state acreage; D, even though it's close to the shaft and all developed to as state acreage. So I put them back. I went through at that point, of course, and I calculated what was closest. I had already looked at what was closest to the shaft.

I then looked at -- I compromised that with whether it was state or federal, presuming that the state acreage would be mined last in most cases. So I developed all these blocks, and I took the logical progression, that F would be mined, G would be mined -- I mean, they found something very worthwhile there.

They, I assume, are going to get their way back to the shaft. And then that they would

come up here and mine block B. I can't understand why they haven't been up in here earlier. And then C is state. If they don't go through the state, they can't get to this part of block C and that part of block C.

Really, no reasonable idea why they don't go up into A. You can see a little bit of that is state, but predominantly it's federal. And it's all developed, and it's close to the shaft compared to down here to the south.

So then I put in some hypothetical entries. From this, once they get this developed and this mined out, presumably they will put an entry in at some location and drive it down here and develop this ore -- keep in mined this is barren -- and this ore, and ultimately get down to Section 2.

I did this without the benefit of knowledge that they had worked a deal out with IMC. So this is just a stand-alone mine plan that they would work down to here at their present rate of mining.

Q. And that rate is what you've told us before --

A. Right.

Q. -- based on the net acres?

A. Based on what they've done over the 39-month period over three years, they'll get down there to the edge of Section 2 in 80 years, 80.

But, gentlemen, look at this. Look at what they have to go through. Those are all state leases. And they've been avoiding state leases. They have a good reason. I don't know what it is. But their history speaks to that.

Q. Mr. Hutchinson, again the major concern of this Commission is waste. Do you have an opinion with respect to that concept and the overall problem that we are facing here, and this is the regulation of two competing industries, trying to develop minerals that happen to be on the same block or tract of land?

A. Well, if I were -- if I were consulting for the state, I would find out what in the world was going on here. I mean, they mined up to the state lease line and stopped on three sides. If they have -- according to their maps, they have enough room to get down to this barren zone and get back there, but I'm sure that they won't.

If they shut this down, that will

definitely be wasted. This area over here in Section 12, which is on their lease line, appears that it's going to be wasted. However, I don't know the grades and it's very possible, since this is federal acreage, that this area is a barren zone and they know it and they just have failed to put it on their map.

They have this barren zone shown north of this green line. And so we can't imagine that there would be any waste over there. Let's go over to what I call block C, which is Section 36. They could eventually get into there, and I've built it into my mine plan in its proper sequence away from the shaft and the higher royalty. But they've got a little strip up here. I don't think that will get mined, nor this.

And if they don't mine C, they can't get to this. Now, here is a huge salt horse. They know it's there. They've mined along this edge of it. They've mined all the way along this edge of it and stopped here. But keep in mind, when they were developing this panel, ore had to go all the way up and around to the shafts.

They were doing a logical thing. They

were driving a drift over here, developing a panel. They hit this barren zone, said hey, let's drill some holes out here. They found that this was huge, and the expense of getting over to there is too great.

But if this block C is not developed, that area is going to be wasted also. Here's a barren zone. Here's a big barren zone. Perhaps they mined up to what they thought to be uneconomic ore with this tremendous haul back to the shaft. That makes a little sense to me. But this doesn't and this doesn't.

This is just a stand-alone section that they hole. It's state lease, but they don't have anything surrounding it. Maybe they made a deal with IMC on that one too. I don't know. If I were them, I'd try to do that.

I think I beat that up pretty well.

Q. All right. Now, your exhibits have shown that around the first of this year, the LMR changed?

A. Yes. I had a map, dated 1/1/90, that showed the LMR, as you called it. I just thought it was uneconomic ore. And then the 1/7/92 map changed that and brought it down here.

Q. Have you reviewed any information that would allow you to render an opinion as to whether or not that change was justified?

A. Well, I was perplexed. And preceding doing this, I called Walter Case. He's also a Mines graduate. He's been at this mine for many years and asked if I could come and visit the mine. I thought I would learn something about that. He was very cooperative. He said -- I told him that I was working for Yates.

And he said, "Well, I'd love to have you come and look at the mine. But we have this thing going on with this potash group, and I'll have to check with Charlie High." And he called me back and apologized. He said, "Charlie High says 'no,' you can't come and look at the mine." I don't think that's very cooperative. But I might have a lot better mine plan, and it might not be 80 years, to get down to Section 2.

But, at any rate, Section 2 is way down here. I cannot make any sense of why they suddenly find this so valuable when they've got so much ore so much closer to their shaft. And I can guarantee you, they don't have enough money to put a shaft in down here.

Two days ago I saw a letter that showed they had made a deal for this down here. Now, that to me makes sense. That makes sense for IMC because there's some langbeinite down here. It makes sense for New Mexico Potash because it's so far from their shaft. But until two days ago, I couldn't make any sense out of why that suddenly became so valuable to them.

Q. Now, Mr. Hutchinson, you also performed some work for Yates. There's been a lot of conversation about the recent lease purchase. You were the consulting mine engineer that Yates consulted to help determine whether or not they should make a bid on that acreage?

A. I've done so much work in potash, and I knew what was going on with langbeinite, and I knew that Western Ag was making a few bucks down there. They're a terrific medium-sized mining company. They've diversified into several minerals. And they're a public company in Canada, so I was able to get some information on how they're doing economically. And I think they're doing well. They have a well run operation, and it's making some money.

So I was told about this state lease

sale, and Yates people said, "What do you think?" And I said, "Well, let me take a look at it." So I gathered up all the information with the help of a geologist. We took a look at the information that the BLM supplied to the bidders.

And I made an absolute nuisance of myself in Artesia. I thought I was going to get thrown out of town one day by Mr. Yates. He said he didn't want to be in the potash business. I said, "You're a minerals company, if you really want to look at it this way. You know geology; you know exploration. You might as well turn a bid in on it."

Also, another consideration for that was there's so much secrecy, so much confidentiality. And the oil companies really don't know whether they're getting a fair shake or not, and they get enough information to confirm what's going on. So I thought, well, that would solve a problem there also.

But the heart of the matter was that I think this area down here that was put up for lease has some tremendous economic potential. I did not make an exhibit, but there's been quite a

bit of conversation about this. So I had a map that I had made to present to Yates management flown up here so that I could show you what I think is going on down there. And this is not confidential.

Here's the WIPP area in red -- I hope you can see it -- is the area that was put up for lease. This is on an oil and gas map. We looked at all of the logs where it was logged through the salt zone through these wells.

And I found that from around exploration standpoint, giving you guys a little tip here, there's a little strip of state land there that was not part of the sale. There is a very prospective ore body there identified by these wells or coreholes that the BLM gave the bidders.

And by virtue of the oil well logs, where we can tell a little bit about mineralization of potash, this may extend out here. That's down in the fourth zone. It's all langbeinite. It's of minable thickness almost. The grade particularly in this hole is excellent. This is excellent. I stopped the ore body 500 feet from WIPP because I don't know what

their requirements are in this presentation to Yates.

This well is -- corehole is marginal. This is marginal. AEC-8, which has been the subject of some discussion here, is a dandy corehole for langbeinite. And so we just kind of contoured that in.

This black outline that runs down this north-south leg of the lease is sylvite, and there's absolutely no way in my mind that this is economical.

Getting back to, after I had done this, I compared it to my mine plan, and I found that in the tenth ore zone, which is what this is, it's up hundreds of feet above the fourth ore zone. You recall they're numbered from the bottom up.

Here's Section 2. When I made this map, it was my understanding it was owned by New Mexico Potash. That may or may not have changed by now. But this is, by any stretch of the imagination the north -- if you had a mine here already, that would be the north end of an economic ore body. If you had a mine there already and the capital cost was written off and

you had the return on that investment, just on an operating cash basis, you could mine that if you had a mine already in place.

So there's a gap between here and here. In fact, to my best information, there is a gap between here and down in the south half of 11 where it picks up again. And I have no exploration information through there.

There's one corehole that Yates was given in confidence that shows an indication of what might be called commercial ore. It's only a 10-inch hole, but it doesn't have anything to connect with around it to prove that the tenth ore zone continues. So I just don't think it's there.

Q. Did you attend that auction, Mr. Hutchinson?

A. No, I didn't.

Q. You were aware that New Mexico Potash didn't attend that auction?

A. It was reported to me by Nelson Muncy, who did go to the auction.

Q. From a mining standpoint did that strike you as odd?

A. It did until two days ago. I couldn't

understand why New Mexico Potash wasn't in there bidding. They're very proud of Section 2. But now I know they've made a deal with IMC. So maybe they had decided between themselves that only one person would bid and -- or maybe they bid as a joint venture. I have no idea.

Maybe they'll split the -- if they had gotten the lease, split the minerals up between the tenth ore zone and the fourth ore zone or any number of things. That's not bad. That's good business. IMC knows how to mine langbeinite. They're a huge company. They've got the money to put in a new mine, but I don't believe New Mexico Potash does.

Q. Now, Mr. Hutchinson, with this kind of situation facing a regulatory agency like the Commission, how do you think it should be handled? What's your opinion?

A. Well, the mining companies certainly have my sympathy. They are in a tough situation. They're, as I said, fighting for their economic lives. They do need sufficient reserves for their future. Whether it be two years or ten years, they need to have those reserves. They need to have them protected.

To help them protect those reserves, I think that this Commission or the state regulatory bodies that control them should require them to come up with some definitive mine plans. I'm groping in the dark here. And I'm pretty experienced at mine plans.

I don't put much pride of authorship on this, but this is the best I could do with the information I had. And I had to figure out how long it would take to get down there. Certainly that's a consideration that you would like to know about.

Q. Well, Mr. Hutchinson, can both industries coexist?

A. There's no question about it. We did it in Oklahoma. We did it in Texas. They do it in Montana. They're beginning to have a little bit of a problem with Atrona mines in Wyoming.

But I've always found with people like Walter Case and me, Randy Patterson -- if you can encourage those people to sit down and talk things out, they'll always find a way to compromise. I've never heard of anyone in the potash business down here, a mine, that just absolutely didn't want any drilling for any

reason, except perhaps IMC, and that could have another agenda.

But Walter Case was -- if it hadn't been for R-111-P, I think the two of us could have sat down and worked this problem out.

Now, at the time we talked, I wasn't privy to the agreement that they had with IMC. It would have been inappropriate for him to tell me. But still he could have told me, if we had sat down, he really can't discuss that now, but let's see what happens in the future.

Q. What about the safety concerns? You just gave the opinion these companies can, in your mind, work together. You've said that they've been doing it all over the rest of the United States.

We've heard for many years and through the cross-examination in the last couple of days time and again safety concerns. Have you looked at those issues also, Mr. Hutchinson, and do you have an opinion there?

A. There's been so much technology developed. In 1977 when all the coal mines were required -- underground coal mines were required to submit mine plans and subsidence research,

that research of subsidence really took off.

Today there are a lot of parameters that a guy like me can just pick up and get some estimation of subsidence situations. The casing requirements specified by R-111-P are quite good. They seem to solve the problem.

I know that the mining companies here are quite concerned, mainly because the New Mexico Potash mine, long before it belonged to New Mexico Potash, I think back in 83, they had some explosions. And they weren't related to oil and gas. But there was some naturally occurring methane that showed up. That brought MSHA in, and the mining companies had to fight tooth and nail with them. And finally they have held them at bay, I think, realistically.

Q. Now, Mr. Hutchinson, in your experience and education of underground construction and mining, have you been involved with and been required to apply the principles of rock mechanics and specifically with respect to the issue of surface subsidence?

A. Sure. But let me back up and pick up one point that I missed.

Q. Sure.

A. You asked me about a situation of the mining companies and what the Commission might do, which I did talk about. I came across a Commission case, I think it was a Commission case, No. 4312. It was dealt with in 1970.

Here's the WIPP area. And this area I'm talking about is down in here. I don't know who the oil company was. I could go -- or anyone can go to this case number. But US Potash came in in 1970, objected to drilling, saying they were going to put a mine in any day. There's a lot of correspondence between US Potash and the Commissioner at that point, and it was going to happen any day.

Well, here it is 22 years later, not one bit of oil and gas has come out of area, and there is no indication of a mine. For those people like US Potash, they probably don't even own it and they're not even in the basin anymore, and for Narranda that holds some leases, state leases, federal leases--

MR. HIGH: Excuse me, Mr. LeMay. I'm going to object to this. The Narranda is pending at the Hearing Examiner level. And I'm going to object to Mr. Hutchinson --

CHAIRMAN LeMAY: Fine. I think any references to Narranda can be eliminated for that reason.

THE WITNESS: My suggestion is for those companies that don't have any operations but have outlying leases --

MR. HIGH: Excuse me. Again I'm going to object. We have a mine here. We're not talking about a leaseholder that doesn't have a mine. New Mexico Potash has a mine in this case. So any testimony about someone who doesn't have a mine I think is irrelevant.

MR. CARROLL: We do have outlying leases, and I think that's the point and the drift that Mr. Hutchinson is trying to address.

MR. HIGH: Well, then that's not what he's testifying to. I have no objection to that.

CHAIRMAN LeMAY: All right. I'm confused as to why you're objecting to outside leases.

MR. HIGH: I'm not. Mr. Hutchinson is talking about leaseholders who have no mines.

CHAIRMAN LeMAY: Well --

MR. HIGH: The leaseholder in this case has a mine.

CHAIRMAN LeMAY: What's wrong with talking about leaseholders who don't have mines?

MR. HIGH: Because that is a case that is pending now.

CHAIRMAN LeMAY: Oh, Narranda is. And I've advised Mr. Hutchinson not to talk about Narranda. I'm assuming he's referring to someone else besides Narranda.

THE WITNESS: I was referring to the US Potash case that took place in 1970 and responding to the question that Mr. Carroll asked me about what would I tell the Commission. Well, I covered what you might do with existing mines, get them to work together.

For nonexisting mines, you might have those mining companies deliver some at least preliminary mine plans and review whether or not they're taking any action on those leases every two or three years.

Q. (BY MR. CARROLL) All right. Now, Mr. Hutchinson, getting back to the safety considerations. If you recall, the question I asked was, specifically in your experience and with your educational background in the areas of construction and mining, have you been involved

with the application of rock mechanic principles and especially with respect to the issue of surface subsidence?

A. Yes. I guess because I was a mining engineer and knew quite a bit about geology, I was working for Morrison-Knutson and S. J. Groves the first eleven years out of school, I was involved in a very large underground powerhouse construction. I was the project engineer back in rural Massachusetts.

I opened up a coal mine for S. J. Groves in Utah, put it into production. And before that I worked with other Groves divisions to do contract mining of coal in West Virginia. Those are all underground projects.

And currently, in fact next week, I'm going to Europe to look at an underground precious metals property for a client, and of course it's in Scotland. I have a great appreciation for what the chance of subsidence might be there. So --

Q. Have you --

A. -- yes, I have quite a bit about it.

Q. Thank you. Have you studied and applied what you know, your knowledge of rock

mechanics and subsidence principles, with respect to the New Mexico Potash industry?

A. Yes, I have. It's obvious, as we heard yesterday, that there's some subsidence out there. US Borax Mine back in the mid-50s wanted to expand their reserve base, and they thought the best thing to do was do it internally and start pulling some of their pillars or go to a more or a higher recovery rate. And they did a lot of studies there. And I was able to get ahold of those.

We have a special situation here in New Mexico in the potash because above the potash is several hundred feet of salt. And those of you familiar with oil and gas geology, you know that salt will flow. It's fairly plastic. And that the salt that's above the mines, when they are mined out, is going to flex down and fill up that void. And the sandstone, shale, limestone, whatever is above it will react to that void, and there will be some subsidence.

But this is a sedimentary basin, evaporite basin. And they're relatively flat-lying. So those are some special considerations that you don't have in the

mountains or in hilly country or where there are a considerable number of volcanic intrusions involved.

Q. Are you aware, Mr. Hutchinson, of any site specific studies that have studied the actual effects of subsidence in the potash basin in the area that we're talking about?

A. Yes, I am. But, if I could, I would guess you're not subsidence experts. I might give you a little nomenclature.

Q. If you would. And also one other term, Mr. Hutchinson, we've used it a lot, and I think there will be some other. We keep hearing the word "plastic." I know we hear the term "plastic" and "elastic." What's the difference here?

I think having a good understanding of that term and how it works is basic to one's understanding of how the salt reacts when it flows as a result of mining.

A. Well, a plastic substance is going to -- I guess one way to describe it, has a lower internal friction. Cold molasses might be considered plastic in a sense, but it's really a fluid. But it will bend and not break. And it

will, as though it's going -- it can even extrude, but it will bend, reform, but it won't break.

And some of these salt horses that we see in the mines might be -- one explanation of them might be that there was a resolution of the potash that might have been there at one time and -- it was eroded away or became -- went back into solution for some reason. Goes back into solution much faster than salt.

And so the salt formation would flow into that void and recrystallize. Hopefully that's --

Q. As opposed to the word "elastic," though, there is a major difference between plastic and elastic?

A. Oh, certainly. Something that is elastic, like a rubber band, if you pull it far a enough apart, it's going to break. But if you just go up to its -- and stay below its yield strength, it will return to its original shape.

Q. Now, these salt formations, once they have been put under pressure and they flow, they don't return to their original shape?

A. They can take quite different shapes is

my understanding.

Q. All right. If you'd carry on.

A. Okay. I think you have an exhibit.

Q. Next exhibit is 55. No. Exhibit 55 is a map.

A. Excuse me.

Q. So it would be exhibit --

A. 56?

Q. 56.

A. Looks like this.

Q. Mr. Hutchinson, that's not 56.

A. Okay.

COMMISSIONER WEISS: You've got two 55s.

THE WITNESS: Okay. This is 55-A, I guess.

MR. CARROLL: I don't even have it.

MR. STOVALL: Is this it?

THE WITNESS: I want the Commissioners to know that I do this under tremendous pressure, talk about subsidence, because my mining engineering/rock mechanics professor is sitting over at the next table. And I don't know if he's going to give me a grade but--

MR. STOVALL: Mr. Hutchinson, is the

exhibit labeled, "Figure 2.35, Definition of Radius and Angle" --

THE WITNESS: Right.

MR. STOVALL: -- that will be 55-A?

THE WITNESS: Yes. I've tried to put it to scale more than this diagram. I'll draw it more to scale than that is. But this represents the in-place material, in the case here, potash. And I'm just going to show you half of the section.

This is all open ground. Diagrammatically the subsidence over the open workings will take a shape something like that with the original ground being here. Now, this distance is the maximum subsidence. If you take half of that distance, you can see that I have a radius here. And keep in mind this is diagrammatic. It's tough to find this perfect in nature.

There's a radius point here. It will come up. There will be an inflection point at 1/2 S, or the maximum subsidence. And then it will take a reverse curvature about the same radius back till it hits the original ground.

Now, at this point, this inflection

point, you come down to where it's been mined out. And there is a D, distance, here. And in the coal seams in the east, I think we have found information in New Mexico that this distance, D, extends into the open workings that would be half of the maximum subsidence.

Also studies just -- we'll get into this more -- I've shown this at about, oh, whatever its total depth is, this would be about 70 percent of that. It varies between half to -- or 45 percent to 80 percent. Of course, that's a large function of what goes on here in terms of geology. Hopefully this is Exhibit --

Q. (BY MR. CARROLL) 56.

A. -- 56. Again I'm going to make a similar sketch, but I'm going to give you some better nomenclature.

Mr. Weiss, can you see?

COMMISSIONER WEISS: Yes.

A. This is the edge of a mined out area. Here's the other edge. There is another opening here. Getting over to this edge where there are no more openings, this might be the edge of a mine or the edge of a panel where there wouldn't be any more mining towards me. Here's a vertical

line to the surface. Before there's any subsidence, there's the surface. After subsidence we have something like this.

Now, the chairman or the head of the mining engineering department at the University of West Virginia, a Dr. Peng, has given some nomenclature to a couple of angles. You've heard one in the last couple of days, I think, called the angle of draw.

He describes this angle as the angle of draw. And he says in his book entitled, Surface Subsidence Engineering, and I quote, "The angle of draw is more or less of academic interest because the subsidence profile levels off and subsidence become very small far before it reaches the edges of the subsidence basin. And from surface structural damages point of view, it is in practice meaningless. In this respect, the angle of critical deformation and angle of break are more useful."

This Dr. Peng calls the angle of critical deformation. Now, this is -- it's a big variable. If the surface structure is a large, brick building with a concrete floor that is being used to carry huge cranes back and forth,

you'd want -- that would be a pretty large angle.

If it's a frame structure, it wouldn't be nearly as critical. If it were an 8-1/2 inch oil well casing, it wouldn't be very critical. This angle would be much smaller. But that's called the angle of critical deformation.

And they're all kinds of tables. I don't put myself up as a rock mechanics expert. My professor does that. But I've learned a few things in my career, and I've had some major problems where I've had to use people like professor Grosvenor to help me figure these things out. I've learned from that.

The angle between the vertical line and this angle of critical deformation depends on the types of deformation and the types of surface structures. So there's no exact science to it, and no one can say that it's 45 degrees or 15 degrees or 4 degrees universally. If they do, you guys now know that they don't know what they're talking about.

If before this surface is disturbed you are able to put some survey and some points out there very accurately, you could -- and with some

scientific measuring devices, and since we've talked about these formations that are in here, they must bend; some will break. But they need to fill up this void.

And, of course, this can be the case of New Mexico anywhere from 600 feet to 2,000 feet from the top of this to the surface. So there can be a lot of geology in there.

They've been able to measure the tension, tension in pulling something apart. You're going to get cracks. Or you may not see the cracks, but may be down below a limestone bed in tension might crack.

On the surface you can measure that tension, and there will be a point here. I'll call this zero. Tension will grow. At the point of maximum tension and angle down -- I haven't really drawn this very well because this area of tension will move for different situations.

But where this is the highest is a fairly critical point on the surface, if there's no buildings or anything else there. So that's another critical thing to think about.

Getting closer to the situation here in New Mexico, a Dr. Deere, who we'll get to later,

went to the US Borax mine when they were doing a lot of studies. In 1961 he came up with some other nomenclature. And it's not all that different, and I'll just put it over here.

There's a vertical line. He again takes -- this will be a better example. That area of maximum tensile strain, and he calls that -- he uses some Greek that I won't use. But from the vertical to this point where the maximum tensile strain is measured, he thinks that's critical. I agree, particularly on the structure whether there are structure or not.

Then he goes to another point where the tensile strain gets back down to zero. That might be a pretty safe place to be. Those -- if you can get outside the tensile strain, you really shouldn't have a subsidence problem on the surface at all.

Now, down below here, below this line you have very little disturbance to any oil well casing or pipelines or things of that nature. Over in this area you might have a problem. But over here you should not. Now, Dr. Deere says that this angle, over to the point where we have zero tensile strain, minor tensions or

compressions may occur beyond that point. That would be in this direction. Minor tensions or compressions may occur.

Inside this point structures are liable to experience substantial disturbance. So in this area, if you're from here over -- actually over to here in this example, you may, if you're inside that line, experience some substantial disturbance.

Now, getting to your question, Mr. Carroll, about site specific situations, Mr. Deere said that in this case, where there's no more mining out here, that angle out to that point where you would have virtually no effect, or something you could certainly design for, that angle would be at the mine, at the US Borax mine, approximately 31 degrees from the vertical out to a point of zero horizontal tension.

Over on this side and in the potash, the way potash is mined here, you have another opening. This would be -- actually there would be three of these options out here.

So these options are going to eventually have some effect on subsidence because that, when the mine is closed, if they pull out

of an area and decide they're never going back, they'll just let this collapse. This is going to have some effect on subsidence.

And if we take a parallel line to this critical deformation limit from here, that means that this angle -- or this angle is equal to this angle. Those lines are parallel, excuse me. And since this is laboratory type stuff, out in the real world all these openings are out there, and they're in the business of getting potash out of the ground, not keeping track of subsidence.

But what happens, and before they did all this research, they would say here's the edge of our full mining. That would be the angle outside of which you would have no subsidence. We can see that that's faulty reasoning.

But still if they don't have any better information and they can only -- they don't have tension tests on the surface and they can only measure that point and compare it to here, that's all they have. And you'll find information in the data that comes up that way. But it's not very scientific.

If I might, let's say that we have an angle like this out to the point of critical

deformation on the surface, subsidence. Now, if you have a mine plan and you have entries coming in here like this, you stabilize that because you want to be able to use it to get back to the shaft.

But you come in here and you put in panels. And then you mine into those panels, and the conveyor takes it back to the shaft, and out it goes. And you'll work by panel from the end of the commercial ore back to the permanent opening here.

You can see that if this cross-section that I've just done is through this area, and you calculate the subsidence or did a study of the subsidence with all the geology and other aspects that are necessary that I'll get into, you can see in this example if this whole thing gets mined out, you don't have a very good picture of what the subsidence picture may be on the surface. Again, this is a planned view, and this is a cross-section.

So, trying to get away from the purely design mode of the situation, try to imagine this plane of subsidence, which would be here. And let me project it out, trying to make it look

three dimensional, so that you have a sloping face and it goes quite a ways.

Now, here in this example, it's going to bend around, and the subsidence is going to come out like this. The subsidence is going to come in again like this, or that point of critical deformation.

Since we're going to be talking about oil wells later, keep in mind that on this plane that oil well may be 8 inches. It may go up to 17 inches at surface casing. I think, Nelson, it's 17 inches or less until you get to the salt? Okay.

Think of 17 inches and think of the huge expanse of this plane where this may go for literally miles, as we've seen in the New Mexico mine, New Mexico Potash mine has actually done.

So someone starts talking about a plane and everything in that plane being disturbed, keep in mind from an oil point of view, it's one little 17-inch diameter casing that is designed to withstand a lot of stress.

On the stress situation, however, a mine opening -- we'll get to this in the gas thing later -- but there's a mine opening. And

where that material was mined out was supporting the earth above, it's gone so it can no longer provide any support.

So the stress pads will revise their locations and will come together back down here, as though this never existed. But keep in mind, if you're looking across, as I showed, maybe a 70-foot panel that was mined out and with some entries on the side of it, that may be 70 feet wide.

Well, that's going to have a 70-foot effect on subsidence at the surface at a minimum. It's going to be a little bit more than that. But keep in mind we're talking about 18 inches or less casing. There's a big area there where the stresses in plan, in a big plane around an 18-inch oil well, that's designed or can be designed to withstand a tremendous amount of stress, there's not going to be a big effect on that.

These are things that can be calculated. I'm not capable of doing it. Perhaps Mr. Grosvenor is. But there are people out there that can. And I just want to bring this to your attention.

Gentlemen, since 1977 there has been a tremendous amount of subsidence studies and research because of the coal mines in the east predominantly. Take advantage of it. Know that it exists and get your own answers rather than seeing what we see in the "Miner's Bible," where they come out to an angle here, and they make it 45 degrees or 50 degrees or 60 degrees.

There are plenty of coal mines in the east where it's less than 10 degrees to that point of critical deformation, which varies on whatever the problem is you're trying to solve. I have some, and I've made up some copies of some specific studies.

What kind of grade am I going to get?

MR. HIGH: Are you asking me?

THE WITNESS: I don't think you're qualified to grade me.

This is the --

Q. (BY MR. CARROLL) Exhibit 57, is it not?

A. I believe so.

Q. Yes, Exhibit 57.

A. I have a series of these. I'll try and do them fairly quickly. If you'll help me,

Nelson, get the right ones up.

US Borax was the subject of Dr. Deere's examination that I talked about earlier where he commented that outside the point of maximum -- or where the tensile strain got to zero really didn't mean anything as far as surface structures go.

If you get too far inside of that, you have a problem. You have to design for that. This shows the development of the US Borax mine, and I think the date of this paper was 1965. So it preceded a lot of the research that's been done since then.

Here is a development panel. Then it would drive off here with an entry, and they would mine that. These are large pillars left in place to protect this area from subsidence or anything.

What's the next number, Ernie?

Q. 58.

A. Okay. Does this look like the 58 you gentlemen have?

COMMISSIONER WEISS: Yes.

THE WITNESS: This is a part in plan view of that same mine. Part of it is hidden by

this cross-section, but so you'll know we're in the same place.

Across the mine on this surface they put in a line and began to measure subsidence. This is the original ground set at zero. This is five feet. And over on this side, this is tension, horizontal tension.

So we can see that the complete high rate of extraction area is from here to here. Keep in mind we still have a big pillar here, big pillar here, an entry over here. We know that this entry is going to have some effect on this subsidence that comes out here.

Over here it appears to be virgin ground, but you can see it's at an angle. So the importance of a planned view in subsidence studies is quite necessary.

Notice that the subsidence here very accurately follows Peng's curves that we had in an earlier exhibit. I was very surprised. It's 1965; this is a 1992 book. So it does follow that type of curvature, where it comes up and you have a radius here, a radius here, and there is very slight subsidence.

The tension on this side seems to be

maximum right here. Well, that maximum tension, gentlemen, is inside the mine workings below. Here's a point of zero tension. It looks like it's about Station 4. The mining stopped at about Station 7. That's about 300 feet to where you had zero tension.

Now, you could go out here maybe a mile and find a footprint out there that looked like the subsidence and say, oh, the angle of draw is out there a mile, but that's not very scientific.

Over on this side where we have the effect of subsidence of this panel, or of this developed entry, you can see that the curve isn't quite the same. But you can also see that it does follow this rate of curvature that comes up and becomes tangent to the surface. Here we have two points of maximum tensile strain. It's really not conclusive.

If you take this one and project it up, or where it gets to zero, and project it up, you find that you're not over -- excuse me, it's right here -- you're not over the mined out area by extraction. You jumped across a pillar, but you do have this entry. You're actually right on

the edge of that entry.

So if you wanted to put an oil well or something else down in here, you need to know what in the world their mine plan is out there to get a true determination of it. But according to this stress diagram and subsidence, you wouldn't have any trouble right there.

Q. That would be drilling an oil well adjacent to--

A. Right.

Q. -- the mine opening?

A. Now, that would be silly to do. I'm not proposing that that happen. I'm just trying to point out there's some science, not just conjecture, but some science. I'm sure Mr. Grosvenor will agree with me that can allow some predictability of subsidence.

Q. Your next exhibit is 59?

MR. HIGH: Excuse me. Is that the same one we have here? I don't see all that on there. The one he just had?

MR. CARROLL: That was 58. You've got 59.

[A discussion was held off the record.]

THE WITNESS: By the way in mind, this

comes from an article that was presented to the AIME by Mr. Pierson, who was eventually the mine manager at the US Borax mine.

I don't know if you can see it, but -- do you know which one that was, Nelson? US Borax? Perhaps we can spot it for you on the map. But it's over on the western edge of the field, I think, about midway or towards the south.

Q. (BY MR. CARROLL) These are actually exhibits that were taken from Dr. Pierson?

A. Right.

Q. I don't know if he's a doctor or not, but Mr. Pierson's actual report of their study of subsidence over this US Borax mine?

A. Right. He did some previous studies in the 50s. But this was a paper presented in 1965 to a professional group. Same sort of situation. You may recognize this area. This was the first line and plan view we looked at.

Here's the second one we're going to look at. And again this appears to be the edge of the mining. Virgin ground in this direction. Here we have a big pillar. And we have entries developed, except here instead of four, there are

many more than four, and it's quite a bit wider.

This is a zero point. This is minus 5 feet of subsidence and here is the compression and tension situation over here. If we go to this edge, where we have virgin ground, we can see that subsidence has taken a little more erratic curve. I don't know why. Erosion on the surface -- it could be any number of things.

But by and large you can see this trend coming up here and flattening out. It gets down to the point of maximum subsidence about here.

Looking at tension, here is the maximum tension, and here's where the tension gets to be zero. And so you can calculate -- if you knew the depth, which is about 1,000 feet, you could calculate that angle.

My point here is that this point of highest tension seems to be further to the left than it was up here. But if you're looking at a cross-section, look back this way, the mining is at an acute angle to the cross-section. Here it is also. But if you're looking in this direction, it's getting further away. So obviously this mined area is having some effect on the subsidence here.

Planned views are very important. Over on this side we have two spikes. But trying to do some predicting or gathering this information up for predictability of subsidence, the edge of the mining -- keep in mind this is a big pillar -- would be here.

The tension in this area gets to be zero at this point. We can calculate that angle, but I've kind of sketched that out at less than 500 feet. So what I'm getting to is this R-111-P half a mile, quarter of a mile, whatever, is not based in science, it does not appear to me, for the New Mexico Potash area.

Q. Next would be Exhibit 60.

A. Now, here is a section across a totally mined out room and pillar system. Here we have high tension. This says, no doubt - here it says "State Panel 3," "Panel F-2." I assume this says "State Panel 2," since this has really just been superimposed on a mine map. I think there are probably some workings out here, but it's not really clear on the exhibit or the original.

But you can see we've got -- here's 5 feet of subsidence. Maybe we have 8 feet total. I think they were mining 12 feet thickness in

this mine. We have the edge of mining right here. It's falling away somewhat so the subsidence line might be something like that in planned view.

But bringing this point down, we can see that curve again here that Dr. Peng came up with. We can really see it well here, how it's developed. But the further you get away from this inflection point, the less damage could be caused by subsidence to a surface structure or a pipeline in the ground.

This distance to virtually zero tension is nothing. Maximum tension is here. You certainly wouldn't want to put a structure inside of that, but it falls off rapidly into this virgin ground. And at some point in here there's enough technology today that you can calculate the stresses all the way down an oil well and design the casing for that.

Q. Then the conclusion that these last two or three exhibits are making is that, at least in the potash basin of southeastern New Mexico, the area that we're concerned in, the area of influence, this area of subsidence nowhere extends the distances that we have been hearing

for some years; is that a fair statement?

A. That's correct. And I don't know what the proper distances should be, but the science is there to make some really good predictions.

Q. And the amount of tension or the strain that does exist in the area of critical concern can be calculated; is that correct?

A. It can be.

Q. And there are casings designed to withstand those?

A. That's true. Getting back to -- I'm shocked that the BLM and also the state doesn't require this type of study by the mines as the coal industry is required to do. If you had -- if you didn't have such a sparsely settled area here, mainly ranches and grazing and things like that, if it were more densely populated, I think you'd require that these mines do these studies. It just makes sense to me.

You'd get their mine plan for one thing, and you could do some more accurate predicting.

Q. This next exhibit is 61.

A. Now, this mine is the Wills-Weaver mine, which is up here. It's my understanding

this paper was made by Golder Associates for the USGS.

Q. This is one of the studies that have been contained in the "Miner's Bible" too?

A. I have no idea.

Q. Or this one isn't.

A. No, it isn't. But just to show you in planned view, these guys put a shaft down here, put another shaft down here: one for production, one for services. That's a real good way to do it. Two shafts are really necessary today.

They developed their panel or their entries out here. And then they came off until they hit uneconomic ore, and then they would pull back on a room and pillar system, several panels, looks like when this map was made. Here was a panel. And maybe these pillars were pulled later; maybe they weren't. Same thing over on this side.

So this gives you some idea of how they planned their mine. They put in two studies, an A line and a B line.

Q. This is Exhibit 62; correct?

A. Yes. I'm going to mark mine up a little bit just for demonstration purposes. But

there are a series of subsidence lines here. They're over time. And, of course, you can anticipate that immediately after mining, there may not be some subsidence. But as the years go by and that effect of that void area is transmitted to the surface, the subsidence is going to be deeper.

Q. Now, Mr. Hutchinson, just to make sure that everyone understands, this diagram now is actually the diagram of subsidence overlying "A" that went across this Wills-Weaver mine that was depicted in the previous exhibit?

A. Right. I drew the two vertical lines just to highlight what was going on there. These solid dots connected were done on January 26, 65, the first one, 10/10/63.

But another thing to take into consideration, they mined about 48 to 52 inches of material. The maximum subsidence here is less than 2 feet at this point. It may be more now, but it may not. It may have reached equilibrium.

At any rate, this average subsidence is just a little over a foot-and-a-half, quite low for potash basin site specific areas. But I'd

like to drew your attention to what -- this is really an upset scale. I mean, there's 1,000 feet, there's half a foot. So it's not in the same perspective as the last exhibits.

But if you come across here and look for the point of maximum subsidence on either side and look at this line up here, when it gets to be zero, you know you're way out there, and probably there's no effect on the surface at all.

My point here is that this distance from maximum subsidence out to where there is no subsidence at all is about 400 feet.

MR. HIGH: I'm sorry. I didn't hear that.

A. About 400 feet. Over on this side, from here to there, that looks like about 600 feet.

As we get to the high station numbers, we're going north on the planned view. To the south we have the effect again of those entries that were kept open for transportation and service purposes.

Q. That, in your opinion, then would have caused -- is why you had more to the south, 600

feet of effect, as opposed to the 400 feet?

A. Yes. But it --

Q. It plays some effect?

A. It probably had some effect. Here, however, we know that this point of maximum subsidence is well within the mined area at station -- approximately Station 8, which is right there -- woops, wrong one. Right there. The point of maximum subsidence is well within the mine limits.

Q. Exhibit 63 is your next one.

A. Right.

Q. The other vertical line on planned view is depicted here. And again this last date was March of 67. The first one was August of 64. Two-and-a-half years later the subsidence went from virtually nothing down to approximately 1.7 feet. Again mining a 48 to 52 inch seam down below.

Again, the point of maximum subsidence here. Virtually none up here. That's a distance of maybe 350 feet. Over on this side, taking a point here, it gets kind of garbled up here, but you can see the majority of these lines come up here. That might be 1 to 200 feet.

Q. Now, where you beginning measuring your 350 feet or your 1 to 250 feet, that is not measured from the edge of the mine workings; that starts in back over the mine workings, does it not?

A. Right. Let me get to where that is in planned view.

Q. All right.

A. This point here looks like it's about Station 23. This point looks like it's about Station 8. So let's find out where Stations 8 and 23 are on the B line. Station 8 is here. Inside this area, this apparently was developed, and they ran out of good ore or something and may not have mined it.

And what did I say? That was 23?

Q. Yes.

A. 23 is right here --

Q. How much --

A. Excuse me. -- well within the limits on this section. But you've just got to open your eyes and take a look around. Look what happens here. That's the edge of their mine.

So you just really have to take a look at mine plans to know what is going on with

subsidence.

Q. What is the distance, just to put this into perspective, from, say, that upper station to the edge of the mine?

A. Well, here it goes from Station 23 to 31. That's 800 feet. But realistically here's the edge of the mining. Let's not be blind. Let's extend that over there and say this solid rock out here is having some effect on that.

So if this line B were over here a couple hundred feet, we'd be on the edge of the mining at -- or just inside of it -- for this point here.

I think that what you see here is affected by the fact that they're very close to the edge of the mine and really paralleling it. A cross-section through here would really pin down what effect the edge of the mine is having on subsidence.

Q. And I guess the point is that, at least with respect to each specific mine, you have to look at it because here the range of subsidence that you were talking about, 1 to 200 feet, when you measure from the measure station, it's well within the confines of the mine. The area of

influence never extended beyond the mine in this particular exhibit.

A. That's true.

Golder says that, in talking about this low percentage of subsidence versus what was actually mined, that it appears that there was very little break-up or bulking of the overlying strata.

Certainly you gentlemen are sensitive to the fact that this is -- the nature of the strata above is going to have a lot of effect on the subsidence.

If there were big sill, volcanic sill up there that was very strong, the subsidence may go up to it and may not be enough to cause it to even flex. Or if it flexed, it wouldn't break, and there would be no subsidence on the surface. Maybe in a thousand years. That's how important the geology above is to this.

Wills-Weaver mined about 80 to 85 percent of the ore where they mined in those areas and pulled the pillars. The subsidence rates that these charts were designed to measure were anywhere from half an inch to an inch per month. Something that just doesn't happen all of

a sudden. It's gradual and something that could be measured if you had a surface structure there.

Let me quote from the Golder Associates report. "The zone of disturbance of strata above the mine workings extends beyond the limit of the mine workings, and data from southeast New Mexico potash fields suggest that a reasonable limit for defining this zone of disturbance" -- I mean, that's any disturbance -- "would be an angle of 45 degrees from the vertical from the edge of the mine. More significant disturbance would occur with an influence angle of about 30 degrees."

That's a pretty good range. So if you had -- we get back -- what's going to be within that 30 degree and 45 degree range, if it's going to be oil well casing that's strong, no problem. If it's going to be a scientific lab, you better put it somewhere else.

These areas of influence with respect to possible damage to the No. 3 shaft --

MR. HIGH: What page is that?

A. 73. Here's the No. 3 shaft. Here's the No. 4 shaft. I told you earlier that there were two shafts.

You can see that they went out here a ways before they started developing their entries into the mine. The reason for that is that they need to protect that shaft. This is a large diameter concrete structure, I'm sure. I haven't seen it, and the information I have, I don't know what it's made of.

But you can imagine it's very important for that mining company to protect those shafts. If those shafts get out of kilter, those skips don't run true in the guides. And you're going to have a big problem handling that high volume of muck that has to come out of shaft.

So they're very concerned about that. And since this mine is abandoned, they wanted to know if part of the study was to assure that those shafts would not be damaged. And apparently in that angle of 30 to 45 degrees, they designed their entries so that there would be a maximum number of big pillars down there and no subsidence at the shaft.

"Three" -- again quoting from Golder Associates, page 73, "The three producing oil wells currently located on the Wills-Weaver mine site are protected by salt pillars with radii of

approximately 150 feet," much less than some of the predictions that we took off of this study, which were, you know, in the range of 100 feet to 4- or 500 feet.

"Surrounding these pillars," and I'm quoting again, "the average ratio of extraction is about 70 to 75 percent. And some closure of the mining horizons would probably have occurred within these areas. These closures at the mine horizon level would have impacted the oil wells because of the limited pillar sizes. But the level of disturbance has evidently not been sufficient to cause problems."

Site specific data is not my conjecture. That's just the way it is.

Q. Now, Mr. Hutchinson, there's also some other considerations that may go in that are glossed over. We know that there is a mine, the Mississippi Chemical mine, that's been closed for ten years, temporarily abandoned.

Well, why hasn't that mine just completely closed in? I mean, there is technology out there that these miners are using everyday to protect those shafts. Many of these mines have been open for years. There's things

going on that haven't been explained to us; isn't that true?

A. That's true. These miners down here are -- it's a violent environment. These mines are like being in somebody's living room compared to a big underground powerhouse or a big block caving mine. When they're putting off big explosions, you think the end of the world is then.

But these people support, probably with roof bolts, easy to put in. My tour through the AMAX mine, or now the Horizon mine, I saw lots and lots of rock bolts. They even put them in as they're driving these panels up here to assure that when they pull the pillars, they're going to come out.

Now, if they leave those rock bolts in there, those rock bolts could sustain that back -- we call the roof the back -- for a long, long period of time. So there would be no effect of subsidence in an abandoned mine because of the support in these entries.

Now, some would like us to believe that on one hand that subsidence takes place immediately, but that can't be true. They're

keeping those things maintained and opened.

If the Mississippi Chemical mine has been kept open for ten years, you can bet there are rock bolts or stulls. A stull is a timber post that just takes some of the stress and pressure to support the back. Or some form of support. They will not take the risk. I mean, their production system could be shut down and the conveyors crushed if they didn't do that. Since they do it, it has a much delayed, if ever, effect on subsidence in those areas.

Now, a state or federal mining requirement where you can get multiple use to extract in this, as this case is, both oil and gas and mining, might require that if there is an existing oil well here and this mine plan is to come up this entry, developed off of it, take the muck to the shaft -- if the oil well is already there, a reasonable compromise would be, rather than waste potash and cry about it, put in some rock bolts there and start pulling this material back here. Put stulls in. We did it in the coal mines all the time, mainly to protect our underground workings. But the same thing could apply to other structures.

Q. Your next exhibit is Exhibit 64.

A. This is another site specific study, and I alluded to it earlier. This is of the same mine, the US Borax mine. This was done by Dr. Deere. It's included in the Golder report, which is where I got it. It shows stations across the mine.

What I wanted to point out is that they have a maximum tension, zero tension, maximum tension, zero tension. Shows the profile. Note again we're picking up those curves, so Peng must have something going on.

In this case the subsidence was 10 feet and, I think, of the 12 foot of the mined area. That's about 83 percent. So this is more typical of the potash basin than the Wills-Weaver mine.

And these are -- I read to you some of his descriptions of -- here's tension at zero, bringing it down to the surface and taking this angle out here. You've got to be careful inside that. It's of very little consequence outside.

And that stress line, they're always drawn straight, that's not true. It's just that they don't know any better. None of us do unless we've got some good corehole data and tests on

the strata between the surface and the top of the mine.

In effect that with the series of beds in there, the subsidence, say, through a sandstone might have an angle that's very steep. Through shale it might be a little flatter. Limestone, it might break and be flatter yet. So in essence it gets to be that way. In reality it probably does not. Very important knowing what the geology is between the surface and the mine workings.

Well, if everybody is still awake, I think I've covered most of those points, Ernie.

Q. All right, with respect to subsidence.

One of the other problems is the problem of methane gas, and your last two exhibits, I think --

A. Sure.

Q. -- deal with that issue. The first of those would be Exhibit No. 65.

A. Before I go on to this, just to reiterate again, I'm a mining engineer, a civil engineer. I have a lot of experience, many years working under ground in all kinds of nasty conditions. With the tremendous education that

Mr. Grosvenor was able to help me get, I've been able to apply these engineering principles to real life situations. And I've been doing it for a lot of years.

I'm not here as a rock mechanics expert. I'm here as an interpreter of technology available so that you know it's there, and we don't have to continue past this point to have hypothetical and loosely documented things come out of the air. I think our technology is beyond that.

Okay. The tenth ore zone has had some problems with high pressured gas. I think when I went through the literature -- before this I did go to MSHA and get their reports. I concluded from their reports, and I think that's what their reports actually say, are that there is some methane that was found in these blowouts in the, then the Kerr-McGee mine, now the New Mexico Potash mine, what is of small amounts.

They had some fatal accidents here that brought the feds in and they had to do a thorough examination of everything. I read those reports. It seemed the predominating problem and the cause of the injuries and the deaths were

high pressure gas.

The continuous miners had gone into an area, and it wasn't a problem with ventilation. Just suddenly the back would come down and the rocks would fly out. And one instance, I think, one of the operators was hit by a piece of metal that had been knocked off of his piece of equipment by a flying rock caused by this explosion.

When I say "explosion," it is not a fire, a detonated explosion; it's the release of pressure. I think down in Nash Draw they may have had one. But predominantly it's been in the tenth ore zone. And I think with minor exceptions, predominantly in what's now the New Mexico Potash mine, they have not had an accident that is on record that I could find since they took over the mine, a tribute to their mine management and engineering.

Q. This next exhibit is 66.

A. This is a diagrammatic area or drawing of an area of where these blowouts occurred. And they have measured the bearing of the fractures that existed after the blowouts. You can see that they kind of run in a northwest-southeast

direction. This one is a little off.

But what's interesting here is this one. This crack developed here at the location of the blowout, but the crack did not extend into those entries. So as we heard -- as we have learned, these are very limited in extent. This one didn't go all the way through that entry. And there's another one at another entry that comes up here. I'm sure it wasn't found up there in the literature I saw.

Q. That was the same phenomena that Mr. Brent May was alluding to in his report on the geology of this area?

A. Right. Well, I read the information from the potash industry manual, and I was skeptical. They were implying that this gas or these explosions were caused by oil and gas. I don't think that's the case. I think we have testimony from competent geologists to refute that.

But I drew on my experience. And reading about how they solved the problem, they started drilling holes in these intersections. As they would go by and by driving this entry, this one, this one, they would put a relief hole

in here. And I think earlier testimony talked about how some of the gas was measured.

That seemed to solve the problem. Gas did not communicate between these in the tests that were run. And I postulate a theory that seems to answer most of these questions, and that is the idea that this tenth ore zone exclusively, apparently, has some clay seams in it. That clay seam might be at the top or the back. It might be actually mined out and they built their mill so that it can accommodate this. They don't have to separate it underground and just take up the ore.

Or it might be up here. And there would be, in the case of it being up here, there would be halite or salt predominantly between there. They would mine up to the bottom of the salt.

If this distance is sufficient, they'll never have a problem with those blowouts. But as this were to migrate down towards the top of the potash that they wanted to mine, the thickness of the wall and therefore its strength would diminish, or they would diminish together. Or as it got thinner, the strength of that, of the rock

above the opening would be less.

We have an entire industry in New Mexico and in Colorado called the coalbed methane industry. And they have found that they can go into coal seams by drilling, frac them in the San Juan Basin, for example, with 500,000 pounds of sand as a propagate that will hold the little coal seams open, called cleats, and develop some porosity back into the coal zone.

Well, when the coal was deposited, it contained gas. And over the years that gas became methane gas and nitrogen and all sorts of things.

But my point is that in studying the coalbed methane industry, I learned that after they had frac'd and put in the propagates to hold those little seams open and reduce the pressure on the coal seam by getting everything out of the wellbore and reducing that pressure, that methane gas and water would flow to the wellbore and they could get it out and separate it and sell the gas into a pipeline.

Well, that gas, those gas particles are not chemically tied up with the coal. They're absorbed. In a solid state you could say that if

you pick up a nail with a magnet, it's absorbed. It's not chemically combined. The same idea except it's a solvent gas.

When the pressure is reduced in the coal, the gas desorbs, because of the pressure differential, desorbs from the coal and goes out the wellbore, along with a lot of water, by the way.

I equated that to this, and it seems to me that the solution that they found, if you can imagine the opening and 2,000 feet of overburden above, this rock potash that was taken out has stopped supporting the rock above it. But the pressure inside this opening is atmospheric pressure.

You've got to maintain that pressure for those miners down there and give them fresh air. And fresh air comes from the surface. So it's whatever the pressure is on the surface with a little bit higher because you have to increase the pressure to get the air to move to the miners for ventilation.

Well, if you take away this area, you're in essence creating a void. And if this is the void and this zone, clay zone, gets to be

close to the back, the pressure of the nitrogen -- it's principally nitrogen gas that's been discovered in there -- it has to go somewhere.

And if you stick a pin in a balloon -- the air in the balloon is of much higher pressure than outside, otherwise the balloon wouldn't blow up-- it's going to come rushing out. If you take that same balloon full of air and compacted it into a small area, that air in the balloon would be very highly compressed.

If, in that medium that you compressed it, you then drilled some holes and made those holes bigger and bigger, pretty soon the pressure differential between the holes and the pressure of the air in the balloon would cause that balloon to rupture and flow into that area.

So I think the gas problem is particular to the mine and in no way a function of oil and gas drilling or water wells or anything of that nature. And we've learned from the geologists, who are experts in that, this gas, it flows, but it doesn't flow far.

And if you can imagine, these clay zones being deposited from the volcanic fallout or inflow of freshwater bringing hydrocarbons or

plant life or whatever, over the years that would build up a little lens of gas of high pressure.

Q. All right. Mr. Hutchinson, getting back then to our major consideration, waste, could you summarize for the Commission what circumstances must prevail for waste to occur in Section 2 and if wells are drilled in that section?

A. Well, you recall how far away Section 2 is from the existing operations of New Mexico Potash. New Mexico Potash must find a way to finance the capital costs of getting to Section 2, then completely write it up off, including interested and required return on capital.

Next, the price of muriate must grow faster than inflation on the cash cost of production in spite of the Canadian oversupply. New Mexico Potash must also unavoidably be required to mine in a location of a well while the well is in production and refuse to support its openings, refuse to incorporate the well location into its buying plan.

You saw the big pillars in some of the mines. In fact, in some of those salt pillars in the Wills-Weaver mine, there are existing oil

wells. It can be done. They must find reserves in the well location exceeding 5 feet of 16 percent K_2O as sylvite in the tenth ore zone or have ramped to another zone and written off the capital costs, with interest and profit, to get to that other zone.

Q. Is ramping a very easy, fairly cheap method of obtaining additional production?

A. Well, they already have some continuous miners. If they wanted to ramp down beginning tomorrow, they have the equipment to do it. But all of that muck created by ramping down has to be hoisted and gotten out of their stream. So there's going to be that expense. That's a two-edged sword.

While that continuous miner or group of continuous miners is doing that, they can't be mining potash. So that's another negative that has to be overcome and built into the attractiveness of another ore zone for them to go to it.

This mine has been in production since 1965. The mill has a long life, I'm sure. The continuous miners, and I would estimate that they probably have 10 to 12 of them, are a significant

capital cost. Here we are 25, 27 years after that mine opened up.

Maybe they've been replaced, I don't know. But they're going to continue to have to replace those if they're going to continue to mine. Those things are high-wear items. And one of them might cost as much as 600,000 bucks.

Q. What additional circumstances must prevail before there could ever be a waste of commercial potash?

A. I would think that they would have to develop proof of minable grade ore in Section 2 consistent with their mine practice. And they're going to need the commitment of their management, their parent company.

And I've spoken about the need for their additional mining and milling plant and equipment as they progressed through, as I expect years and years, before they get to Section 2.

Q. Well, Mr. Hutchinson, this is of some interest to me. It says, "to develop proof of minable grade consistent with mine practice." We know that there is one corehole in Section 2; is that correct?

A. That's correct.

Q. Is that consistent with New Mexico mine -- New Mexico Potash Company's practice of drilling coreholes that you have seen?

A. Well, the most comparable thing, the best comparison I can make -- and, Mr. Weiss, you touched upon this yesterday. For another situation I have obtained the location of all of the coreholes that I can find in the entire basin. I don't know the grades, but I know the coreholes.

I know where their mined out areas are. I'm in the preparation of this information for another case, as I said, and so it is preliminary.

But for this purpose and because we're so far away from any operations that they're going to have to put down a new shaft or drive a tunnel or do something to get down to Section 2 in the foreseeable future, in my lifetime any way, they're going to have to experience some capital expense.

But to get back to Ernie's question, I took their mine shaft location and when Kerr-McGee put that shaft in -- and remember Kerr-McGee was one of the last mines to come on

stream -- they just went down to the tenth ore zone, the first minable zone that they could find, to get their ore in the water in the potash industry here.

They drilled around that shaft in the 4 sections, 4 full 640-acre sections around that shaft. They drilled between 21 and 23 holes. That's at least 5, almost 6 holes per section necessary to prove up the reserves before they sunk that shaft. I mean, any bank, any board of directors, any financial officer is going to require something like that.

The same situation exists in Section 2. If New Mexico Potash owns Section 2 and they're going to mine it, they've got to put in some capital equipment, and I don't think they can finance that without a lot more exploration data than has been made available to us.

Somewhere in the range of 5 to 6 holes per section might prove up enough reserves to justify a capital expense to be written off over a 10- to 15-year period.

Q. Now, Mr. Hutchinson, did you also look at the remaining sections that have been developed in that mine and counted the number of

coreholes in those other sections around the mine?

A. Yes, I did.

Q. Were the numbers consistent with what you just testified to?

A. A little bit less. But keep in mind, they probably have an average of 3 holes every 500 acres. I did the calculations for this case on 500-acre blocks. So they have at least 3 holes for 500 acres that are mined out. That doesn't count the holes that they drilled where they didn't mine because it's of subeconomic grade, or they hit a salt horse, or it doesn't fit their mine plan.

So that if you count the holes just within the confines of what they've mined out, it will average around 3 holes every 500 acres. But there's more to it than that. Once you have a shaft down and you're into the deposit, as I mentioned, everyday you've got a geologist down there taking face samples. So you have many more points.

And when you hit an area, as they did in their 90 to 92 development period, where the grade coming -- the sample's grade is below

economic grade, they've got to find out why. So they have to go drill some more holes.

Well, those holes are most likely going to fall in that barren zone. I haven't counted those holes. But at 3 holes per 500 acres, plus everyday samples, they have a lot of data to see where they're going to be in the next 6 months, 12 months, 2 years.

Q. Well, it is safe to assume, Mr. Hutchinson, is it not, that these coreholes were not drilled after that mining occurred?

A. It's safe to assume. Nobody wants to incur that expense.

Q. Then isn't it also reasonable to assume that those coreholes were drilled in their normal exploration process determining where they're going?

A. First of all, to justify the tremendous expense of putting in a mine and then to know what direction to mine in, it's necessary.

Q. Let's just assume that maybe all of these considerations take place, do you have any thoughts with respect to how much potash would actually be included in a reasonable island around these wells during at least while a well

would be in a productive stage?

A. I calculated a 5-foot thick tenth ore zone deposit down here. Some indication that might be how thick it is. It might be 6 feet. But it's close to that range. I used 5 feet and a 16 percent grade or better, distances proven to be acceptable in existing or closed mines with experience around wells, AMAX, the Wills-Weaver, you know, actual numbers, not my own conjecture.

I calculated that 15,000 tons -- 14,000 tons would be left in place and that most likely temporarily.

Q. In today's actual costs and prices, in your opinion what would New Mexico Potash realize then as operating revenues for this at least temporary loss of this salt or potash in these pillars that you're talking about?

A. I think that if they were mining it today, at today's price of potash, I think they're getting about 72 bucks a ton of product. That's fairly current information. Based on actual costs of mining, not of New Mexico Potash, but in the area, they would have an operating profit, that is a cash flow profit, of about $154,000 in that 14,000 tons.

Q. And what would the royalty be lost to the state on that, at least temporarily, including in this drilling?

A. About $20,000.

Q. Now --

A. That's at a 2 percent royalty. I don't know --

Q. That number is calculated at 2 percent?

A. Right. 14,000 tons and $72 and 2 percent.

Q. I think from your research that's what you feel is a federal royalty; is that correct?

A. That's what I've read it is. I've read some of the leases, and that's what they reduced their royalty to.

Q. All right. Now, if the oil well is not drilled, how does that compare, these amounts, comparing the losses to the oil operators compared to the mine operators?

A. Well, if the well is not drilled, the present value of revenue lost at $20 a barrel --

MR. HIGH: Excuse me. I'm going to object. We've heard two or three other witnesses already testify, and we have documents in evidence already. Do we have to hear it from

someone else?

CHAIRMAN LeMAY: Let's take a 15-minute break. I have no idea how long we're going here, so -- I think we have a court reporter that's out of paper.

MR. CARROLL: Just a couple of minutes, though, for your information. I'm almost at an end.

CHAIRMAN LeMAY: We'll bear with him a couple of minutes, Counselor.

MR. CARROLL: I don't care about taking the break. I just wanted you to know that we are drawing to a close.

CHAIRMAN LeMAY: We're trying to figure out timing, Mr. Carroll.

MR. CARROLL: Sure.

Q. Again, just for comparative purposes.

A. Just royalty at -- I think the state leases are 1/6 royalty. That loss would be $420,000, or a swing of $400,000 per well not drilled.

Q. So economically this Section 2 decision, or these four cases, it could cost realistically $1.6 million?

A. Present value.

Q. At present value?

A. Yes. And if those four wells were all successful, hypothetically, and they caused geologic reason to be offset and those were good wells, it would double, of course. Over $3 million.

Q. Just one last question. You actually have gone in, I think you've testified, to the AMAX mine, or the Horizon mine?

A. Yes.

Q. And been privy to their mine plans and the kind of pillars they're leaving around the oil wells?

A. Yes. I was there with their mining superintendent. He took me to their engineering department. They laid out all their mine plans. They're in detail. It takes a big sheet of paper. And they showed me where the wells were that they had to deal with and how they were going to do it.

Q. The safety or the pillars that you've been talking about, were they consistent with what was in the actual practice there in the AMAX mine?

A. Well, AMAX is going to use 100-foot

radius. The Wills-Weaver mine is actually 150-foot radius.

CHAIRMAN LeMAY: I'll have to stop you there. We just ran out of paper, as I see it. We'll have to take five-minute break? Two-minute?

MR. CARROLL: Whatever. But I am. I've got to the old question about waste and prevention and that's it.

CHAIRMAN LeMAY: We have to get a record.

MR. CARROLL: I understand.

CHAIRMAN LeMAY: Let's come back. If you have a couple statements -- don't leave. My inclination is to finish up those statements, take our break for lunch now. Do you want to start cross and finish up after lunch, Counselor?

MR. HIGH: I don't know that I can finish up after lunch if we're going to quit at 3:00.

CHAIRMAN LeMAY: We're going to continue here today until we get through. The 3:00 o'clock deadline is gone. You have as much time as you want then. For some reason we didn't

get a good indication of how much time you all were going to give on your presentations, which we usually do have, so our time limits must be flexible. We're going to have as much time as it takes.

MR. CARROLL: I apologize, Chairman LeMay. These things do take -- you can practice and rehearse them and --

CHAIRMAN LeMAY: We'll try to manage. And I'm just giving you the option, Counselor, if you want to break and have all your cross at one time, we'll take a 15-minute break and come back.

MR. HIGH: I would like to have a lunch break before I begin my cross. I have a lot of exhibits to get in order.

CHAIRMAN LeMAY: Sure. Let's come back at 12:15. We'll take an early lunch, and we'll come back to finish up at 12:15. We'll keep going until we finish.

[The lunch recess was taken.]

CHAIRMAN LeMAY: Let's continue.

Q. (BY MR. CARROLL) As we were just breaking, Mr. Hutchinson, I realized that you gave us some numbers for a safety pillar, or pillar that you could -- that temporarily could

encase a producing mine, and you gave some dollar figures.

We neglected to get into what that width of that pillar or the radii of that pillar was and that the factors that went into calculating that. If you could briefly give me that so that we can finish your testimony, I would appreciate it.

A. Okay. I think I said when I calculated the 14,000 tons, I had used some distance proven to be acceptable in existing mines. The 150-foot dimension that was experienced in the Wills-Weaver mine and the 100-foot dimension -- that's radius -- in the AMAX mine.

And I just averaged those two, I believe I used 125 feet, something that was there and I felt to be reasonable, based upon probably the most important information that is used in the subsidence prediction. And that is site specific data, not for a particular area, a particular unmined area, but for the New Mexico Potash enclave, if you will, or mining set-aside.

I did fail to really point out those most important aspects of input into predicting

subsidence. But far and above the most important is these type studies that we have from Golder, Deere, Pierson, perhaps there are some more.

But getting past that, the next important thing is the physical properties of the overburden strata. What is it composed of? Sandstone, shale, whatever. In a generic sense, anywhere you would try to predict subsidence, the most important thing would be to try to find out what the overburden is.

The next is the mined out opening. That would give you some idea of what other than salt that flows, if you just had sandstone above a coalbed or something, what the size of the rock would be that would fall into that. And that's important as to the dimensions of the actual height mined and how wide it's mined.

And then another very important factor is mining depth. The deeper you are, the less important mining department is. But the closer you are to the surface, the more important it is as an input into predicting subsidence in an area where you have it mined or do anything else.

Then multiple panel mining, I think I made that point in my discussion, that if you

have more than one opening or a big panel and some transportation entries alongside of it, that's an important thing.

And then the topography. Here in this area of New Mexico it's relatively flat, so it's not a big deal. But you can understand that if you were in a rolling hill area or something steeply dipping in topography, that subsidence calculations would make a difference as to where they intersect the surface.

And then the last major item is time. And we saw from some of the exhibits that subsidence can place over considerable amounts of time. One property, Wills-Weaver, it was measured at half-an-inch to an inch a month, but at another property, it might be faster or slower.

But I thought I would summarize those. And I think that covers your question.

Q. Mr. Hutchinson, this Commission is charged with the prevention of waste, both in the oil and gas sense and in the potash sense, and I think you're very familiar with those statutory requirements. Plus you must look to the conservation of both minerals, and it must

protect correlative rights.

In your expert opinion would the granting of these four drilling permits that Yates has made application for, would they violate any of those principles by the granting of them?

A. I don't believe so. I think getting back to time and economics, there's a resource there that Yates and others, I assume, are willing to go after and put up the risk money to do now.

The probability that there will be any mining during the life of those wells, if ever, is quite low in my opinion. And it's just not a reasonable thing for me to think that there would be any potash wasted at all, particularly commercial potash, by the granting of those permits.

MR. CARROLL: Mr. Commissioner, Chairman LeMay, I would move admission of our Exhibits 42 through 66. We will also mark, since Mr. Hutchinson made extensive drawings and diagrams on these exhibits, we will gather them up at the end of the day and also, because I think they are essentially part of the record,

but we will make sure that they are given to the court reporter at the end of the day.

MR. HIGH: And we would request that we get copies of the pad drawings, as well as the exhibits on which Mr. Hutchinson marked, so we'll have them. We have the clean copies of the exhibit. I would like to have a copy of one that he marked up as well.

MR. CARROLL: I don't have them and I'm not going to be taking them home, but I think we can make arrangements to allow you to come up here and get them.

CHAIRMAN LeMAY: It's a matter of public record, Counselor, so they're available up here for anyone who wants to have copies.

THE WITNESS: I'll make the offer one more time. If you would tell me what you would best like to see with the mine map and the overlays, I'll provide that for you.

CHAIRMAN LeMAY: Well, I think that's adequate. That's going to be the court record, or the Commission record right there. People -- except for the confidential maps. I assume you want to keep those with the LMR on them as confidential exhibits?

MR. HIGH: That's correct.

CHAIRMAN LeMAY: We certainly will so honor that. That will be available except for those exhibits to be copied.

MR. STOVALL: Mr. Chairman, in response to Mr. High's needs, just make arrangements to protect the custody of them, since they are official exhibits. But we can arrange that with Mr. High.

MR. HIGH: Does the Commission have the authority to maintain the confidentiality? I know you raised that issue before that there's no statutes that allows them to keep that confidential.

MR. STOVALL: The context in which I raised that was one of the specific authority in R-111-P. I think at this time, I believe, we can keep these confidential because they are being provided to us in the confidential setting. If somebody fights it, we'll do everything we can to protect that. I believe they can be.

CHAIRMAN LeMAY: We'll do our best to do that.

Is there objection to exhibits?

MR. HIGH: I have no objection.

CHAIRMAN LeMAY: Then those exhibits will be admitted into the record. And I assume now it's time for Mr. High's cross-examination.

Mr. High.

CROSS-EXAMINATION

BY MR. HIGH:

Q. Mr. Hutchinson, let's pin down a little bit more your expertise because you've covered a whole lot of stuff this morning and yesterday and this afternoon. Have you had any experience, other than working for Yates on this particular case, in the potash basin?

A. No, not in New Mexico Potash Basin.

Q. So, before you were hired by Yates in the case, you had never done any work involving potash mining operation in New Mexico; is that correct?

A. That's correct.

Q. But you do have underground mining experience elsewhere?

A. A tremendous amount.

Q. Is most of that in coal?

A. No.

Q. Do you have any underground mining experience in potash?

A. No.

Q. Is the type minerals that are being mined an important factor in terms of how you mine, safety and those sorts of things?

A. Oh, it certainly is. There are many different types of mining. And I do have some -- a considerable amount of underground mining experience in coal where we had a drilling, chute, and cutting operation going on, which is identical to the system used in langbeinite.

While I was there, I took over that mine as president of the mining company, we developed it into a nice operation where we converted the cutting and drilling and chuting to a continuous miner operation. And to do so we had to put in a wash plant.

What happened there was a 10-foot seam of coal, had a 1-foot parting, which is essentially barren in the middle of it. And any seam by itself was not high enough to mine economically, I felt. And so we designed and built a wash plant and converted that mining system to continuous miners identical to the systems used here in potash.

And through that mining system I feel

very qualified to understand mining the system that is used in potash.

Q. That's because of your experience in coal?

A. Yes. That was a coal experience. And to get back to your question --

Q. Thank you. Go ahead.

A. Oh. Precious metals mining in both open pit and near vertical vein mining is entirely different. Both of those are entirely different types of mining systems. In fact, the mining industry is a materials handling industry, and I cut my teeth in the most competitive materials handling industry, heavy construction industry, in the construction of dams and tunnels and things of that nature, big powerhouses, where the most critical thing is to get the material moved, no matter where it is, and get it out.

Those large construction companies that are competitive bidders are the best at materials handling.

Q. Would you degree with me, Mr. Hutchinson, that a person's experience or lack of experience in mining a particular mineral is at least a factor that should be considered in

relying or not relying upon that person's opinions?

A. Would you be more specific? Do you want to talk about potash?

Q. No. I'd really like you to answer my question. I'd ask you just to answer my question, if you can.

A. Yeah. I'd just -- yes and no.

Q. That's the best you can do?

A. Yeah. If you want to be specific, I'd be happy to do that.

Q. No, that's fine, if that's the best you can do.

You mentioned several times and you spent a lot of time talking about subsidence. Subsidence is part of rock mechanics or what people know as rock mechanics; correct?

A. They're certainly related. Rock mechanics is a science that can help in the understanding of subsidence, yes, sir.

Q. All right. And in the interest of saving some time here, you said this morning several times that you are not an expert in rock mechanics; is that correct?

A. Yes. I am not someone that one would

hire to take care of a very complex problem that involved rock mechanics. I have been in many positions where I would go out and hire those type of people. They usually come from academia, and they don't have the production experience.

And so you have to combine their knowledge with your problem of economic production to understand that. And you know at the time they don't understand your problems, you're trying to learn how to apply their technology to your problems. And I've been in that situation many times.

Q. And you mentioned also this morning a person by the name of Professor Grosvenor?

A. Yes, I did.

Q. Is that Professor Niles Grosvenor?

A. Yes, he's sitting at your table.

Q. And that's the gentleman sitting at my left and has been sitting here most of the day?

A. Yes.

Q. Would you consider Professor Grosvenor an expert in rock mechanics?

A. He in the early 60s certainly taught me a lot about what was known about rock mechanics

at the time. I was grateful to him for that.

Q. You were a student of his?

A. Yes, sir.

Q. At the Colorado School of Mines?

A. Correct.

Q. My question, do you consider Professor Grosvenor an expert in rock mechanics?

A. I haven't followed his career in rock mechanics. I consider him extremely proficient and an expert in all aspects of coal mining. I'm not sure of his expertise in coal processing, but it may be very good. I just haven't used him for that.

I recommended him to my father who was responsible for the construction of the, then called, Straight Creek Tunnel, and I think that the Colorado School of Mines ultimately did some work there. I regard him in a very high fashion.

Q. Would you consider Professor Grosvenor an expert in rock mechanics?

A. I've never used him as a consultant for rock mechanics, but I have recommended him so I would say yes, I've used Dr. Reed, which was an associate of his, and some other people that were more in the hard rock construction situations

rather than sedimentary deposits.

Q. Now, you talked about some misinformation from the potash people, and I think you used the words that the oil and gas people were arbitrarily being kept out of drilling?

A. Yes, sir.

Q. That was some of your introductory comments that went on for quite some length, and I want to talk about that, Mr. Hutchinson. So no one is left with any doubt as to what it is you're talking about. Are you aware of the history of R-111-P?

A. I can succinctly tell you what I know about it. It was developed as an -- I don't want to go all the way back to R-111-A, but I'll just abbreviate and say that R-111-P came out of an environment where oil and gas exploration were encroaching upon the potash area, and there was a valiant attempt made to get the parties to communicate.

And I believe engineers and geologists did so and tried to work out their problems. And R-111-P came out of that attempt to do so.

Q. Well, you mentioned this morning that

one of the suggested solutions that you had to this conflict between potash and oil is that the people ought to sit down and talk and come up with some kind of a resolution?

A. Yes, I did.

Q. My question to you is, do you or did you know that this is precisely the process that was followed that led up to R-111-P? Did you know that?

A. Yes, I just said that I knew that that was an attempt to do so.

Q. Did you know that the State OCD was the one who initiated that process, the very one you recommended?

A. No, I don't know who initiated it.

Q. And you are aware that there were representatives from the oil and gas industry and from the potash industry that actually sat down with each other and did exactly what you recommended?

A. Obviously there were petroleum engineers that came up with a casing program and I assume mining engineers from the potash people. I don't know any of them, but I assume that there were such people.

Q. You weren't involved in any of that, of course?

A. No. And that really hits upon the problem, not that it wasn't Gary Hutchinson personally, but I could not find in my questioning of anyone that told me about R-111-P where there was anyone involved that had worked in both industries.

And it's my direct experience that if I had an oil and gas guy in Oklahoma and a coal operator, both operating on my property that I was responsible for, that I had to get them in the same room and when one guy would say something, I would have to interpret that to the other guy.

And we did that for days until I was confident that the oil guy knew the problems, the real problems of the mining guy, and the mining guy knew the real problems of the oil guy. And we always worked it out, but I needed that interpretation. I think that R-111-P didn't have that.

Q. Did you realize, Mr. Hutchinson, you didn't have to go very far to find out somebody who had worked in both industries that was

actually there?

A. I don't know of anyone that was there.

Q. Do you know who the oil and gas representatives were in the negotiating process that led up to R-111-P?

A. I can't -- I've seen the signature page. I don't know of any of them personally.

Q. You know whether or not any of those people worked for Yates Petroleum Corporation, the very party involved in this proceeding?

A. No, I don't.

Q. Do you know who Mr. Norbert Rempe is?

A. No.

Q. Let me tell you he was a geologist that worked for Yates Petroleum, and he was one of the oil and gas representatives, and he had worked in the potash industry. The very representative of Yates had been in both industries, and he was there in that negotiating process?

A. Oh, I'm not surprised.

Q. Do you think that was valuable?

A. I doubt it if he was a geologist. Geologists are much more concerned about rocks.

Q. Okay.

A. Yesterday we had a very experienced oil and gas geologist who has worked in potash, and believe me, when we get down to mining concepts, he knows very little about those things. In fact, he said that he was supplemented by Arco with a mining economist and a mining engineer. You know, that's a pretty good team.

Q. You don't know Mr. Rempe?

A. No, I don't.

Q. You don't know if he's good or bad or knowledgeable or any of that stuff, do you?

A. Never met him.

Q. Now, in that process, the people not only did what you recommended to meet and sit down and try to come up with some resolutions, but they, the people involved, Mr. Hutchinson, were actually able not only to reach an agreement, but to type it up and put it on paper? Were you aware of that?

A. Oh, with R-111-P?

Q. No. The agreement between the two industries on how to drill oil and gas wells and mine potash in the known potash areas were able to put in writing what they had agreed to. Were

you aware of that?

A. Yeah. Isn't that what R-111-P is?

Q. No, it is not.

A. Oh, then I may not be aware of that.

Q. Let me show you, if you will -- may I approach the witness, Mr. LeMay?

CHAIRMAN LeMAY: Please.

Q. Look at Exhibit No. 9. And to speed things up, Mr. Hutchinson, let me tell you that the first part of Exhibit 9 is R-111-P and then attached to that is another document.

A. There is no Exhibit 9 in this book.

Q. Well, let me just give you mine. I'm sorry about that.

A. No problem. Exhibit B?

Q. Yes. Do you see that?

A. Yes.

Q. Entitled, "Industry Agreement"?

A. Right.

Q. That's the document that the people were able to agree upon and sign. If you look on the last page, you'll see the signatures of people?

A. Yes.

Q. Do you see those?

A. I remember seeing that.

Q. Those are the signatures of the potash people and the oil and goods people, and on the left-hand side the signature from Mr. Rempe, who was from Yates Petroleum?

A. Hard for me to read, but -- do you have them typed out? Do you know who these people are?

Q. Yes, I know exactly who they were.

A. Maybe.

Q. Do you know Mr. Jens Hansen?

A. Jens Hansen, yes.

Q. With Bass Enterprises?

A. Landman?

Q. Yes.

A. Okay.

Q. And Norbert Rempe from Yates Petroleum Corporation?

A. You described him.

Q. And then John -- from Tailsman Energy, John Wade. John Wade.

A. What was his expertise in this?

Q. With Tailsman Energy, he's an oil and gas -- I don't know. He's an oil and gas person. I don't know what he does.

A. So we have a landman and an oil and gas person and a geologist.

Q. Well, those people, Mr. Hutchinson, were selected by other oil and gas people. I don't know why they're there. They were there telling us they were selected to represent them.

A. Uh-huh.

Q. That's all we know about them. I don't know how they were selected.

A. Okay.

Q. But that's the very process --

A. But could go we go through the names on the other side?

Q. Those are the potash people.

A. Okay. And that is --

Q. Are they important to you?

A. Yes.

Q. For what purpose?

A. To answer your question.

Q. I haven't asked you a question yet.

A. Okay. Well, then ask it and we'll get back to it.

Q. The sitting down and talking and coming up with an agreed upon way of doing it, as reflected in that exhibit --

A. Uh-huh.

Q. -- is precisely what you recommended this morning; correct?

A. No. It's close, but that's why I was asking to get the background of the people on the other side. I recognize Mr. Thayer's signature and Mr. Lane's. I know Mr. Lane to be a very reputable engineer. Mr. Thayer, I think, is a manager of IMC. And Donald -- someone, at the bottom -- who is that?

Q. Western Ag?

A. Western Ag.

Q. Don Gilbert.

A. Don Gilbert. What's his background?

Q. He is a mine engineer is my recollection?

A. Okay. Is this your name?

Q. That's correct.

A. High?

Q. Yes.

A. So we have a lawyer, a management guy, an engineer, and you think another mining engineer.

Q. Those are just the people who signed, Mr. Hutchinson.

A. Oh, I misunderstood. I thought they were the committee.

Q. They were a very small part of a larger committee.

A. Okay.

Q. That's the process that you recommended this morning, just sitting there and talking and agreeing upon this; correct?

A. No.

Q. Your --

A. I used the example this morning --

Q. Excuse me. Let me ask the question.

A. Okay.

Q. I don't want to argue with you or we'll be here from now on.

A. Okay.

Q. Is your dispute with what I've just asked you about, this sitting down and talking with the people that are doing the talking, is that your problem with it?

A. Oh, no. These are good people to have there, I think, with the exception of a lawyer -- not you personally, but any lawyer.

Q. Do you know whether or not any of the other oil and gas people had lawyers involved?

A. I have no idea.

Q. Of course you don't know. Let me suggest to you that there were a lot of lawyers involved.

A. That's reflected in R-111-P.

Q. That's right. Unfortunately a lot of lawyers get involved in these things. But that process is what you recommend, sitting down and talking?

A. I think I've answered that question three times.

Q. Okay. What is there about that process that you disagree with?

A. There's no -- I don't see an intermediary here unless it's the, OCD and the OCD people have confirmed to me that they do not have in-house the technical expertise to mediate this thing and translate.

Q. Well, were you aware, Mr. Hutchinson, that a representative of the OCD was present at every step of the way reaching that agreement; that a representative of the BLM was there every step of the way in leading to that agreement? Those people have that expertise; correct?

A. Oh, absolutely not.

Q. All right. So you think it ought to be by sitting down and talking but in a different way than it has already been done?

A. I think each party needs to know what the other person is really saying. And I know mining engineers that don't understand what spudding a well means and petroleum engineers that don't know what bulking is in a mine or gob. I know that's true. That's the fact.

Q. You said also this morning that something was craftily drafted to hold oil and gas at bay?

A. Yes.

Q. What in the world were you referring to?

A. I was referring to R-111-P and specifically the wording that says and -- there are other examples. But I've read it many times, and I've tried to imagine the process and application. And what it says to me, in my words, is that a mining company must submit an LMR to the state. They must submit a -- well, they must submit an LMR --

Q. Excuse me.

A. -- which is their life of mine

reserves.

Q. Would you answer my question?

A. Yeah, I'm getting there.

Q. What part of R-111-P are you saying was craftily drafted?

A. Those paragraphs that allow a mining company to set down their life of mine reserves, which is fine, but it goes on to say that the state officer taking this information is not allowed to question it; he just has to take it.

And then it's followed up by, almost word-for-word, "There will be no drilling in the LMR." To me that's unfair. That's crafty draftsmanship that an engineer or geologist probably didn't do.

Q. You disagree then with the concept of the industry agreement in R-111-P, which and the concept being, there will be LMRs in which there will be no drilling and the other areas will be freed up for drilling?

A. No.

Q. Do you disagree with that concept?

A. No. I disagree with the concept that the LMRs are in essence shoved down the oil companies' throats.

Q. And you believe that that's what R-111-P allows?

A. Coupled with the fact that the state has no right to question the lateral extent of the LMRs.

Q. Okay. And that's the part you say was craftily drafted?

A. I believe it is.

Q. But do you know whether or not the oil and gas representative on this committee agreed to that system?

A. I have no idea if he agreed or not.

Q. You haven't read and studied the industry agreement, I take it?

A. Well, just in the interest of time, I recognize the signature page, and I'm sure that this is an industry agreement, as you stated.

Q. I didn't ask you that. My question was, have you read and studied it?

A. No.

Q. Do you disagree with the concept that there ought to be an area of oil reserves that are protected from any oil and gas drilling?

A. Absolutely. I would fight tooth and nail for that.

Q. You think that's a good concept?
A. You bet it is.
Q. Your problem then is with who determines it? The scope of it?
A. The approval process.
Q. Okay. Do you know who drafted R-111-P?
A. No.
Q. Were you suggesting by the remarks -- and I've taken them to be somewhat derogatory toward the potash industry this morning. Are you aware of the fact that the potash people did not draft R-111-P?
A. I don't think I said anything derogatorily. If I did, it wasn't by design towards the potash industry.
Q. Well, let me -- I'm going to move on to some other things here, and perhaps that's something else we disagree about.
A. Okay.
Q. You mentioned this morning that there has been a lot of misinformation from the potash industry.
A. Okay.
Q. What information are you claiming was misinformation?

A. The concept of subsidence in terms of the buffer zones that are included in R-111-P, in my opinion, are not based in any particular amount of good science.

Q. Let's stop there for a minute and we'll continue. What information did the potash industry put out concerning the angle of draw or angle of subsidence?

A. I have come across it several times in the transcripts of the hearings. I can't be more specific than that from this desk.

Q. You're saying we put out misinformation. My question is, what misinformation?

A. Well, that the implication that there should be absolutely no drilling allowed within a buffer zone. I know it has some delineations as to depth. But I think that's -- I don't think that's fair to anyone.

Q. Okay. That's because you think the potash industry has put out misinformation concerning subsidence and the effect of subsidence on a possible gas well?

A. Also the implication --

Q. Excuse me. Answer the question. Are

you claiming that the potash industry put out misinformation about subsidence and the effects or possible effects of subsidence on an oil and gas well drilled within the angle of draw?

A. Yes.

Q. And do you recall the angle of draw that the potash industry has said should be observed to avoid any adverse impact on oil and gas wells?

A. Yes. I think it's a one-to-one ratio, horizontal to vertical, plus 10 percent. I think that appears in R-111-P.

Q. Is another way of saying that, depth of ore plus 10 percent?

A. Yes.

Q. That's what you're claiming is misinformation?

A. Oh, undoubtedly. There's so much science that refutes that broad-brush attempt that it's appalling.

Q. What would the depth of the ore plus 10 percent be in the area of Section 2 that we're talking about here, Mr. Hutchinson?

A. I think that -- and hopefully I'll be within a couple hundred feet -- but I think the

depth to the ore in Section 2 is approximately 2,000 feet. So depth plus 10 percent would be 2,200 feet.

Q. Okay. And you think that's the misinformation that's being put out?

A. Yes. There's an implication that it should not be allowed to be drilled within that. And I think that's misinformation.

Q. All right. Any other misinformation that you can identify that the potash people you say have put out?

A. Two other things: that the strong implication that, if there is an oil or gas well anywhere near a potash mine, that oil and gas is going to leak into that mine, notwithstanding the very expensive safety design casing strength --

Q. All right. Let's stop right there. So the second misinformation you're putting out -- you call it an implication --

A. Yes.

Q. You're saying that the concern expressed by the potash industry over the possibility that methane gas will escape from a well into the mining horizons, get into the mine,

is misinformation?

A. Yes. In a practical sense it is just not going to happen. We can say it might happen, you know, in some great farfetched idea, but I don't think, from a practical matter, it's going to happen.

Q. And you know, Mr. Hutchinson, that people used to think that for all practical purposes it never happened in a domal salt mine, didn't they?

A. I'm not familiar with domal salt mines. Never been in one.

Q. Well, you know that coal mines for years were the only ones required to comply with gassy mine standards; correct?

A. Yes. I did it.

Q. And I take it that part of the reason is because of the hazard of methane gas?

A. Correct.

Q. And in your work in other mines, did you realize or understand that for a while noncoal mines didn't have to do anything with respect to methane?

A. Yes.

Q. And would you agree with me that that

was based upon the assumption that nothing would ever happen?

A. I don't know what it was based upon.

Q. Well, don't you think that if the regulators and the mining people and the union representatives thought that there was a hazard of methane gas in a non-coal mine, they would have done something about it?

A. Oh, of course.

Q. Just like they did in the coal mine?

A. MSHA was created to do that.

Q. Okay.

A. OSHA was created to provide safety in heavy construction projects in the workplace.

Q. In the absence of those regulations concerning methane gas, wouldn't you agree that people, pretty sophisticated people, in terms of safety in mining, concluded that there was no possibility of a methane occurrence in a domal salt mine?

A. I have absolutely no idea what they concluded.

Q. Would you agree that some time later these non-coal mines were also subject to methane gas regulation because people realized, hey, it

can happen here?

A. What do you mean "it can happen here"?

Q. Methane explosion, methane ignition.

A. Well, methane combined with enough oxygen and a detonator is going to explode no matter where it is.

Q. Are you aware, Mr. Hutchinson, that at some time people found out in the mining industry that methane is a hazard, not only in coal mines, but in other types of mines also?

A. Methane mixed with oxygen and an ignition anywhere, particularly in a mine that's so confined or in an elevator shaft is -- I put down 250 minuteman missile shafts and that --

MR. HIGH: Excuse me. Mr. LeMay, we're going to be here a long time unless the witness will just answer my question. I can move this along very, very quickly if he will stop arguing with me and just answer my questions.

CHAIRMAN LeMAY: I don't think he's arguing with you. I think he's trying to be direct. Maybe as to cooperation you can both be a little bit more direct. Just hit the salient features.

THE WITNESS: I'll try.

Q. Are you aware, Mr. Hutchinson, at some point in time people in the mining industry and the government came to the conclusion that methane is a hazard in mines other than coal mines?

A. Yes, through accidents.

Q. Because of an accident in that mine?

A. Right.

Q. And it blew up and killed people?

A. Most likely.

Q. So when you say that there's not very much risk -- or whatever words you used -- from an oil and gas well in the potash basin, would you agree with me that there is always some risk?

A. I don't want to just give him a trite answer or anything. Of course. Anything can happen at anytime and anywhere. The probability, with the science that we are using today, is very low that there would be a problem in a potash mine caused by an oil and gas well.

Q. Are you aware of the consequences if something does in fact happen and methane gets into one of these underground potash mines in Carlsbad, New Mexico?

A. I would hope that the miners, for their

own sake and in following the MSHA rules and regulations, to which they are required to follow, would know and they would monitor these things. I would hope that MSHA is doing its job and the mining companies are also.

Q. Are you or are you not aware of the consequences if methane gas gets into an underground mine in Carlsbad, New Mexico?

A. If the ventilation is good and the methane goes out, nothing is going to happen.

MR. HIGH: Mr. LeMay, we can be here all afternoon.

MR. CARROLL: Mr. LeMay, I'm going to lodge an objection here with Mr. High. He's being extremely argumentative.

CHAIRMAN LeMAY: I think both -- I mean, he can address the point, but at the same time, sometimes your questions are such that it leaves the witness no alternative but to explain a little bit.

MR. HIGH: I don't have any problem with that. I want an answer to the question.

THE WITNESS: Do you want a yes or no answer?

CHAIRMAN LeMAY: Is there any way you

can get the probability rather than yes-no answers because we are dealing with a complex area. And "yes," "no," "sometimes" doesn't fit the question asked.

MR. HIGH: I'm not asking for a yes-no answer. I want my question answered. If he wants to explain it, I don't have any problem with that.

CHAIRMAN LeMAY: Let's go along with that.

MR. HIGH: I have no problem if he wants to explain his answer. None whatsoever.

CHAIRMAN LeMAY: The question has to be phrased such that it gives him an opportunity to answer correctly.

MR. HIGH: I agree with that.

CHAIRMAN LeMAY: Otherwise there's a problem with yes-no.

MR. HIGH: That's correct. I'm going to try once again.

Q. Are you or are you not aware, Mr. Hutchinson, of the consequences if methane gas gets in an underground mine in Carlsbad, New Mexico?

A. Yes.

Q. And what is that consequence?

A. Okay. If methane gas gets into a mine from any source and the ventilation design of the mine is correct, the methane gas or nitrogen gas or acetylene gas from a torch will be carried out of the mine without any consequences whatsoever, without any health hazard to the miners. That's engineering.

Q. What is it that the Mine Safety & Health Administration would do if methane gas were detected in an underground mine in Carlsbad, New Mexico, if you know?

A. Up to certain limits, there's no problem. If you get consistently over a certain minimum amount of methane, over a period of time consistently, the mine would be reclassified as one that would require permissible equipment.

Q. And do you know whether or not the mines in -- the potash mines currently use permissible equipment?

A. I'm aware of the AMAX mine or the Horizon mine, and they are not.

Q. And would you agree that it would be very costly to change from non-permissible equipment to permissible equipment?

A. No question about it. Put them out of business.

Q. Pardon?

A. It would put them out of business.

Q. So in your opinion if a mine in Carlsbad, in the Carlsbad Potash Basin, were in fact classified gassy, because of methane leaking into the mine, and then was required to comply with the gassy mine standard, it would put them out of business?

A. Doesn't make any difference where the methane comes from, Mr. High. They would be in a world of hurt.

Q. That's correct. And you are aware of the geological studies, I take it, in the basin concerning the presence or absence of methane from natural occurrences?

A. All that was in the MSHA reports that I read about the explosions in the New Mexico Potash mine, and I think there's some other public information that I did read that talked about the presence of methane in situ with the salt including the potash zones, but the studies all concluded it was at a minimal amount.

Q. Did you look into the history of oil

and gas drilling in the known potash area, Mr. Hutchinson?

A. I've been told about it. I looked at the maps. I tried to figure out what the problems of the oil business was, particularly Yates Petroleum's problems, so that I could determine whether or not I thought I could help them in this problem.

Q. Are you aware of the fact that at one point in time no oil and gas drilling was allowed in the known potash area?

A. No, I'm not.

Q. And do you know how many -- today, do you know how many oil and gas wells have been drilled in a known potash area?

A. Many.

Q. Would you agree with me that today we have over 1,000 oil and gas wells in the known potash area?

A. That's a number that's verifiable. Whatever you say.

Q. You wouldn't disagree with the number, would you?

A. No. I have no feel for the numbers.

Q. Would you agree with me that the more

oil and gas wells that are drilled, the greater the risk becomes of a leak?

A. I suspect that in a fantasy world that that's true. I think that the R-111-P requirements eliminate any strong probability, or even slight probability of that happening.

Q. Do you believe, Mr. Hutchinson, that if this Commission were to grant the exceptions to R-111-P being sought by Yates, what impact that would have on R-111-P itself? Do you understand that question?

A. No, I don't think I do.

Q. If the four APDs are approved in this case as an exception to R-111-P, do you think that every or most -- I'll make it not quite so broad -- that most other oil and gas people would then file APDs seeking similar exceptions?

A. I don't think the oil companies file APDs because of what other oil companies do. I think they have sophisticated geologic and engineering staffs and land people who follow their business plan of acquiring leases so that they -- over which they have a good geologic concept for finding oil and gas. I think that's their primary reason.

Q. Do you have any basis, Mr. Hutchinson, or a feeling as to the impact on R-111-P, if these four exceptions are granted?

A. No.

Q. Do you believe that there is at least a possibility that every oil and gas leaseholder around will file an APD seeking an exception and the exception will in effect swallow the rule?

MR. CARROLL: Mr. LeMay, I'm going to object to this line of questioning. I let it go far enough to see really where Mr. High was going. But it seems like he's indirectly doing what you told me I couldn't do.

CHAIRMAN LeMAY: Well, I think the speculation on what we may do and the effect of what we may do is a little bit out of the ordinary.

MR. HIGH: Mr. LeMay, I know time is getting short and I know you want to leave.

CHAIRMAN LeMAY: I'm not speaking about that. Let's talk about the issue that you're raising on speculation.

MR. HIGH: I feel like I'm getting the short end of your patience because Mr. Carroll went into some detail for a long, long time over

the granting of these exceptions. And now I'm just asking this witness, as a follow-up question, what the impact of that opinion would be on R-111-P.

MR. CARROLL: I think that's totally --

CHAIRMAN LeMAY: That's fine. I thought I heard the answer that he didn't know.

MR. HIGH: Well, that's fine. That's fine.

CHAIRMAN LeMAY: Okay. But the objection -- and I hope I'm not influencing your objecting and response. But the implication that anyone can possibly, one, decide what we would rule in this particular case, and two, the implication of what we would rule, when we don't know how we would rule is highly speculative.

MR. HIGH: I don't disagree with that. But I was asking about his earlier opinion is all I was doing.

CHAIRMAN LeMAY: Fine. I'll ask the witness to answer the question, if it's what I heard before. Then repeat that, sir.

THE WITNESS: Okay. I'm a little confused about the discussion of R-111-P. I was told by counsel that was not to be discussed

here. I only used it to lay the groundwork for how I got here and what I'm doing. And I have no idea what the impact would be if suddenly everyone filed an APD. I don't work in New Mexico. I have no economic interest in this question. And I don't know.

Q. (BY MR. HIGH) All right. Are there any other areas of misinformation that you think the potash industry has put out? You've named two.

A. Well, I think I talked about -- oh, there was one other thing. There is an implication that was discussed by another witness earlier, I think Brent May, that the oil seeps found in one of the mines could have come from oil wells. And I would think that with all the research that's been done, or if that research has been supplemented by the potash industry, that that could be -- should be clarified.

Q. Anything else? Any other --

A. Those are the major things. There might be more, but those are the major things.

Q. Fine. Are you saying, Mr. Hutchinson, that's correct the potash industry put out bad facts or that you disagree with the concerns

being expressed based on the facts that were put out?

A. As a practical person, I think the weight given to what could happen in the whole world on any given situation carries too much weight.

Q. Okay, sir.

A. There's very little science in that. That's my interpretation.

Q. You don't have any problem with the facts that you've seen from the potash industry. It's just the potash industry's fears, or whatever it is you're saying, about those facts?

A. Yeah.

Q. Okay.

A. What I could interpret as being facts, I don't recall that I had any problem with those.

Q. Okay. Very good. Now, I want to ask you a few questions -- and I don't want to dwell on this, I assure you -- about Canadian competition over potash. From our standpoint you didn't have to tell us Canada was in competition with us.

A. I know that.

Q. We've known that for a long time. I take it you're not suggesting just because of that competition we ought to shut down and go away, are you?

A. Absolutely not. I think every mine should operate to its economic limit. I would do whatever I could to help that situation.

Q. And, in fact, this is probably one area where there's a pretty good parallel between the potash industry and the oil and gas people with the OPEC nations?

A. Almost identical.

Q. And what the Canadian potash people can do to us, OPEC nations can do to the oil and gas industry?

A. Much easier.

Q. But Canada doesn't have langbeinite, does it?

A. Not at all.

Q. And the langbeinite reserves in New Mexico, you know those to be the only langbeinite reserves in the western world, don't you?

A. I think there's a langbeinite mine in eastern Europe. And the only other one I'm aware of is in a -- what was it? Centrally planned

economy. I only know of four that I've been able to find in the literature. Two of them are right here next to each other.

Q. There's only four mines you're aware of in the world?

A. Yes.

Q. Two of them are in New Mexico?

A. Right.

Q. What are the names of those two mines, Mr. Hutchinson?

A. One is operated by IMC, International Minerals & Chemicals, and the other one Western Ag, a subsidiary of Gray Rock-Yellow Knife Resources, a Canadian company.

Q. Now, do you know what the core survey, the core results of corehole No. 162 were in terms of the ore indicated?

A. I've seen it. I can't spout it.

Q. Do you know whether or not the corehole data showed the presence of langbeinite ore?

A. Yes. In the fourth ore zone.

Q. Do you know whether or not the corehole data for corehole No. 162 showed the presence of sylvite?

A. I don't remember. I could look at it

and refresh my memory.

Q. All right. Why don't we do that.

A. Okay.

Q. Look at the book in front of you, if you will, Exhibit No. 6.

A. Let's see, tenth ore zone is sylvanite, 16.04 -- I'm sorry.

Q. Let's don't go into numbers.

A. I apologize.

Q. Do the corehole results of corehole 162 indicate the presence of sylvite?

A. Yes, it does.

Q. And do you know what type ores New Mexico Potash mines?

A. Sylvite.

Q. Can it mine langbeinite?

A. It sure can.

Q. Can it mine langbeinite as a separate product? Does it have a separate circuit, if you know, to process langbeinite?

A. To process?

Q. Yes.

A. I thought you said mine.

Q. Process.

A. I don't believe -- the literature I

read about the milling process is not conducive to milling langbeinite.

Q. Do you think that a mine would have a whole lot of interest in ore that it couldn't process?

A. Not in this basin.

Q. Do you think --

A. I think if they could mine it, they could get it to one of the other mills that could process it.

Q. Do you think a mine would have more interest in a section that had ore that it could process?

A. I assume so. I mean, that's their business.

Q. And in this supply and demand business that you were talking about, you're not again suggesting that just because there's a low market price, in a cyclical type industry, that that's a licensing effect to go out and waste that resource, are you?

A. So that I understand your question, you know that I have a master's degree in economics?

Q. I saw your qualifications.

A. Okay. Cyclical to an economist means

not that that industry goes up and down, but that industry goes with the general economy. For example, oil is not cyclical. You're going to drive your car and fly your airplane whether your fees collected from your legal business are high or low.

Q. All right. Let me stand corrected. Again in the interest of moving along, let me stand corrected, and I won't use those buzz words.

A. Okay.

Q. Just because the market price of a particular resource is low or lower than it was at other times in history, you're not suggesting that that's a license to waste that resource, are you?

A. Oh, of course not. Anything that is profitably minable at that price and it's there to mine at a positive cash flow should be mined.

Q. Well, you do understand that there may be times when the market price may not be high enough to actually go out and get a resource at a profit?

A. Oh, definitely, I do.

Q. Okay. But that doesn't mean at that

particular point in chronological time you should go out and waste that resource, does it?

A. Oh, you shouldn't.

Q. Even though it can't be retrieved at a profit at that particular time?

A. I agree with that.

Q. I want to ask you some questions about these maps. Where are those overlays?

A. Of the mine?

Q. Yes. I'd like to have those back up here.

A. Okay. This is, Mr. High, this is the base one. There is an overlay -- do you want all the overlays?

Q. Yes. I'd like to have all the overlays.

A. Okay. There you are.

Q. Thank you very much. Now, I want to fold this back. I'm not sure of this exhibit number. But this is the mine workings, I suppose?

A. As they are. The mine workings as of 1/7/92.

Q. Okay. You have indicated on this exhibit, Mr. Hutchinson, the words "Barren

Limit." Do you see that?

A. Yes, I do.

Q. I assume that you're suggesting that that's the green line around the bottom one, part of which is dashed?

A. Yes. On the north edge of Section 2 --

Q. Well, let's not call out that section. I really don't want to get into that.

MR. CARROLL: Mr. LeMay, let the record show we are talking about Exhibit No. 52, which is mine overlay No. 1, mine workings.

MR. HIGH: Thank you. Is everything shown -- 51.

MR. CARROLL: It's 52. The overlay that you're referring to is 52. The base map is 51.

MR. HIGH: Okay.

Q. So, Mr. Hutchinson, is everything on Exhibit 52, which is green, is that a barren limit line?

A. I interpreted it to be barren or permanently uneconomic.

Q. All right. And you base that upon some information, I suppose?

A. Oh, yes.

Q. Are you suggesting that by using those words that New Mexico Potash can't mine and process ore that is outside that green line? Do you understand what I'm asking?

A. I don't think they can mine and process ore in Section 3. They don't own it.

Q. Well --

A. I don't understand.

Q. All right. If you don't understand it, please don't try to answer it. The green line you have labeled "Barren Limit" -- correct?

A. Yes.

Q. -- you understand that that is not the point at which the ore goes to zero?

A. I didn't interpret -- it could be zero, but I interpreted it to mean that area outside of the green line that they had no intent of mining. There are green lines inside the mine that they have mined around, and those are obviously barren of economic ore. That was my interpretation.

Q. So your testimony is the green line is the limit of ore that New Mexico Potash intends to mine or wants to mine? Is that the way you interpret it?

A. Not in the instance of being down in the subject Section 2. I think you'll see here that I show a dashed line all the way down starting up at Section 7.

CHAIRMAN LeMAY: I wouldn't go into where that dashed line goes. Just say "here, here, here, and here," and that won't appear on the record, for the simple purpose of trying to keep this confidential.

THE WITNESS: Oh, I understand.

Q. (BY MR. HIGH) Let me ask you a different way.

A. This dashed line was what I got from, as I described, the source of my information. I think that dashed line was -- I interpreted it to be questionable as to its location.

Q. Okay. You don't mean by the use of the word "barren" that it contained zero percent ore?

A. No. No economic ore is what I interpreted.

Q. Okay. You understand that green line -- I take it you got that off the LMR map of New Mexico Potash?

A. I didn't know it was an LMR map at the time, but that's where I got it.

Q. And you do understand that to be a cutoff, a percentage ore cutoff used by New Mexico Potash to establish their LMR?

A. Oh, I assume that that's what they do; that they have a cutoff grade that they use to establish their LMR. They don't use zero. That's far from realistic.

Q. And you also testified that when you were describing this exhibit earlier that New Mexico Potash mined out here, and then they ran into some barren stuff and turned around and did this and did something else and that sort of thing. You took quite a while talking about that.

I take it that that's based upon your interpretation of the maps?

A. Oh, of course. I had no other reason to -- no other information.

Q. All right. You haven't talked to New Mexico Potash and asked them where they mined first, why they mined there, and why they turned around, and that sort of thing?

A. No. I reiterate, I asked to go look at the mine, and permission was refused by you, Mr. High.

Q. Okay. That's when you say you called Mr. Walt Case. He called me and I told him, he told you not to let you in the mine?

A. That is correct.

Q. At the time you were working for Yates Petroleum?

A. And still am.

Q. And did you know that Yates Petroleum was reneging on the industry agreement they signed?

MR. CARROLL: I object to that classification.

CHAIRMAN LeMAY: I think that should be rephrased, Counselor.

Q. Were you aware at the time that you were told you could not go into the New Mexico Potash mine that this case was in progress?

A. No. Mr. Walter Case very apologetically, in a very friendly manner, said that he was told by you that I shouldn't go in the mine. He informed me, when I identified myself and asked permission, which he was willing to give, he said, "However, because you're working with Yates, we have a conflict with them, I'll just have to see."

Q. Do you now know that the conflict with Yates was in fact this very case we're litigating now?

A. No, I don't think it was identified. It could have been. We had a fairly nice conversation.

Q. Do you know also that the dispute between the potash industry and Yates over the BLM's adoption of the industry agreement into a new secretarial order?

A. Yes, I'm familiar with that.

Q. And that Yates is trying to stop that and the potash people want to go ahead?

MR. CARROLL: Your Honor, I would also object to that classification. It's not Yates; it's the entire oil and gas industry.

MR. HIGH: I just want the record to reflect the reason why Mr. Hutchinson did not get to go down to New Mexico Potash mine.

CHAIRMAN LeMAY: Maybe you can have a witness that will testify to that. I'm not sure Mr. Hutchinson knows that.

MR. HIGH: All he has to do is say no.

CHAIRMAN LeMAY: Okay. Fine. You may answer the question.

THE WITNESS: As to why I was denied entry? I have no idea.

CHAIRMAN LeMAY: You have no idea.

Q. (BY MR. HIGH) Now your hypothetical mine plan that you came up with, which is the --

A. Next number, Ernie.

MR. CARROLL: That would be exhibit -- let's see, that overlay is entitled --

THE WITNESS: No. 3 overlay.

MR. CARROLL: No. 2 overlay is 53?

THE WITNESS: This is No. 3.

MR. CARROLL: Oh, No. 3. Excuse me.

Q. (BY MR. HIGH) Now, in coming up with that mine plan, Mr. Hutchinson, you've already told me you had no information from New Mexico Potash; correct?

A. That's correct, except the map that I found in the OCD office.

Q. So if they had a mine plan different from this, you're not saying that plan would be bad?

A. Absolutely not. I mean, they know so much better than I do about it. I'm sure there's is far better than mine. It should be -- there are real good people down there that have been

down there a long time and know what they're doing.

MR. CARROLL: Mine plan overlay No. 3 is Exhibit 54.

Q. Now, the change in the LMR --

A. Yes.

Q. -- and the change we could talk about if we, in effect, took this one line; correct?

A. Yes. This was the barren limit as shown on the 1/1/90 map, the north edge of Section 2, and it was dashed. So I don't know what that means. I interpreted it to mean that they really didn't know.

Q. Do you know how soon after the corehole 162 was drilled in Section 2 that the LMR was changed to take out that part?

A. I don't know. And -- I don't know.

Q. You are aware that corehole 162 was in Section 2?

A. Yes, I've been told that.

Q. And you just looked at the result of that?

A. Yes, sir.

Q. And corehole 162 showed sylvite --

A. Yes, it did.

Q. -- which New Mexico Potash can mine --
A. Yes.
Q. -- and process?
A. Yes.
Q. Something it would be interested in; right?
A. New Mexico Potash should be interested in any sylvite out of the tenth ore zone within their lease boundary.
Q. Do you know what the corehole just below Section 2 there in Section 11 is called AEC-8 shows in terms of sylvite?
A. Not off the top of my head.
Q. Why don't, if you would, look at Exhibit No. 8-A.
A. Yes.
Q. Can you read, interpret 8-A?
A. It's very, very small print.
Q. All right. Aside from the print, can you read and interpret the results shown on 8-A? And I don't mean the specific numbers, just with respect to the conclusion of whether or not corehole AEC-8 shows the presence of sylvite?
A. May I ask to look at the block diagram Leo Lammers put in as an exhibit? It's much

larger, and I know that he has the figures on there.

Q. I don't want to dwell on this.

A. Just tell me if you think there's sylvite there.

Q. No. I'm asking, do you know whether or not corehole AEC-8 shows the presence of sylvite?

A. Yes, it appears to.

Q. Do you know where corehole AEC-8 --

A. However, with the depths to the intervals that appear to show sylvite, I don't know what zone they're in. Granted.

Q. All right. Do you know where corehole AEC-8 is located in relationship to Section 2? Approximately. I don't mean exactly.

A. No. I know it's in the vicinity. Why don't you just tell me.

Q. You understand it's just below Section 2 down here in Section 11?

A. Okay. I know that there is a corehole there, yes.

Q. Okay. Would what is shown by corehole AEC-8 -- would that be something you would want to consider if you're trying to consider whether or not Section 2 contains commercial potash?

A. You bet. Public information. I'd sure use it.

Q. And both of those coreholes show the presence of sylvite, that would be stronger, of course, than just one corehole?

A. You bet it would be. Particularly if they're both in the same zone.

Q. Let's assume for a minute that both of them show sylvite in the tenth ore zone.

A. Okay.

Q. Those two coreholes would be some evidence at least that there's commercial potash down there?

A. Depending on the grade in the corehole, right.

Q. Let's assume that the grade of the potash or the sylvite shown is at least as high as, if not higher, than the average mine in the basin. Pretty good stuff.

A. Maybe I can help with this. I have calculated what I think to be the cutoff grade for an existing mine mining the tenth ore zone in the basin.

Q. I'm going to ask you about your numbers in a little while.

A. I'm just staying I don't want to disclose your numbers. So I can give you mine, and we can say higher or lower. But that would accommodate your --

Q. Have you asked the BLM -- and this is public information -- have you asked the BLM what the average grade of ore that's mined in the basin is?

A. No, I haven't. And I think that the BLM potash people are a large part of the problem in this conflict and that they are severely understaffed technically.

Q. So the answer to my question is no, you haven't asked them about the average?

A. I haven't.

Q. Would it surprise you if the average grade of ore mined in the basin is between 10 and 11 percent?

A. Yes.

Q. Okay. Let's -- and I don't want to argue the point -- but let's assume that the ore shown by corehole AEC-8 and corehole 162 both showed the presence of sylvite several rungs above the average grade mine in the basin. Would that be stronger evidence yet of commercial

potash down there?

A. If they were both above a minimum -- well, tenth ore zone, you've got to have about 5 feet to mine it because it's got clay in it. You've got a lot of dilution.

Q. Let's assume the height is there.

A. Let's say it's 5 feet, and I think both of them are, you need to have, in my estimation, a 16 percent grade if you're already there and don't have any capital expense to write off. You can make about 14 percent operating profit at that price.

Q. Are you suggesting or are you saying that New Mexico -- that no ore is commercial potash to New Mexico Potash unless it's 16 percent or higher? Is that what you're saying?

A. Today, yes, that's what I'm saying.

Q. You're saying by that, you mean that New Mexico Potash cannot take out of the ground at a profit any ore that is not at least 16 percent sylvite; is that what you're saying?

A. In that number --

Q. I'm sorry. Is that what you're saying? Then you can explain.

A. Well, let me tell you where the 16

percent came from, if I may. Is that fair?

CHAIRMAN LeMAY: I guess you can say yes first.

A. Okay. Yes. That's a long convoluted question. It's my estimation that you must have 16 percent K_2O in the tenth ore zone, 5 feet thick or greater, to make a positive cash flow when you take your consumables and labor and equipment maintenance, et cetera, all consumables, subtracted from the price you get -- I'm using 72 bucks a ton of product -- and have a -- it's really a minimum allowable profit of 14 percent on sales and pay a 2 percent royalty.

Now, I've added everything in there that I can except capital, write-off, return on capital, and interest and taxes.

Q. And I take it you developed this 16 percent number based upon public data?

A. Actual costs out of public data.

Q. Okay. And of course you don't know what New Mexico Potash's actual cost is?

A. I don't have an idea.

Q. You don't know what minimum grade of ore in New Mexico Potash can process at a profit?

A. Oh, what their mill will accept?

Q. Yes.
A. Or at a profit?
Q. What their mill will accept?
A. No, I don't know what their mill will accept.
Q. You don't know what their mill will accept and can be sold at a profit, do you?
A. I think I just said.
Q. Is that the 16 percent?
A. The 16 percent includes taking a ton out and processing it, and selling it with those costs attributable to doing that entire operation.
Q. So you are saying that right today, if New Mexico Potash is mining ore that's less than 16 percent, sending it through the mill and selling it on the market, they are selling it at a loss?
A. No. They're not getting 14 percent return on sales.
Q. Oh, okay. Your 16 percent ore grade means that they'll be making 14 percent profit?
A. On sales and I said that three times.
Q. Well, I missed it. I'm sorry. That's why I'm going over it. So that assumes this 14

percent profit on sales?

A. Right.

Q. Okay. So they might be making a profit less than 14 percent. Let's say 10 percent.

A. I said they should operate until they have a negative cash flow. They should do that. I would keep those miners working and go to the state and ask for every -- and the feds -- for every credit they can give them. Transportation incentives.

Anything to keep those mines working, I think the state and federal government should assist them in that and help them without compromising other industries' rights.

Q. Now, when you said -- well, I don't even want to talk about the Yates lease.

Now, you've had some experience with coreholes, Mr. Hutchinson, and you've talked a lot about them. How much influence do you give to a corehole in terms of the test results?

A. A single corehole?

Q. Yes.

A. Absolutely none. It's just an indication there's mineralization.

Q. This is what Mr. Weiss asked

yesterday. One corehole in the middle of 100 square miles --

A. Doesn't mean a thing.

Q. That's right. And I wouldn't disagree with that. A corehole put down here in Section 2 is not like a corehole in the middle of a 100 square miles, is it?

A. As far as potash goes, about the same thing.

Q. No difference in the two?

A. No. It just shows there's some mineralization there. I wouldn't invest a nickel in a mine on one corehole.

Q. All right. And if you knew what was shown down here just below AEC-8, would you give any influence at all to a corehole there?

A. I'd say that if I could trace that they both are at cutoff grade that I've come up with, that includes profit -- I mean, we're a capitalist particular society here, that there -- if I could trace that same zone between those two and no faults in between, I'd say, hey, here's something we ought to take a look at.

Q. If you had the two coreholes showing a pretty high grade ore, you'd say this is

something we ought to take a look at?

A. Yeah, if it was above my cutoff.

Q. Let's suppose the gamma log of a well up here also showed the presence of potassium. That's even better yet, isn't it?

A. That doesn't give me an idea as to grade, but it's an indication.

Q. All right. And if here in Section 5 the gamma log also showed potassium, it's getting better all the time; right?

A. As long as we know they're in the same ore zone.

Q. Okay.

A. This is all a hypothetical thing.

Q. Oh, sure. At some point you get enough information that there may very well be ore down there; right?

A. Oh, yes.

Q. And --

A. That's the way the business runs.

Q. Would you agree with me that in the mining business you drill a whole lot more holes if you're thinking about buying a mine or putting in a new mine than you would be if you already had an existing mine and simply going out in one

direction?

A. Oh, yes. I said that in my testimony this morning. The coreholes that are put out there, particularly when a hypothetical mining operation runs into some uneconomic ore, they better put some coreholes down to find out what its extent is.

And everyday I'm confident that these professionals are sampling every face to know what their grade is. There's another point, see.

Q. All right. So if you were looking at Section 2 from a purchasing prospective, someone going to buy Section 2 to put in a mine, you would want more coreholes than just corehole 162 and AEC-8?

A. Far more.

Q. You wouldn't draw a whole lot of conclusions from those?

A. No.

Q. But if you were already an existing mine here and intended to mine that direction anyway, you'd use fewer coreholes than you would if you were buying it?

A. Buying it? I want to go back. Buying

it with the intent to open up a mine?

Q. Right.

A. You could get by with fewer coreholes.

Q. And that's part of what's reasonable in terms of cost. How many coreholes do you drill versus the worth of the information you get back?

A. Oh, sure. I have enough data to tell you what New Mexico Potash has done in those two circumstances.

Q. Now -- and again I'm not going to spend a whole lot of time on all the subsidence stuff given an earlier discussion. But would you agree with me, Mr. Hutchinson, that most of your discussion this morning you were talking about horizontal tensile strain; right?

A. Not most of it. I did bring out that that is information that can be acquired and should be acquired when a mining company goes to a high rate of extraction just so that the surface owners have some idea of what might happen over the lateral extent that the mining company plans to extract that large percentage of ore.

Q. You weren't suggesting that the only movement of strata during subsidence is

horizontal?

A. Not at all.

Q. You understand that the movement is in fact three-dimensional?

A. Yes, I do know that. I had a good teacher.

Q. In fact you heard Professor Grosvenor explain that last week in another case here, didn't you?

A. Yes.

Q. I do want to cover a couple things, Mr. Hutchinson, with respect to subsidence. And again I'm not going to spend very much time on this. You read from the Golder report this morning, and we will be offering this exhibit. In fact, we're going to offer the whole program so the Commissioners can read it themselves. And it's in our book as Exhibit 33, if you'll look back there.

A. It looks like the one I have is limited to Chapters 4 and 5.

Q. That's correct.

A. Okay.

Q. And Chapter 4 I, believe, is entitled, "Subsidence"; correct?

A. Correct.

Q. And Chapter 5 is entitled, "Mine Conditions," or something like that?

A. "Present Condition of Mine Workings."

Q. Right. But I want to refer you to Chapter 4, which is the one you were really reading from this morning --

A. That's correct.

Q. -- and ask, if you would, please, turn over to page 63. Now, this report was not prepared by the potash industry, was it?

A. No. There's a cover letter here that -- or the --

Q. I don't think it's included in this copy.

A. I think I said it was a report to the USGS. I think Golder contracted with the USGS to make this report.

Q. Who is Golder Associates?

A. They're a well-known consulting geotech -- it says on their letterhead. I know them to be geotechnical engineers of high repute.

Q. You don't have any problem in putting a great deal of confidence in their work?

A. No. I think they, for what their

objective was, that they -- and I only -- I started at Chapter 4, so the introduction to the whole report must deal with the mandate they received. I don't know what that was.

Q. Okay. You don't know the purpose of this report?

A. Recommendations for abandonment of the Wills-Weaver mine and mine shafts.

Q. Okay. Turn to page 63. You read one sentence on this page. I want to read the one just before it, so we can keep things in a little bit of context.

A. Yes.

Q. You read the last sentence at the bottom of -- or just before the last paragraph starts, you read the last sentence. I want to read the one before it. It starts out, "The data do indicate, however, that the region of the surface liable to experience movement as a result of high recovery mining will correspond roughly to an angle of influence of 45 to 55 degrees." Do you see that?

A. Yes, I do.

Q. And you don't have any great disagreement with that, do you?

A. That's what it says.

Q. Okay. And then in the second sentence which you read is, "More severe movements and strains will occur within a zone characterized by an approximate 30- to 35-degree influence."

A. Right.

Q. That's the one you read this morning?

A. Yes, I did.

Q. Now, when talking about the effect of the impact or possible effect of subsidence on a well casing, you seemed to be talking this morning about horizontal strain.

A. No, I didn't. That wasn't my intent.

Q. Well, were you suggesting that -- and again I'm asking because we're going to cover this area ourselves.

A. Uh-huh.

Q. -- but were you suggesting that it's okay to put in an oil and gas well inside that point that you identified as being the point of zero horizontal tensile strength?

A. Two parts. Two-part answer, if I may.

Q. Okay.

A. My first objective was to provide the Commissioners with the nomenclature as to what

the different angles meant. And then I gave them an interpretation from, I think, several examples of what was critical and why and how that could vary depending on what the structure was to be within that particular angle.

Okay. It just so happens, because we can walk around on the surface and measure the horizontal tensile strain of the surface, that the rock mechanics experts that devise and research this can make measurements to that point.

They can't measure the horizontal tensile strain of the rock below the surface. Even if they opened up a mine down there to do so, it would be prohibitive from an expense standpoint. I think the data would be compromised. I think Professor Grosvenor would agree.

Q. All right. I'm not sure how that responds to my question. But are you saying that the horizontal -- or the point at which there is zero horizontal tension is a factor that should be considered by the Commission in deciding whether or not an oil well should be drilled there or not?

A. Oh --

Q. Are you saying that it's okay to drill one inside that zero point?

A. Oh, I don't pretend -- with the availability of half a dozen computer programs that deal with this specific problem, I don't pretend to hypothetically say that any particular distance is safe or unsafe --

Q. Okay.

A. -- but that the science is there to do that on a site specific basis. I wanted to make them aware that the science is there. It can be done --

Q. Do you know --

A. -- in Section 2 or any other place.

Q. Do you know the distance in Section 2 in feet if there was a separation between oil and potash of a 45 to 55 degree angle?

A. It's geometry. I could calculate it.

Q. You haven't done so?

A. Forty-five degree. I just happen to know, because I had a good teacher, that that's the -- the height at 45 degrees is equal to the horizontal distance.

Q. You don't know in terms of specific

feet what it would be with respect to these wells?

A. No. I said earlier that I think that the ore to the tenth zone is about 2,000 feet there. 1,700 to 2,000 feet.

Q. All right. And also with respect to the exhibit where you were talking about the movements, let me get the number here, Mr. Hutchinson. I want you to keep the Golder report open, but also with respect to your Exhibit No. 62.

A. I'm with you.

Q. Sir? You're with me?

A. Yes. I think you asked me to look at page 62.

Q. No. I'm sorry. I want you to look at Yates Exhibit 62.

A. Okay.

Q. That's a copy out of a report, is it not?

A. Yes, it is.

Q. And out of which report?

A. The Golder report.

Q. The very one we're talking about?

A. Yes, it is.

Q. Now, the movements shown on Exhibit No. 62 were over a period of time?

A. Yes. The first measurement was in October of 63, the last measurement was in January of 65.

Q. Okay. And you weren't suggesting by your testimony this morning that this is the end of the subsidence, are you?

A. No, I don't know that it is. It's been 32 years since the last measurement was taken. It could be that they took out the shaft and the surface buildings. And there would be so much disturbed, they would be unable to measure the subsidence.

Q. All right. Well, let's look at page 100 of the Golder report. Do you have it in front of you? Do you have page 100?

A. Yes, I do.

Q. The very last sentence on that page says, "Available data do indicate, however, that deformations continue for very long periods of time and probably, for all practical purposes, they continue indefinitely."

A. I read that.

Q. Do you have any disagreement with that?

A. Yes. I think there's got to be some finite end to it. In the words, "for all practical purposes," if that means whether or not you could go ahead and build a house there after 85 years, it might subside a little bit more. You might get a few cracks. But for all practical purposes it had stopped.

Q. You understand what the Golder report is saying here is that the subsidence will continue indefinitely until that point in time that the strata has come back together?

A. The strata has come back together?

Q. Or fully subsided or whatever word you want to use.

A. Oh, you mean at the mining level?

Q. Yes.

A. Yes. I mean, when that void is full, sometimes it's got to go back up to the surface.

Q. Right. At some point it will eventually end?

A. Yes.

Q. But the subsidence will continue until the void below the mining horizon has been completely closed; correct?

A. That's what they're saying. I'm sure

there's a circumstance, and this is probably one where that will be the case.

Q. So that the area of the Wills-Weaver mine may very well be continuing to subside today?

A. Could be. Can't go over 4 feet, however.

Q. Which would be the depth of the void taken out?

A. Right. As a result of mining.

Q. That's right.

A. There is an aquifer under there. If that aquifer is depleted, you'll have what's going on in Venice; all the buildings are sinking. And the surface would sink because of the lack of water in that aquifer.

That wouldn't have anything to do with mining. But there are lots of things that can affect subsidence at the surface other than mining. It's just in this area it's the most rational explanation.

Q. Now, this angle of influence, Mr. Hutchinson, that Golder found, the 45 degrees to 55 degrees, isn't that within the range -- isn't that essentially what the potash industry has

been saying over the years?

A. Saying as to what?

Q. Well, I'm getting back to the misinformation that you've talked about before.

A. Okay.

Q. And our 45 degree angle you said was misinformation.

A. Yes.

Q. I'm just wondering, is the Golder report misinformation also?

A. I think it's a pure coincidence. The the Golder just dealt with one mine that was shut down. If you'll look on page 74 and look at the title, it says, "Recommendations for abandonment of the Wills-Weaver Mine and Mine Shafts."

On page 74, if you'll locate the No. 3 shaft -- have you located the No. 3 shaft?

Q. I'm waiting on you. I'm sorry.

A. Okay. If you'll go out to the crosshatched area, down into the left of the No. 3 shaft, that crosshatched area is 30 to 45 degrees in the nomenclature. You can see by the legend that the wide crosshatch is the 30 degree angle influence and that the close crosshatch is the 45 degree influence.

And, as I said this morning, these people, when they put that shaft down and drove away from it and put in their shops, et cetera, and left those huge pillars, they did it out to a point of 30 degrees. Okay. So they felt -- then they started their development. They said okay, at 30 degrees, we're okay. We will not harm the shaft. I think history will show that the shaft was operational throughout the life of the mine and that that solved the problem.

Then looking at Golder's mandate, which is implied in the title, I don't see anything in there about oil wells. So I think, getting back to misinformation, if you apply one report across the board for New Mexico Potash, I think that may be unscientific.

Q. All right.

A. It could be in some areas the critical angle of deformation is 60 degrees. It could be in other areas it's 15. I'm just suggesting that the science is there on a case-by-case basis to do more.

Q. All right. Let's refer to your Exhibit No. 64.

A. Okay.

Q. This will be Yates Exhibit 64.
A. That's also on page 62 of the Golder report in Exhibit 33, I believe, of New Mexico Potash.
Q. I guess if you disagree with Golder's statements about the 45 and 55 degree angle of draw, do you disagree with the calculations set forth on Yates Exhibit 64?
A. I don't see any calculations there. I see the table.
Q. All right. Then let's look at the table.
A. Yes.
Q. Let's look at the bottom part of the document.
A. Yes.
Q. Do you see in the center of the block where it says, "Direction of Advance"?
A. "Direction of Advance," oh, yes.
Q. Do you see that?
A. Yes.
Q. You know what phi is, don't you?
A. Phi?
Q. Look at -- I'll call it angle.
A. Oh, okay.

Q. Look at angle 4.

A. I thought that was alpha, but my Greek is not all that great either.

Q. Look at angle 4 on the right-hand side, in the middle, on the bottom. Do you see that?

A. Right.

Q. That's the angle of draw that we call it; right?

A. No. That is -- that's defined in the Golder report as being the angle from the vertical all the way out to an arbitrary subsidence of 0.02 feet. I mean, that is minuscule.

Q. Okay.

A. That's what that is.

Q. For the purpose of this report, point S, 0.02 --

A. Yeah.

Q. -- do you see that?

A. That's where the subsidence is 0.02 feet.

Q. That's the point at which Golder said there is no more surface subsidence?

A. No. That's where Golder said that's the angle out to the point where an arbitrary

subsidence of 0.02 percent is found. And I see that 0.02 percent in a lot of the literature.

As I said this morning, that could be the critical angle. If you had a highly technical laboratory on a concrete slab that was like the Boulder Standards Bureau, where they keep time all over the world, they cannot have any shaking or deformation of that building.

Q. That's the area within which there could be some effect from the subsidence, however insignificant?

A. It would be insignificant, yes.

Q. But there will be something felt with respect to subsidence within angle 4 on Yates Exhibit No. 64; right?

A. That's right.

Q. Okay.

A. It's the same -- got it from the same source.

Q. And the angles on the right-hand side are those that occur when you're mining up against a developed area; right?

A. The direction of advance is pulling the pillars back towards the entry, or it's called a hallway here, yes.

Q. And what is the angle of angle 4?
A. On the right side room and pillar area, it's up to 56 degrees.
Q. All right. And that's within the range that Golder mentioned back on page 63?
A. Yes. And if you walked out there with your cowboy boots, you would have more than 0.02 feet depression. And beats me how that could be measured.
Q. Looking on the left side, where you're up against a solid, an unmined area --
A. Yes.
Q. -- what is angle 4 over there?
A. It says greater than 49 degrees.
Q. And again that's within the numbers that Golder of course concludes back on 63?
A. Yeah. And this is the heart of the misinformation problem. This interpretation of a subsidence limit that goes all the way out to 0.02 feet has absolutely nothing to do with the strong casing program required by R-111-P. It can withstand tremendous stresses.
And like the BLM, Mr. High -- and I think he speaks for the potash industry, I attribute it to him, says that you have to go out

at 45 degrees, plus 10 percent, and that that's the law. Fellows, it might be greater than that. I think it will be a lot less from the information I have derived from site specific information of scientific studies in the potash basin.

I read it before. It's in the record. I quoted from Golder on page 63. Alpha sub-2 goes out from the end of the mining to the point of zero tensile stress, something that could be measured in another mine nearby and brought to this area, the angle from the mine face to the point of zero horizontal tensile strain.

Beyond this point, out further, as shown by "TO" in figure 4.2, which we were looking at in this exhibit, minor tensions or compressions may occur. Minor tensions or compressions. Keep in mind they're thinking of closing this mine.

Q. May I -- are you through with your answer, Mr. Hutchinson?

A. No. The rest of the paragraph says, "Inside this point structures are liable to experience substantial disturbance." So let's look, to be fair, let's look at alpha 3.

MR. HIGH: Excuse me, Mr. LeMay. Mr. Hutchinson is debating me instead of answering my questions.

THE WITNESS: Okay.

MR. HIGH: He and I are not going to agree on this issue.

CHAIRMAN LeMAY: You have a witness, too, that's going to cover all this?

MR. HIGH: I sure do. Again, I don't want to debate him. If he'll just answer my question, I'll be glad to move on.

CHAIRMAN LeMAY: Before we move on, are you through with this point, with this diagram?

MR. HIGH: Not yet, I will be very quickly.

CHAIRMAN LeMAY: I'd like to take a break at that point.

Q. (BY MR. HIGH) Mr. Hutchinson, forget for a minute about the effect of subsidence on a well casing. Okay. Forget about the effect. I don't want to talk about whether a well casing will or will not be able to withstand -- I don't know anything about that. Okay. Forget about that.

You agree, do you not, that angle 4, as

shown on Yates Exhibit 64, is at least the block of dirt within which subsidence will occur, ever how small?

A. I think they measured it that way, yes.

Q. You don't disagree with that part?

A. Oh, no. Assuming Golder did it, it's a scientific measurement.

Q. And the disagreement, which that's my word, that you expressed a moment ago is the impact or the effect of that subsidence on a well casing?

A. Or any other structure.

Q. Okay. Very good.

CHAIRMAN LeMAY: We were thinking about taking a break, Mr. High.

MR. HIGH: Oh, I'm sorry. That's fine.

CHAIRMAN LeMAY: Is that okay with you?

MR. HIGH: It sure is. I'm sorry.

CHAIRMAN LeMAY: Let's take a 15-minute break.

[A recess was taken.]

CHAIRMAN LeMAY: We're continuing with the cross-examination. Mr. High.

Q. Mr. Hutchinson, in the calculations you

gave of the potash that you said would be lost by leaving a pillar around these wells, the four we're talking about here, you came up with that number, of course, without knowing the operating costs of New Mexico Potash; correct?

A. I think I just made a volumetric calculation.

Q. I understood your testimony was that you used the price of $72 a ton; correct?

A. Oh, I thought your question was about the amount wasted. Go ahead and ask your question again.

Q. All right. I'm sorry if you didn't understand it. In coming up with what you testified to be the lost profits to New Mexico Potash --

A. Uh-huh.

Q. -- in the event a small pillar was left around these oil wells, you said that you used operating costs; right?

A. What I used was -- yes, it looks like I used a cost of $16 per ton. That's what I used.

Q. And do you know what New Mexico Potash's cost is?

A. No. I think I made it clear that that

cost did not include taxes, royalty -- taxes or royalty.

Q. Now, looking at the exhibit that has the state leases on it -- I forget the number.

A. Overlay No. 4 -- yes, overlay No. 4.

Q. You testified earlier that it appeared to you that New Mexico Potash -- I don't want to put words in your mouth -- but I understood you to say that, or suggest perhaps, that New Mexico Potash was intentionally avoiding mining on state leases.

A. That's the way it appears to me.

Q. Would you tell me, please, sir, the basis for that suggestion.

A. All right.

MR. CARROLL: For the record to be clear, overlay No. 4 is Exhibit No. 55.

Q. Let me see if I can speed it up. Is that opinion or conclusion or suggestion based upon anything other than your observations from the exhibits you have in front of you right now?

A. Oh, no.

Q. Okay.

A. They mined up the lease line on three sides and left it.

Q. That shortens it up.
A. Yeah.
Q. I take it you don't know when the state leases shown on your overlay were acquired by New Mexico Potash?
A. No, I don't.
Q. And it would be entirely possible, would it not, that the areas shown in blue, which you said had been mined, was mined long before the adjoining state lease was even acquired by New Mexico Potash; correct?
A. Yes. I'm sure Ernie Szabo can provide that information. It's not my --
Q. If that were the case, then might that be an answer instead of this intentionally not mining on state leases?
A. In part. But right here, right here, between 1990 and 1992, they mined right up to the state lease line. Now, they mined this earlier and this earlier and this between 90 and 92. It doesn't make business sense to me that they would mine around this and not own it and then mine up to it on this side maybe years later.
I suspect -- we don't have the acquisition dates there this. But hypothetically

speaking, this doesn't make good business sense to me. You don't mine up to somebody else's lease line on three sides. You just don't do it; you make a deal with them.

Q. Wouldn't you really need to know, Mr. Hutchinson, whether or not New Mexico Potash even owned those state leases before you could render or say that they are intentionally avoiding mining on those?

A. Okay. That's Section 18, 21 South, 31 East. At the time I did this, I have a map that says, "New Mexico Potash." I think it has a lease number. Can you read this, Nelson?

Section 18. M65163504. I think those are probably identifying numbers for that lease. But, as of the time I made this, I knew that they owned that state lease.

Q. And my question to you, Mr. Hutchinson, was this: Wouldn't it be important to you that when you make a statement, like you did in your testimony about New Mexico Potash intentionally avoiding mining state leases, that you would check and see whether or not at the time this area was mined they did in fact own the lease that you said that they intentionally did not

mine?

A. Well, I don't think it's necessary for me to do that.

Q. Now, in coming up with your -- again the value of the potash that you say would be lost, you referred to the size of pillars around wells that have already been drilled, and you referred to Wills-Weaver and AMAX.

A. That's correct. I used those as guidelines for hypothetical.

Q. Do you know how deep those wells are?

A. Which ones?

Q. Either one of them. Wills-Weaver or AMAX, either one.

A. I think we heard testimony -- and the record will speak for itself -- but my impression from testimony given yesterday is that those wells are -- I'm going to say less than 4,000 feet deep.

Q. Well, your opinion this morning was based upon those sized pillars; right?

A. That's correct, yes.

Q. Would it make any difference to your opinion if the wells in those instances were deeper than those that we're talking about here?

A. Not at all.

Q. Do you think the same sized pillar would be okay?

A. For a hypothetical calculation. But before I put a well down or before I let a mine get to where a well was, I would require some scientific data measurements in the field to make sure that both industries could mine their reserves and take care of each other, again putting myself in the position of the regulatory body that looks after having people work together.

Q. All right. Let me see if I can get right to the point here. Were you suggesting to this Commission that it would be okay to allow these wells to be drilled and only to be 150 -- I'm sorry, 125-foot pillar left around them?

A. Yes. I think for purposes of this, with no other information, that that's a reasonable calculation.

Q. Do you think that would protect the wells from subsidence?

A. There are ways to protect them from subsidence.

Q. If they would drill with 125-foot

pillar left in Section 2, would that protect them from subsidence?

A. I don't think there will ever be any potash mined in Section 2, so yes, it would protect them from subsidence.

Q. Would it protect the underground mine from methane gas?

A. Yes.

Q. And that would be true, in your opinion, without regard to the depth of the well?

A. Yes, it is.

Q. Do you know the bottomhole pressure of wells drilled in the Delaware?

A. No, I don't.

Q. Do you think that's something people ought to know before they start deciding the size of the pillar?

A. I think before somebody puts a casing string in there, they better know what they're talking about.

Q. Including knowing the bottomhole pressure?

A. Of course.

Q. I don't know if I asked you -- do you know what the bottomhole pressure is in a well in

the Delaware?

A. No.

Q. You don't have any idea?

A. No, I don't have any idea.

MR. HIGH: Thank you, Mr. LeMay. That's all I have.

CHAIRMAN LeMAY: Thank you. Additional questions of the witness?

MR. CARROLL: Yes, Mr. LeMay.

FURTHER EXAMINATION

BY MR. CARROLL:

Q. Early on, Mr. Hutchinson, in Mr. High's cross-examination of you, there was an exchange concerning, I guess it was an academic exchange, but it dealt with the rules and the creation of NMSHA -- I guess it's the Mining Safety Board, the federal board.

And I think it was your testimony that the board was created as a result of concern for safety and they passed such rules as the Gassy Mine Rules, which we've been talking about here; is that correct?

A. Yes. I think its predecessor was an organization called, or with the letters MESA, but it was Mine Environment Safety Authority.

And that goes back to at least the early 70s, I think, maybe before that.

And you're right, those were created as occupational safety regulatory agencies to make the work place safer: OSHA for heavy construction and manufacturing, then MESA, and then MSHA.

Q. Isn't it within your experience that the corollary was also occurring in the oil and gas industry, at least in New Mexico, with the creation of the OCD and adoption of casing regulations such as we find in the Order R-111-P?

A. I can't speak specifically for New Mexico, but I am familiar with Oklahoma and Kansas and Michigan. And yes, it seems that the states really take care of the oil and gas safety in the workplace situations rather than the federal government.

Q. Mr. High, after some cross-examination, threw a hypothetical at you that basically said that isn't it fair to say that just because a price is low for a mineral, it doesn't mean that you should waste that product. Do you recall that hypothetical being posed to you?

A. Yes, I have some gold in the ground

that I'm not going to waste.

Q. Right. And your answer was that just because the price is low, you shouldn't waste it. You said no, you shouldn't?

A. That's correct. It was a hypothetical. We didn't talk about a specific mineral.

Q. Let's put that hypothetical with respect to the facts that we know. Section 2, in taking into consideration the facts that you know about it and with respect to the presence of sylvite in the tenth ore zone, do you feel that that hypothetical fits with respect to the situation that we have before us in Section 2?

A. Not at all. I spent, what, an hour-and-a-half going through the economics to show that there will be no new sylvite mines opened up in New Mexico. And those that are here, I hope they can keep scratching for as long as they can. But there aren't going to be any new ones. You can't waste potash that doesn't have any value.

Q. And along those lines Mr. High got into talking about coreholes. And he talked about AEC-8 that's down here below Section 2, the

corehole 162. You remember that?

A. Yes, I do. We tried to expand from one hole out to another.

Q. You remember -- I think I remember you asking if you could see Exhibit No. 41 that was created and testified to by Leo Lammers; is that correct?

A. I'm not very good with exhibit numbers, as you know.

Q. Okay. Well, that's what the Exhibit number reads. There are other coreholes -- I mean, on that Exhibit 41, AEC-8 was talked about, was it not?

A. Yes, it was.

Q. And you remember one of the other coreholes besides 162, the YPC well and the logs about it, the ERDA-6 hole, the K-158, K-157, and the FC-81, do you not?

A. Yes. Those were brought into the conversation.

Q. And isn't it a fair statement that -- or at least I think it's a statement that we've all been agreed to -- that the more coreholes you have, the better your information and the better judgment that you can pass?

A. That's true.

MR. HIGH: Mr. LeMay, I'm going to object. This is redundant. We've heard this several times.

MR. CARROLL: This is an area that you examined.

MR. HIGH: I agree. All I'm saying is it's redundant, and I'm objecting to it.

CHAIRMAN LeMAY: Okay.

Q. (BY MR. CARROLL) The point being, I think, that with respect to Mr. High's use of just two or three holes, was in fact bad science, wasn't it, Mr. Hutchinson?

A. Oh, definitely. And this is much easier to read than the exhibit I was given with very small print, and it wasn't summarized at all. But AEC-8 is noncommercial in sylvite. Even if you have a mine there, it's noncommercial. K-162 is commercial. So this hole that's in confidence, all by itself, there's nothing around it. In fact, there are negative results, drilling results around it, so it stands alone.

If you would offset that well or offset that corehole, a quarter of a mile in four

directions and still have that minable grade, the fact remains that no matter how we hypothecate, there is no mine there. You'd have to get up into the 19, 20 percent and have a lot of it to justify the tens, if not hundreds, of millions of dollars for a new mine.

Q. Let's talk a moment about subsidence, and let's try to put this issue into its proper perspective, Mr. Hutchinson.

A. In your professional opinion is all subsidence something we need to be concerned about, or is there something about subsidence we need to look at and hone down?

MR. HIGH: Mr. LeMay, I'm going object. Not only is it repetitious, this witness has admitted to me he is not an expert in rock mechanics, and I didn't cover that area in depth.

CHAIRMAN LeMAY: That's fine with cross. Can you get toward the point, Mr. Carroll? We did hear that before.

MR. CARROLL: I understand. I just want him to put it into perspective for us, and I think he can do it in just a sentence or two.

CHAIRMAN LeMAY: Fine.

MR. CARROLL: And then I'm going to get

out of here.

CHAIRMAN LeMAY: Put it in perspective.

THE WITNESS: All right. Subsidence is something that we should consider. It is not a fatal flaw in potash mining and oil extraction, working in the same area. It's not a fatal flaw. We can figure these things out.

If the oil well is there first and the mine is mining towards it, the mine should be required to do some scientific data gathering that is site specific. And if they must go near that well, there is enough science to determine the stress on that well and see if the casing with applicable safety factors is reasonably designed and maintained.

As the mining gets closer to the well, it could be required that the mining company put in rock bolts. That would even minimize any hypothetical loss of potash even further.

So there are very good scientific ways and mining principles to allow that. If the mine is there first, the oil company can do other things, including directional drilling if they think it's good enough, or then let them do the

subsidence tests to prove that their location is a safe one.

But to out of hand exclude one from working with the other, I don't think is fair. There's science that allows us to do that.

Q. (BY MR. CARROLL) In other words, if subsidence doesn't cause damage, it should be of no concern?

A. That's true.

MR. CARROLL: Mr. LeMay, that's all I have.

CHAIRMAN LeMAY: Thank you. Additional questions of the witness?

MR. HIGH: I just have one.

FURTHER EXAMINATION

BY MR. HIGH:

Q. Did you say, Mr. Hutchinson, that AEC-8 does not show ore of a commercial grade and quality?

A. It sure doesn't. It's public information. It says 6.4 feet of 12.3 percent sylvite. And I say if you don't have 16, you don't have a today's price that's acceptable that will generate a profit, given that mining companies have alternate uses for their cash.

Q. Again, when you say AEC-8 is not commercial, you're using the little standard that you have developed, the 16 percent which includes a 14 percent profit margin?

A. Yes. And I might add I spent a lot of years as a cost engineer for Morrison-Knutson, and I think I'm pretty good at figuring those things out.

Q. And you also understand that there may be other people out there who have different views than yours on commercial or not, don't you?

A. I think the people sitting in this room have a better idea of what their costs are than I do.

Q. Thank you.

A. I would bow to their experience.

MR. HIGH: Very good. Thank you. That's all I have.

CHAIRMAN LeMAY: Additional questions of the witness?

Commissioner Carlson?

COMMISSIONER CARLSON: I think I've got some.

EXAMINATION

BY COMMISSIONER CARLSON:

Q. You testified that you don't envision New Mexico Potash mine ever mining sylvite out of Section 2; is that correct?

A. That's correct.

Q. And you said they're mining how many acres per year?

A. The number I came up with was 136 net acres per year.

Q. Net meaning --

A. That's how I made the -- the one exhibit I showed, it showed where they were doing second mining. If they did first and second mining in that time period, I gave them 90 percent of the gross acres would be the net acres. If they just did in that time period only did first mining, I gave them 50 percent. If they did second mining only in that period, for that gross acres I gave them 40 percent.

Q. Okay. And that was based on their last three years?

A. It was 39 months. I think R-111-P required the submittal of an open mines working map of October 1, 1988. That's within a month, I think. And then they were to do it anually thereafter. And so I got one that went from

October 1 through the following December. I think that's, what, 15 months.

And then the next one I went -- the next one I just had a two-year period, from 1/1/90 to approximately 1/1/92, and that's 24 months. And 15 and 24 is 39. So it's a 39-month period. And I checked the first 15 months and the last 24 months to make sure I was within a pretty good range.

Q. So you based that on their plats that they have to file annually pursuant to R-111-P?

A. Yes, sir.

Q. They've been open since 1965, but you didn't take any average over the life of the mine?

A. Oh, yes, I did.

Q. Do you have those numbers?

A. The first 26 years that's all I could calculate.

Q. Is that factored into the 136 net acres per year?

A. No. But I wanted to make sure I was in the ballpark. Of course, their first 26 years they were higher than that. That mine is not operating at full capacity and hasn't been for

the last couple of years, I think. Maybe it's operating at full capacity under some other constraint, but potash demand isn't great.

Q. Do you know how much higher it was over those first 26 years?

A. I apologize. I don't have those calculations with me, but I can make an educated guess that it was probably close to -- over a 26-year period, over maybe close to 200 acres per year, net acres per year.

Q. But you used 136 acres and by that estimated it would be 80 years at that rate until they got to Section 2?

A. That's exactly how I made the calculation.

Q. Then you mentioned that New Mexico Potash mines will survive only as long as Canadian mines will let them -- I think that's what I heard -- that their days are numbered. Do you have any feel for how many days that is, how long will Canadian mines let New Mexico potash mines mine?

A. I can make an educated guess. The Canadian mines in Saskatchewan have plenty of capacity that is unused. They're operating at --

I checked different mines -- they're going from anywhere from 45 percent of what they can produce up to maybe 65 percent of what they can produce. Let's say they're a little over half of their rate of capacity.

So they can really open up the valve and turn out a lot more potash if the demand were out there. If demand remains flat, making that assumption, and the New Brunswick potash mines come on, I think that they will be able to put potash delivered to the customer at a lower price because they're on the water, and water transportation is about 60 percent that of rail; that they're going to be in competition, serious competition with the Saskatchewan potash, which is going to require the Saskatchewan people to get off their high horse of being a price setter and go to the more competitive curve of operating up to their marginal cost rather than their marginal revenue.

That's going to put more supply out there and reduce prices. When those prices are reduced in those areas where Saskatchewan potash, including transportation cost, is less than what's being delivered from New Mexico with its

corresponding transportation costs, the buyers are obviously going to buy from Saskatchewan. And the demand for New Mexico Potash -- I mean, the muriate of potash, exclusively here, will go down.

The most marginal producer or producers will drop out when they reach a negative cash flow. And I think that those are just the cold hard facts of the situation. Did that answer your question? Oh, you wanted an estimate of time?

Q. Yes. You're talking about the relatively near future?

A. I'd say we'll see some people drop out in the next five to eight years. But I think there's a little glow or glimmer of hope there. These places are wonderful places to put solid waste. I think it would be a terrific business.

Q. You'd be real popular in Santa Fe.

A. I know.

Q. But yet you see a much longer and maybe indefinite future for langbeinite?

A. Oh, langbeinite is terrific. As I said, I made a nuisance of myself with all the research I had done. And Yates has been paying

me my fee. I thought I was obligated to give them the best information I could on that sale.

And, hopefully, they'll let me continue to drill some coreholes and evaluate that property. And maybe there will be a third langbeinite mine in the basin.

Q. Aren't there commercial deposits of langbeinite in Section 2? Hasn't corehole 162 confirmed that?

A. I have to make a calculation to convert that to my economics, but I can say by inspection that it's close. I can't -- you know, it's out there by itself. And the fourth ore zone is in AEC-8. Here's 162 and here's AEC-8. It's obviously commercial, AEC-8, in Section 11. 2 could be. The fact that they're both together, as Mr. High pointed out, perks up your ears.

It's no secret to me -- it is a secret to me -- but it's no surprise to me that an astute company like IMC, with big bucks to put into mines, was very interested in buying Section 2 for the langbeinite.

Q. So even though it could be well out of any future plans for New Mexico Potash to allow oil and gas drilling, they still could waste

commercial deposits of langbeinite; is that possible?

A. No, I don't think so. Langbeinite consumption is -- let me say sulfates of potash and langbeinite gets a little bit better price. But total sulfates of potash is in the 200,000 metric tons total production in the United States. I think 80 percent -- don't hold me to that -- 80 percent of that is exported, which doesn't make a lot of difference.

But if you're only mining 200,000 -- if the whole industry, of which langbeinite is only a small part, is only producing 200,000 tons, it doesn't make much of a mine. You'd get a nice price for it, but it would be a small mine.

I think I calculated that Western Ag, their 35 years of reserves will only consume about, in 35 years at their present rate of mining, I think their stated rate of mining, I think that only consumes about two to two-and-one-half sections gross. So it's a really small quantity.

Q. But there is a potential deal in the works between IMC and New Mexico Potash for langbeinite; isn't that correct? Haven't we been

shown that?

A. I don't know what the deal is for. The letter that we got in the exhibits was for Section 2. I presume since IMC is a big player in the Canadian muriate or sylvite mining arena that their interest is not in sylvite; it's in langbeinite. But that's a deduction on my part.

Q. Have you done any work to see if Section 2 is accessible to IMC's mine in some future time period?

A. IMC is mining here. Can you see this, this big blue area? They also come down here, and they just recently -- oh, they bid on a section here, but Western Ag got it. This is Western Ag. Here is Section 2. IMC has been mining in just this area since the 40s.

You can see that, even if they started now, here's a jumble according to the BLM, a jumble of maybe nonproductive potash. If they went all the way through that, oh, that's maybe a couple hundred years to get over there.

But they're somewhat blocked since they didn't take this lease, and I think there's commercial langbeinite on that lease that Yates took or I wouldn't have recommended it. I think

IMC's interest in Section 2 may have waned.

Q. On subsidence, I think you mentioned one of your exhibits shows that the subsidence -- I think it is Exhibit 64, I have in my notes -- was 83 percent of the mined out area. You said that's typical of potash mines. And then Mr. High on cross talked about that subsidence essentially goes on forever until that void is completely filled at some period.

How long a period is that? I mean, when does the ground become stable again?

A. One of the exhibits that I showed across the Wills-Weaver mine -- oh, I have it here, I think. Yes. I don't know what the number is of my exhibits -- I'm terrible at that -- but on Golder Associates, page 70, the legend shows a round black dot, dated 5/5/66. And you can see where the bottom of the subsidence zone was on that date.

Apparently ten months later, plus or minus ten months, shown by the round, open circles, unshaded circles, it appears to be about the same point. And so it appears in that instance that over that ten-month period, it, for all practical purposes, stopped. You can see

that the upset scale of the vertical scale, we're talking about virtually the same elevation after eight months in 1967.

You can also see that with those V's there that there's been what I suspect to be some erosional things taking place. Or at this scale it could be a Cat track or a jeep track or something that would cause that.

Q. And the original reading on that was July 23 of 64. So you're saying in less than three years, it closed the gap completely; in other words, the subsidence stopped?

A. I think that that's a reasonable way to read that chart. I think that was the purpose of the chart.

MR. CARROLL: For the record, that was Exhibit 63 of Mr. Hutchinson's exhibits.

Q. So are you saying three years is a reasonable time period, that anytime there's mining that stops, then that should close completely within three years?

A. I brought out, you know, one of the main parameters in predicting subsidence is time. And I think that this gives us some indication that if you're mining 4 feet and you

have about 900 -- or say 1,000 feet of cover above you in the northern part of the potash basin, that that's a pretty good windage application.

But if you look at the other chart, it shows that from -- that's on page 68 -- from September of 64 to January of 65, that would be a three-month period, it went from at the deepest point, say, 1.6 to 1.8. That's 2/10 of a foot; that's 2.4 inches in -- what did I say? -- in a three-, four-month period, four-and-a-half-month period.

There's something strange going on with that one because the right-hand lobe continues. It has continued to hold its shape for most of the readings. I can't explain what it is.

Certainly, Mr. Carlson, the depth from the surface to the mine is going to have quite an effect, as well as the geology is that I've already spoken about.

MR. CARLSON: I guess I don't have any more questions.

I do have one question of Mr. High. Mr. High, when you present your case, are you going to give us some indication of when those

state sections, state leases were acquired and when the mining occurred around them?

MR. HIGH: I assure you, Mr. Carlson, we will address that very issue. And we will address the allegation that we have intentionally avoided state lease, which we deny, and we will address that in our case.

CHAIRMAN LeMAY: Commissioner Weiss.

COMMISSIONER WEISS: I have one question.

EXAMINATION

BY COMMISSIONER WEISS:

Q. I doubt that you have experience, but I'm going to ask it anyway. The oil field is very aware of subsidence in the offshore applications. And when those platforms get underwater, they're no good. So they've studied this extensively, and I'm not familiar with that history to any great extent.

But have there ever been any instances of sheared pipe in the subsidence situation in the oil field?

A. You're right, I don't have much experience and wouldn't know about those things. And I do not know of any in the areas where I

have worked.

MR. WEISS: Thank you. That's all I have.

CHAIRMAN LeMAY: Thank you, Commissioner Weiss.

I just have a couple questions.

EXAMINATION

BY CHAIRMAN LeMAY:

Q. How important do you think confidentiality is to the success and profitability of mining companies, in particular, potash companies?

A. I think that the potash companies need to protect their grade, the grade in their coreholes. If I were them, I would want to hold that in confidence because, with a couple of beers, you can find out just how fast every mill operates, what the feed grade into it is, and how many tons are shipped out of that mill on a daily basis, if you'd like.

Q. Well, then how would that help the competition? Can you go a little further?

A. If, for example, let's just assume that the Mississippi Chemical mine were in operation today competing with New Mexico Potash in the

tenth ore zone.

Q. Competing in what way? For leases?

A. No. No. No. No. They're both producing out of the tenth ore zone.

Q. Okay.

A. It's a special unto itself zone. They're all special unto themselves, that one particularly so. It's the top one. And they get to that and they mine to get some costs and cash flow coming in, and that's as far as they ever go usually.

But if I were managing New Mexico Potash, I don't think I'd want Mississippi Chemical to know what my average grade is going to be for my next two or three years of mining. But I can't understand why mine plans can't be made public to everybody, particularly in this case, the oil companies, or if there were other mineral people wanting to mine or extract something here, to know what their plans are so they would know if they were interfering. That's a frustrating thing, I know, for the oil companies.

I know that any good mine has a mine plan that they probably update it every quarter,

certainly every year. And it will probably go out there a three-year period and maybe a five-year period. And it won't change much from that unless they run across something that is anomalous.

If they hit high grade, they're going to get in there and get it. If they hit a salt horse, they're going to figure out how to get around it and still provide that quantity, that volume to the mill.

Q. Well, then, so the mine plans you would recommend being made public, but the corehole quality data, we'll say, should not?

A. Correct.

Q. The locations of coreholes are okay?

A. Yes, I think that's important to know for anybody.

Q. But if you're getting into a discussion or argument, or whatever you want to call it on the commerciality of ore, how do you put all sides equal when you -- I guess, you need that kind of data to determine commercial deposits, don't you, or do you?

Is the ore grade a critical element in defining what deposit is commercial and what

isn't?

A. Extremely important, particularly once you have a mine. The ore grade is, as I try to describe, the most -- the biggest risk is getting that ore mined to the shaft and up the shaft and through the mill. You know what that costs after a while. That tells you where you're going to mine what grades and what your internal cutoff grade is to make a positive cash flow. So then you try to maximize your profits at that point.

Q. Well, then, let me go back to a statement. I hope I quote you correctly. I think you stated somewhere in your testimony that we all agree that there should be areas of oil reserves off limits to oil companies?

A. Oh, definitely.

Q. In trying to define that statement a little further, if you're talking about, quote, "oil reserves," that would -- implicit in that statement would be the quality, the grade of the ore?

A. Definitely.

Q. And if we're talking about what is commercial and what isn't and we're arguing that point, how can we argue that or discuss it if one

side has the -- we'll call that the secret information, and yet by divulging that, they would lose competitiveness in the marketplace, but by not divulging it -- or by divulging it, then you can have what might be considered a fair, open, level playing field.

A. I don't think that the oil companies care about or need to know what the grade is or the commerciality of the ore. They want to know where the mining company is going to be in the next three years, then the next five years, and then maybe the next ten years. In that three-year period, they won't even come close. If they want to get close, they can work something out with the mining company and do some subsidence experiments or whatever and decide where that well could be.

But it should stay out of that three-year commercial reserve. The next two years perhaps, an oil company shouldn't be allowed to drill in that zero-to-five-year reserve without the permission of the mining company.

But out past five to ten years, I think that your organization or some regulatory person

should be able to listen to both sides and having built -- if these mine plans are submitted annually, build a confidence level that those mining companies actually mine what they say they're going to mine.

And with that confidence level, make a determination that, okay, in the over five-year reserve but less than ten, we're going to let you drill in there or we're not going to let you drill for a year. And let's see where the mining company is then. The next year the mining company submits their three-year, five-year, ten-year plan. And after a while you've got the people working together.

Q. Well, you're saying then it's all right to drill in what might be considered ore reserves but not minable for "X" amount of years?

A. Right. R-111-P doesn't have a time factor in it for the Hearing Examiner to make a judgment. There is none. You either can or you can't into eternity. I think that's a shortfall in a practical sense.

Q. I think I understand your statements, but let me go back to one other question then, because that's what I think we're getting down

to, is this trying to crystallize on this issue of the time frame, what's commercial, what's not commercial, what maybe two reasonable companies could agree, one oil, one mining on where they could put holes and where not to. But we're trying to fine-tune this process, so if you'll bear with me for one more question.

Do you agree with Mr. Lammers, that gamma ray of interpretations of zones within, like, the fourth ore zone, tenth ore zone, are good tools to delineate the presence or absence of commercial ore?

A. Of mineralization only.

Q. Of mineralization?

A. Yes.

Q. Have you looked at this area at all, the extent of mineralization versus the amount of gamma ray radiation in these zones?

A. When I wanted to look into whether or not to recommend that Yates and Pogo bid on the potash sale, I did what I could do. I went to Leo, knowing he had some experience, and we dug out a whole bunch of logs, and we sort of went through those.

And I think on a map I showed there was

a dashed line that to me that means, hey, maybe a corehole should go out here so we really know, because there were gamma ray spikes. You couldn't tell the thickness, but you could tell that there was the presence of a radioactive material.

Now, I have no idea what's going to happen if they ever store anything in WIPP, what would happen to those. But I think it's a tool that, you know, it's like, as you're familiar with, seismic data is a tool that might give you some information before you drill an oil well.

Q. In terms of acquiring corehole information, we maybe all agree -- I hope we all agree -- the more the better. As Mr. Lammers would say, you can't have too many coreholes. Is it more expensive or less expensive to core maybe the prospective potash zones when you're drilling an oil well or drill a corehole, slim-hole corehole, we'll say, from scratch?

A. That's a wonderful suggestion, and I've had several discussions with it. And if we could get the mining companies to let the oil companies know where they're going to be in a certain time and build some confidence in that, then I would

think the next thing that would take place, particularly if there was going to be a subsidence issue, is that the oil company, in exchange for permission to drill, would core those zones. I know I'd be open for it if it were me.

It's a trade off. And it's a sharing of information and probably maybe a smaller incremental cost than the potash company going out and setting casing and doing the rest of it.

Q. As far as actual dollars, do you think it's cheaper to core while you're drilling an oil well, or do you have any information?

A. I've cored some oil wells, and it's pretty expensive. I've cored a lot of precious metal properties, and it's a little less expensive. So I'm not capable of comparing the two.

Q. How about side-hole cores once you have wellbore there?

A. Oh, I think -- again, I don't know what the cost is, but there's the data. And, as you know, sharing of data in the oil business keeps everybody going. I would hope that that might be a possibility.

CHAIRMAN LeMAY: Thank you, Mr. Hutchinson. That's all the questions I have.

Additional questions or --

MR. HIGH: I'd like a few follow-up, if I may.

FURTHER EXAMINATION

BY MR. HIGH:

Q. Under your proposal, Mr. Hutchinson, of this letting people drill in reserves that are not going to be mined beyond five years --

A. Yes.

Q. -- you, in effect, then would protect only mined reserves for a period of that first five years?

A. Yes.

Q. And then regardless of the grade of those ores or the thickness of them, you could have 10 feet of 30 percent potash, and you're saying let people drill through it?

A. Well, I think that's something that under that extreme circumstance, that you're good at coming up with, I think that's a subject of discussion that should come before the OCD or someone else. That's an extreme situation.

Q. Mining, you agree, is a long-term

investment?

A. Oh, it certainly is.

Q. You wouldn't put --

A. These mines have all paid out by now.

Q. But you wouldn't want to be in the mining business and buy one with only five years reserves, would you?

A. Oh, I don't think that would be a reasonable thing. But if we get down to muriate of potash or sylvite mines today, and that's what we're talking about today, rather than some hypothetical tantalum mine in South Dakota, I think that the life of the sylvite producers is so short that that's a reasonable situation. Perhaps it wouldn't be in a big open pit coal mine or even a smaller high grade coal mine in the east with low sulfur reserves.

Q. All right. With respect to langbeinite --

A. Yes.

Q. -- if a mine is going into the langbeinite business, they would want more than five-year reserve, wouldn't they?

A. Well, if it takes 35 years to mine two sections, I think any oil company would move

their location over a few hundred feet and drill. Be happy to. And it wouldn't bother anybody.

Q. So you think two sections is 35-years reserves?

A. Well, I've done some calculations of how fast Western Ag is mining, and I have their mine, open mine workings advance since R-111-P went into effect. It's not much.

Q. Do you know how fast IMC is mining?

A. They're much more difficult to determine because they mine, I think, three zones, maybe not all at the same time. But over the period of the life of mine, they've mined as many as three zones. AMAX is mining two. Now they're only mining one. But last year they mined a little bit out of the first zone.

Q. And one final question. You did agree that there's langbeinite or an indication of langbeinite from corehole AEC-8 and 162?

A. Yes, I did.

Q. And you didn't fault -- or you're not faulting IMC for being interested in Section 2, are you?

A. Well, I'd do it.

Q. In other words, you wouldn't disagree with the fact that it was reasonable for IMC to be interested or believe that there was langbeinite there, would you?

A. Well, no. I'm sure that you gave them the corehole data, or New Mexico Potash did. They wanted to sell it to them.

Q. And it would be reasonable for them to believe that there's langbeinite in Section 2?

A. You bet. Just like the oil companies go out and take leases, they have reason to believe that the geology will get them a good oil well.

MR. HIGH: Thank you.

CHAIRMAN LeMAY: Additional questions of the witness? If not, he may be excused. Let's take about a five-minute break.

Do you have one more witness?

MR. CARROLL: That's correct. I have one more witness. I suspect, and again I know my judgment has not been good, I think it will take at least two hours to put this witness on. That poses a real problem because we'll then be pushing into the area, and I'm sure Mr. High would not be able to finish cross-examination.

And I think, since we've picked our dates more than a month away, I think it's really unfair to put a person on and then have him cross-examined 30 or 40 days over what he said. I think it's almost impossible to do that.

What I'm suggesting then is that my feet are just about gone standing here before this stand, and I'd like to adjourn to the date that we've picked.

CHAIRMAN LeMAY: Let me talk about this a little bit more. I thought you said yesterday -- I thought you gave us a time schedule that your direct would be --

MR. STOVALL: Mr. Chairman, I don't think this discussion needs to be on the record.

CHAIRMAN LeMAY: I'm sorry. Let's go off the record.

[A discussion was held off the record.]

CHAIRMAN LeMAY: Let's continue this witness, your last witness, to the 21st, I guess it is. We'll block out the 21st, 22nd, and 23rd. And we'll do our best to accommodate you on those three days. And I hope you all will work toward that end too.

Let the record reflect that we have

temporarily adjourned the case to be continued to -- let's start it at 8:30 on the 21st, October 21st, here in Santa Fe. Hopefully we get the hall, if not we'll be upstairs.

[And the proceedings were adjourned.]

CERTIFICATE OF REPORTER

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

I, Debbie Vestal, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Commission was reported by me; that I caused my notes to be transcribed under my personal supervision; and that the foregoing is a true and accurate record of the proceedings.

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

WITNESS MY HAND AND SEAL SEPTEMBER 28, 1992.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3