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 II

BEFORE:

CHAIRMAN WILLIAM LEMAY

COMMISSIONER GARY CARLSON

COMMISSIONER BILL WEISS

FLORENE DAVIDSON, Senior Staff Specialist

State Land Office Building

September 10, 1992

REPORTED BY:

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I N D E X

E X H I B I T S

CHAIRMAN LeMAY: We shall continue the Oil Conservation Commission. We're on the second day of scientific testimony on the oil potash case: 10446, 10447, 10448, and 10449. We're continuing on with the presentation of Yates Petroleum.

Mr. Carroll.

MR. CARROLL: Thank you, Mr. LeMay. Our first witness this morning will be Nelson Muncy. Just a word of explanation for all the Commissioners. Two of the exhibits that Mr. Muncy will be talking about appear on the wall. That's, I think, a 1-to-4,000 view.

Each one of the Commissioners, however, has a smaller version, 1-to-8. I may have that reversed, but they're in the packet of exhibits that I've given you. So you will have the same information that's up on the wall. It's on a smaller scale.

NELSON ALAN MUNCY

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

EXAMINATION

BY CARROLL:

Q. Would you, please, state your full

name, residence, and occupation?

A. My name is Nelson Alan Muncy. I reside at 1910 Washington, Artesia, New Mexico.

Q. By whom are you employed, Mr. Muncy?

A. I'm employed by MYCO Industries, Inc.

Q. And what are your positions that you hold presently?

A. I'm an engineer and the operations manager for MYCO and the estates of Martin Yates, III, and Lillie M. Yates.

Q. Mr. Muncy, would you, please, describe your educational background for the Commissioners.

A. I earned a BS degree from the University of Arizona in Tucson in 1966 in business management and then a degree in mining engineering from the same institution in 1971.

Q. Mr. Muncy, do you hold any professional registrations?

A. I'm a Registered Professional Mining Engineer in the state of Arizona, a Registered Land Engineer -- or Registered Land Surveyor in the state of Arizona, and I'm registered as Professional Engineer in Texas with specialization in mining, minerals, and

petroleum.

Q. Totally, how many years of experience do you have, work experience as an engineer?

A. In mining and in oil and gas, as an engineer, I've got 21 years of total experience.

Q. How many of those years were specifically related to mining?

A. Nine years specifically related to mining.

Q. Mr. Muncy, do you have any specific mining experience in the potash basin around Carlsbad?

A. I was employed by AMAX Potash, which is now Horizon, in 79 and 80, and then I consulted for AMAX in 80 and 81.

Q. Would you briefly outline for the Commissioners your mining experience. You told us you have a total of nine years. Acquaint the Commissioners with that nine years of experience.

A. From 1968 to 1969 I was an industrial engineer at Inspiration Consolidated Copper Company in Globe, Miami, Arizona. I performed motion time studies and economic evaluations for their underground Christmas mine, the open pit,

the concentrator, the smelter, and rod plant.

From 1971 to 1972 I was with the Kennecott Copper Corporation at the world's largest open pit mine in Bingham Canyon, Utah, where I was a drilling and blasting foreman and a shuttle and train foreman.

From 1972 through 1977 I was associated with Jaquays Mining Corporation in Globe, Arizona. I started as the mill superintendent; I was the mine superintendent; and I was the general manager. We were involved in chrysotile mining and gold heap leaching.

At the same time I was the branch manager for the D. W. Jaquays Mining & Contractors Equipment and Supply Company. We sold mining equipment to the mines and explosives.

From 1977 to 1981 I was the owner of Marnel Pipe & Supply Company. I was a mining and oil and gas consultant. I flooded oil and gas wells and drilled and operated gas wells and oil wells in the state of New Mexico.

From 1979 to 1981 I was associated with AMAX, which is now Horizon. I was a mining engineer, a relief shift boss, a surveyor, I was

the new mining training coordinator, I surveyed and core drilled and logged some 20 potash core holes further evaluating the third potash ore zone. I was involved in mine planning and equipment selection and evaluation.

I coauthored the AMAX Marietta Continuous Miner USBM Safety & Operating Guidelines. I also monitored and evaluated the impact of oil and gas wells in the AMAX Potash general lease area.

Q. Mr. Muncy, when you were hired by AMAX Potash Company, was your experience or background in the oil and gas industry one of the considerations that you were hired on or the basis that you were hired on?

A. Most definitely. AMAX had a lot of oil and gas wells at that time in the mining area as they do today. And my experience in mining and oil and gas was valuable to AMAX. I speak both languages, both mining and oil and gas.

Q. Now, Mr. Muncy, you have had an occasion to testify before the Oil Conservation Division and Commission previously on several occasions and had your qualifications accepted as a petroleum engineer; is that correct?

A. This is correct.

Q. The first of your exhibits is Exhibit 28. That is a resume covering the information that you have just related to the Commissioners; is that correct?

A. That's affirmative.

Q. This covers in detail your mining experience then?

A. Yes.

MR. CARROLL: Commissioner LeMay, I would tender Mr. Muncy not only as an expert in the field of petroleum engineering, which he has already been accepted before the Commission, but I would also tender him as an expert in the field of mining engineering.

CHAIRMAN LeMAY: His qualifications are acceptable.

MR. HIGH: We enter our objection to that offer. We object to the qualifications of Mr. Muncy with respect to mining engineering.

CHAIRMAN LeMAY: Is there a basis for your objection, counselor?

MR. HIGH: There's been no foundation laid through questions by Mr. Carroll to accept Mr. Muncy as an expert mining engineer with

respect to potash. He's testified he only has one year of experience. And our position is that is insufficient for him to be an expert.

MR. CARROLL: Chairman LeMay, I disagree wholeheartedly. I think Mr. Muncy has testified as to nine years. He has not only testified as to work experience, he is professionally recognized in a couple of states, Arizona and Texas, with specialties in mining.

Furthermore, his experience was much broader in the Permian Basin -- I mean, excuse me, in the Carlsbad Potash Basin. He's worked for AMAX as one mine and had other duties associated and for several years worked in the potash area. I think he's qualified on that basis.

MR. STOVALL: Mr. Chairman.

CHAIRMAN LeMAY: Mr. Stovall.

MR. STOVALL: If I might, the purpose of qualifying an expert is to allow him to give opinion testimony based upon evaluations they made. I think you can safely qualify Mr. Muncy as an expert and allow him to give opinion testimony. And if Mr. High has any concerns, he can certainly attempt to discredit or reduce the

value of that opinion in your mind by cross-examination.

But I think the purpose of qualifying as an expert is primarily to open him up to give that kind of testimony, and I think that's acceptable for you to do so in this case. That doesn't necessarily mean that you have to give additional weight to that testimony as such.

CHAIRMAN LeMAY: Thank you, counselor. Your witness is qualified.

MR. CARROLL: Thank you, sir.

Q. (BY MR. CARROLL) Mr. Muncy, let's first start off and define some terms for the Commissioners, the basis on which I think a lot of your testimony and other testimony will rely, and let's deal, first of all, with the ore -- excuse me, with the word ore, o-r-e. Would you define that from a mining engineer's standpoint?

A. Ore is simply defined as a mineral that presently can be acquired, milled -- or, pardon me, acquired, mined, and milled and marketed for a profit. I offer as Exhibit No. 29 a copy of chapter 1, page 2, paragraph 1.1, from the Society of Mining Engineers Handbook.

Q. Now, Mr. Muncy, before you read that,

would you tell the Commissioners what the SME Mining Engineers Handbook is and whether or not it's recognized in the United States as having any credibility in the field of mining engineering?

A. It most certainly is. This book was supposed to go to print in about 1970. It didn't get out until 73. Prior to that we had the Peale's Mining Engineering Handbooks. And when we had discussions with our good friends at the BLM, they referred us to the Mining Engineers Handbook.

Q. So this book is the recognized work on mining concepts, is that correct, in the United States?

A. That is my opinion, yes.

Q. And it's your information that even the Bureau of Land Management recognizes that fact and uses it also?

A. This is affirmative.

Q. All right. And I apologize, but I did want to make that fact known to the Commissioners. Would you carry on with your testimony?

A. Okay. I'd like to quote from the

book. It will be Exhibit No. 29. I've highlighted it in yellow. The definition of ore is, "A mineral that can be extracted from the ground at a profit. The economic connotation is implicit in the word 'ore.'"

Q. Now, Mr. Muncy, to help aid the Commissioners in the process, the decision-making process that they must ultimately go through with respect to the Yates applications -- and I should ask the preliminary question: You are familiar with the four applications that Yates has before this Commission at this time?

A. If you're speaking of the applications in Section 2, yes, I am.

Q. All right, sir. You have prepared certain maps to aid the Commissioners in acquainting them with this particular area that we're dealing with, and that is the potash enclave; is that correct?

A. That is true.

Q. All right. Your first exhibit is Exhibit 30; is that correct?

A. That is correct.

Q. Would you, please, explain what Exhibit 30 is and what it purports to depict?

A. This particular map that we have here on the wall will be the same map that we have on the smaller scale that I hope all of you are looking at now. The copy that you have in front of you is on a scale of 1 inch to 8,000. And this particular map here is on a scale of 1 inch to 4,000.

The map is computer-generated. And I'd like to start off by saying that I personally researched the tract records at the State Land Office because the purpose of this map is to show the state and federal potash leases as they existed at the time that I made the search. So I started at the State Land Office, went to the tract record section and --

Q. On what date, Mr. Muncy?

A. I did this the week of April 20th through the 24th of this year. And I got the tract records personally, the lease numbers, and who owned the leases. So if we look at the legend on the map, you'll see that the potash leased state land is drawn with vertical orange lines.

You'll further note that unleased potash state land is drawn with diagonal green

lines. I then put these in the computer. We used AutoCad, and that's what you see on the map here with respect to the state potash leases.

Q. Now, the federal potash leases are also contained on this map; is that correct?

A. That is correct. The federal potash leases are depicted with blue diagonal dotted and crosshatched lines, as you see right here. And then the unleased federal potash leases appear white, with no coloring at all.

Q. There are also other notations on this map. What are those? What do they stand for?

A. Okay. If we look at the broad red line, the outermost boundary on the map, this will be the Secretary's area, effective 10/28/86 comprised of 499,002 acres. The KPLA, Known Potash Leasing Area, is depicted by this next broad purple line.

For all practical purposes, the KPLA is synonymous with R-111-P. We found a few places where they didn't agree, but I think the full intent of KPLA and R-111-P is that those two lines track.

Q. When you say they didn't agree, you're talking about very small acreages, like, a

quarter section or something?

A. Not even that large.

Q. Okay.

A. That area, R-111-P, which for all practical purposes is synonymous with the KPLA, represents 366,460 acres more or less.

If you look down on the legend on the map, we went to a commercial source known as PI. That's an acronym for Petroleum Information. And we got the status of the oil and gas wells as of 4/30/92. And the symbol for those wells is shown in the legend.

I'd like to point out also on this map, the WIPP area, 16 square sections approximately, in Section 2 which we're talking about today, right here.

Q. That's just slightly north and east of the area designated as WIPP?

A. That's affirmative.

Q. Now, Mr. Muncy, there's another item, Laguna Plata Archeological District; what is that, since that's an item in the legend?

A. Okay. That is located up in the northernmost part of the map. It's 1,040 acres more or less. And it's depicted by the

double-broad black line. Snyder Ranch is right here.

Q. What is that to your information?

A. Snyder Ranch is a 320-acre tract of fee land.

Q. With respect to the Laguna Plata Archeological, what is that? Is that a federal designation of acreage?

A. What it is is a federal designation of acreage. And I researched the oil and gas leases and potash leases. And both leases on the form have archeological stips, and these stips state that we can't have trails or roads. We can have no surface disturbance in this area.

Q. Now, Mr. Muncy, with respect to the preparation of this map, is there some statistical information that you can provide the Commission about this area depicted on this map?

A. Yes. Based on the time that I researched this map back in April, the point I'd like to make is that 41 percent of the potash is unleased within the confines of R-111-P.

Q. Is that a combination of both state and federal acreage, Mr. Muncy?

A. That is state and federal acreage.

Unleased federal comprises some 141,000 acres more or less. Leased federal comprises some 148,000 acres more or less. Unleased state comprises some 9600 acres more or less. Leased state comprises some 67,000 acres more or less. Unleased fee, some 400 acres more or less. And leased fee is less than 100 acres.

Q. Now, Mr. Muncy, you've also prepared a second map to help aid the Commissioners in this process that they're going to be asked to go through; is that correct?

A. That is correct.

Q. Would you explain your next exhibit, Exhibit 31, then in much the same manner that you've just described this exhibit?

A. Again you'll find at your desk a copy of this map on the scale of 1 to 8,000. This map is drawn on the scale of 1 to 4,000. We'd like to refer to this as the updated 1984 BLM map.

COMMISSIONER WEISS: Which exhibit are you on?

MR. CARROLL: 31, Mr. Weiss. It will be a full-sized map.

COMMISSIONER WEISS: This one is 38.

MR. CARROLL: Well, your package may

have been shorted.

THE WITNESS: Let me give you mine.

CHAIRMAN LeMAY: We've got one here. We can share. Thank you.

THE WITNESS: Okay. As I previously said, we like to refer to this as the 1984 BLM updated map. This map was also computer generated as was the previous map.

Q. (BY MR. CARROLL) Now, Mr. Muncy, when you use the terminology 1984 map, what you're referring to is that back in 1984 the BLM created a map showing this potash enclave and was broken down into certain categories of potash deposits; is that correct?

A. That is correct.

Q. And that 1984 map then served as the basis for this map which you have updated in some manner which you'll explain to us?

A. That is correct. And if you'll refer to Exhibit 32, which is the next exhibit, this is merely a picture of that 1984 map, and then the second page is a copy of the legend which accompanied the 1984 map.

MR. HIGH: Excuse me. My exhibits are not numbered, and I'm having trouble following

here.

MR. CARROLL: This is Exhibit 32.

Q. All right. If you would, tell us how this map was updated. And you might want to first explain what was on the 1984 map and then how you updated each of those items.

A. Okay. The 1948 map was put out by the BLM, and it depicted the mine workings to date. What you'll see, let's take a mine where there's been no activity, like the old plugged and abandoned Duval Wills-Weaver map in the upper left-hand corner.

That 84 map depicted the status of the mine workings at the time that the map was published. It further categorized -- this map, the 1984 map, further categorized the ore in the potash basin.

And we can refer to the legend, which you have a copy of. And the blue on this map is the major potash reserves or what they call the potash enclaves. The barren is vertical purple lines, like you see right here in these big blocks. And then the indicated potash reserves were on this map. And, as on that map, they're diagonally-hatched, and they call that

indicated. And then inferred was double -- or on this map is double vertical green lines.

The first mined area is in the blue, crosshatched blue. And the second mined area is in the crosshatched orange.

Q. Would you explain, Mr. Muncy, what you mean by first and second mined area?

A. Okay. The first mined area is where they go in and potash mines take out approximately half the ore. And then the second mined area is where they go out and take up to 80 or 90 percent of the ore.

Q. We've had earlier testimony that referred to the pulling of pillars and what have you. Is that the process that you're talking about that is engaged in during the second mining?

A. That's affirmative.

Q. Now, Mr. Muncy, I notice one thing. In your orange -- and I think maybe Mr. Carlson asked a question -- on this map and other maps the crosshatching on the orange in some of the mines appears to be of a different size and therefore the color intensity is different. Was there meant to be a distinction there, or what

caused that?

A. That's just a computer glitch, and there was no intent to make any difference. That's just the way it came out. Specifically if you look right here, it's more densely crosshatched than, for example, right here or right there. But it's just the way the computer made it.

Q. All right. So if an area is colored orange, no matter what intensity of the color orange, that means second mined area on this and earlier maps that have been presented to the Commission?

A. That is correct.

Q. Okay.

A. Basically what we did is we took this map and we digitized it and we put it on this map here. So it should be an exact reproduction of the 84 map.

Q. With respect to the measured potash mineralization in the indicated and inferred and barren, you made no changes in the outlines as they were depicted on that 1984 map; is that correct?

A. No, sir. No changes at all.

Q. All right. And you reproduced the mine workings just as they were in 1984; is that correct?

A. That is correct.

Q. However, those mine workings have been updated, have they not?

A. That is correct.

Q. Would you explain that process and how we can tell on the map what are the new and updated mine workings?

A. As you'll note on the legend, those new and updated mine workings that you refer to will be shown as a dark line. For example, we get up here to the AMAX potash mine, you can see this drift taken off right here. We get around here, around IMC and Western Ag, and you can see the activity, the additional activity since 1984.

Q. You're talking about the black lines that actually have no color; they're outlines?

A. They're just outlines.

Q. That is the most recent mine workings that you've been able to determine?

A. Yes. And what I did on April 22 of 1992, I went to the NMOCD here in this building, and I referred to R-111-P, Section 1, filing of

well surveys, mine surveys, and potash development plans.

And I quote, part 2: "Mine surveys. Within 30 days after the adoption of this order and thereafter on or before January 31 of each year, each potash operator shall furnish the Division two copies of a plat of a survey of the location of his leaseholdings and all his open mine workings, which plat shall be available" and I underlined, "for public inspection and on a scale acceptable to the Division."

So that's where I got this information. And I was told that four potash companies had turned in this public information. AMAX, which is now Horizon, had current information. New Mexico Potash had current information. Eddy Potash and IMC also had current information.

I found nothing in the files for Western Ag Minerals, Narranda or Mississippi Chemical. It doesn't surprise me that there was nothing on file for Narranda because they don't even have a mine.

Q. And with respect to the Mississippi Chemical mine, there was no information that

that's consistent with the state of affairs out there; is that correct?

A. That is correct. And their mine, which has been referred to in the past as the old National Lea Mine, is right here on the map. And it's been temporarily abandoned for approximately ten years.

I'll start up here in the upper left-hand corner, and we'll show Horizon. And then we've got Eddy Potash, Mississippi Chemical, IMC, Western Ag, New Mexico Potash, and then Mississippi Chemical Lea Mine.

Q. Now, you made reference a moment ago to your Exhibit No. 32, which is the actual map. It's a small reproduction and also contains a legend. Would you describe or discuss that a moment with the Commissioners.

A. On the second page of this exhibit, I have copied the legend to the original 1984 BLM map. And if we look in the upper right-hand corner, we talk about measured potash reserves. They also call it potash enclaves.

And it says, "Resources for which tonnage is computed from dimensions revealed in workings and drill holes, the grade is computed

from the results of detailed sampling. A minimum of three data points in any one ore zone meeting quality and thickness standards. No more than one-and-a-half miles apart have been used to delineate measured reserves."

COMMISSIONER CARLSON: Excuse me. I don't have a copy of that. I've got two 33s but no 32.

MR. CARROLL: I'll have to get after Mr. Muncy. He was responsible for making the package. We'll get you another copy.

THE WITNESS: I've got it.

I think at this point it's appropriate to introduce Exhibit No. 33, which is again the Society of Mining Engineers Handbook, Volume 1. And on page 5-56 of Volume 1 of the Society of Mining Engineers Handbook on page 5-57, I'd like to quote under the heading, "Potash: At Carlsbad, New Mexico, individual deposits are several square miles in area and can be located by exploration drilling on one-mile centers. Ore reserves can be blocked out on four holes per section."

Q. Now, Mr. Muncy, what is your understanding of this criteria that was used in

1984, as to its original purpose, these terms "measured," "indicated," that you've just been talking about?

MR. HIGH: Excuse me. I'm going to object to asking this witness what the BLM intended by their own publication. I don't know that the witness has any special expertise or knowledge about the BLM's publication.

CHAIRMAN LeMAY: I understand, Mr. High. He certainly has an opinion. That's what we're asking for, is an opinion.

MR. HIGH: If he's asking his opinion, that's fine. But the way it was asked, he's asking Mr. Muncy to explain why the BLM did something.

MR. CARROLL: I think my question was was couched in the words: What is your understanding? And that's what I've asked Mr. Muncy.

CHAIRMAN LeMAY: That's fine. That's acceptable language.

THE WITNESS: Okay. It's my opinion, and it appears to me that the BLM drafted what was not their real purpose. I perceive that a real problem has occurred in a loose manner of

interpretation.

If you'll recall, that measured potash that we just talked about, which is blue on the 84 map, never there do we find a reference to thickness per ore zone and quality as to minability under present-day technology and economics per a specific type of mining operation.

There is a difference between barren of mineralization and barren of commercial ore. No justifiable definition in my opinion of commercial ore exists.

Now, we've got 41 percent, as I just pointed out, of this R-111-P area which is unleased. And I think the criteria for commercial ore becomes more and more germane. The BLM methods in which potash values occurring in several mineralized horizons are combined in a single potash corehole. And the tabulations are very misleading.

And I can give an example of, say, the first ore zone and the third ore zone, which are approximately 30 feet apart in the AMAX portion of the basin. If we get a core and we've got 2 feet of 10 percent K_2O sylvite in the first zone,

and then we get the exact same assay in the third zone, 2 feet of 10 percent sylvite.

The way the BLM interprets that, we end up with 4 feet of 10 percent, and when you look on the map it's blue, but when in actuality you've got two zones that have been combined and they're over 30 feet apart.

Q. Now, Mr. Muncy, you mentioned something that maybe the Commissioners may or may not be familiar with. These zones, they are numbered, are they not? And that numbering process, how does it work?

A. Okay. These zones occur, as have previously been described, in the Salado Formation in the McNutt series. We start at the bottom and we come up. We've got zones 1 through 12. The bottom zone, being 1, the top zone, being 12, and we found no commercial ore in the eleventh or twelfth zone.

Q. Now, with respect to the New Mexico Potash mine, what zone are they currently mining in to your information?

A. New Mexico Potash is mining sylvite in the tenth ore zone.

Q. That's one of the higher zones then; is

that correct?

A. That is correct.

Q. Now, Mr. Muncy, within the field of mining engineering, the term "proven ore reserves" is a recognized term. And I believe your Exhibit No. 33 refers to that term and what -- at least in the Carlsbad, New Mexico, area -- what is considered sufficient data points to come up with or to connote or designate ore on the basis of the number of data points; is that correct?

A. That is correct.

Q. Your study of the legend and the usage of the term "measured" by the BLM, can you use those terms synonymously, or are they synonymous?

A. The BLM uses the terms, as we see here on the legend: "measured," "indicated," and "inferred." And I think these terms were just meant to be leasing criteria only. That's my opinion. And I'd rather equate them to: Measured as being proved or proven; indicated as being probable; and then inferred as possible.

Q. The standards employed by the BLM for denoting measured ore are not the same standards or as high as the ones recognized in the

engineering handbook, are they?

A. No, sir, they're not. I think what we need to do is we need to remember that the key word is "ore." Ore is a mineral that presently can be acquired, mined, milled, and marketed at a profit. And that's not what we see on the 1984 BLM map when it comes to measured.

And I perceive that a real problem has occurred due to this loose manner of interpretation.

Q. All right. And that comes from the uninitiated equating "measured" with the term "proven"?

A. That is correct.

Q. Now, you've also as Exhibit 34 prepared a table of some of the information contained on this map that we have just been talking about?

A. Yes. What I did in Exhibit 34, I took the 1984 BLM map and by township and range, which is the first column on the left-hand side, I compiled the number of acres in the Secretary's area, R-111-P, what the BLM has colored blue, which is measured, what they've shown as indicated, and inferred. And then I've calculated the mined area and the barren area.

And I've done this all in acres per the 1984 BLM map.

And the summary is at the bottom of this exhibit, and what it tells us is that 10 percent of the first or second mined areas within the Secretary's area, which is the outermost broad red line, only 10 percent of these areas are first or second mined.

And then if we come into the R-111-P area, which is for all practical purposes synonymous with the KPLA, we find that only 13 percent of this area is first or second mined.

Q. Now, the mining that's been going on out here and the time period which is relevant to these statistics, again begins back in the 1930s, does it not, Mr. Muncy?

A. That is correct.

Q. So that would be the baseline that you're talking about that so many -- a certain percentage of this area has been developed --

A. That's right.

Q. -- is from the inception of mining?

A. It's been a long time, yes.

Q. Now, Mr. Muncy, one other thing, of course, both of these maps have on them the oil

wells that are drilled in this area, as you told us, I think, as of April of this year; is that correct?

A. We got them from a commercial data base called Petroleum Information, and that is correct, 4/30/92.

Q. There are a number of wells located in or very close to many of the mines that are out here; is that correct?

A. That is correct.

Q. Can you tell the Commissioners which ones or how many there are and if there are actually any wells located within the mine workings?

A. If we start in the upper left-hand corner at the potash mine that previously employed me, that I did some consulting work for, the AMAX Potash mine, which is now known as the Horizon Potash mine, I have listed the number of oil and/or gas wells that fell within that mine, and that total came to 16.

Q. All right. Now, were some of these wells actually within the mine workings?

A. Some of these wells were actually within the mine workings. For example, with the

AMAX mine, we had 7 of these wells in the first mined area; we had 4 in the second mined area; and we had 5 in what they call "measured ore" on the BLM map.

Q. Now, the AMAX mine, that is now the Horizon?

A. That is affirmative.

Q. All right. That's up in the upper left-hand corner of your maps. Really it's the uppermost or the northernmost active mine at the present time?

A. That is correct.

Q. All right.

A. And then, for example, if we look at the New Mexico Potash mine, which is going to be almost in the center of the far right-hand map on the wall, which we're going to refer to as the 84 updated BLM map, I was only able to locate through public records three wells.

So the density of the wells on the left-hand side of the basin is much greater than the density of the wells as we look at this map on the right-hand side of the basin. For example, with New Mexico Potash, the first well I found was in the second mined area. The second

well I found was in the second mined area, as was the third well. All of them were, according to the public records, in the 84 BLM map within close proximity to the second mined area.

Q. The old and now closed Mississippi Chemical Lea mine had at least one or two wells that were in the second mined area, and also the Duval Wills-Weaver mine had a number of wells?

A. That is correct. And they're so noted on the map.

Q. You have had some firsthand experience with these kind of problems, and you will -- later on in your testimony you're going to further discuss that issue, are you not?

A. That is true, I will.

Q. Now, you also have an Exhibit No. 35. Would you explain what that exhibit is and the relevance to your testimony today?

A. Okay. Exhibit 35 is again a copy of the Society of Mining Engineers Handbook, Volume 2. And if we start with page 32-29, which is chapter 32, page 39 -- pardon me, page 39, the Mining Engineers Handbook talks about measured ore, indicated ore, and inferred ore.

Q. Now, this is with respect to the

calculation of reserves, is it not?

A. That is correct.

Q. That's what this chapter is dealing with, calculation of ore reserves?

A. Exactly correct.

Q. All right. Would you carry on? I apologize for the interruption.

A. And that's the term that we find on the 84 BLM map. "Measured ore is ore for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes for which the grade is computed from results of detailed sampling. The sites for inspection sampling and measurement are so closely spaced and the geologic character is so well-defined that the size, shape, and mineral content are well established. The computed tonnage and grade are judged to be accurate within stated limits, and no such limit is judged to differ from the computed tonnage or grade by more than 20 percent.

"Indicated ore is ore for which tonnage and grade are computed partly from specific site measurements, samples, or production data and partly from projection for a reasonable distance

on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the ore completely or to establish its grade throughout."

And then we talk about inferred ore, "Inferred ore is ore for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few or, if any, samples or measurement."

So I think what we're talking about here is measured is really proven; indicated is really probable; and inferred is really possible.

Q. Mr. Muncy, do you have an opinion as to whether or not the methodology we cited in the legend of the 1984 BLM map, that is using three data points no more than a mile-and-a-half, will actually give you calculations which are consistent with or meet the standards as discussed here?

A. It's my opinion that they won't for the reasons that I previously testified to.

Q. Do you have any further comments you'd like to make with respect to this exhibit?

A. Not at this time.

Q. Now, Mr. Muncy, in your preparation and study for purposes of testifying here and gaining an understanding of the problems with respect to the petroleum and potash industries, have you had an occasion to view what has been, as a common name, referred to as the "Miner's Bible," but it was that compilation of materials that was put together and used by the joint industry committee back in 1986?

A. Yes, I have. I've got a copy of it right there in that box on the floor, and I've read it from cover to cover.

Q. Do you have an opinion as to whether or not that compilation by the potash industry was a fair treatment from a scientific standpoint of the issues that we are faced with today?

A. It's my opinion that the "Miner's Bible" is nothing more than yellow journalism. It is chock-full of general terms. And I think what we need is a scientific approach to a troublesome problem. We don't need the "Miner's Bible." And I'd like to reiterate, science dissipates trouble.

Q. The statements that you've just made,

do you have some examples of what you're talking about? Could you be more explicit, Mr. Muncy?

A. Yes. The "Miner's Bible" talks about disaster. I think we all understand that. It talks about the mine disaster at Belle Isle in Louisiana in Merry Paris back in 1979. It talks about the Kane Creek mine disaster in Grant County, Utah, back in 1963.

And it's my opinion that geologically they're just not related. And there's just no way that we need to compare these disasters to the Carlsbad Potash Basin. Geologically they're just not the same, and we all understand the disaster. But we need to apply the science and get down and look at the facts and use sound engineering principles and good geology.

Q. With respect to looking at the facts, are there some examples that you have personal experience with that are contained within this "Miner's Bible"?

A. Yes. I have prepared as Exhibit No. 36 and copied from the introduction, which will be the first page of Exhibit 36, pages 23 and 24. And at the bottom of the page 23 under 4 in the introduction to the "Miner's Bible", I'd like to

read this short paragraph.

It says, "In our own experience" -- or pardon me, "Our own experience also makes us question whether any casing and cement program unless supplemented with additional safeguards is adequate protection against the hazards we are dealing with. In 1980, for example, AMAX," which we just pointed out is now Horizon, "drilled a borehole from the surface to the mine workings to be used for electrical supply casing. In attempting to cement the casing, the cement was lost both above and in the salt section. We assume," and I've underlined on that page "'we assume' clay seams and fractures in the salt zone. In instances like this, we simply do not believe there is any reliable way to be certain that voids in the annulus of the casing are completely filled."

And then they refer to Exhibit No. 22 in the "Miner's Bible." Which follows on the next pages of my Exhibit No. 36. The first page in Exhibit No. 22 is a sundry notice to the BLM -- pardon me, it's to the BLM in Santa Fe, Department of Interior, on Well No. 181, which is located in Section 13 in the southwest quarter,

Township 19 South, Range 29 East, in Eddy County, New Mexico.

And what it says is AMAX has plans to drill a borehole at this location to be used for an electrical power supply to our underground mine workings in the western lease area.

We turn to the next page in that exhibit, and I want to emphasize this came directly out of the "Miner's Bible." It's an exact copy. You'll see --

Q. One thing I'd like to point out, Mr. Muncy, this AMAX mine was a mine you were employed by; is that correct?

A. That is affirmative.

Q. And this sheet that you're just beginning to read from is listed on stationery, Marnel Pipe & Supply Company; is that correct?

A. [Nodded.] And after I left the direct employ of AMAX, that was my company in which --

Q. You were Marnel Pipe & Supply Company?

A. I was Marnel Pipe & Supply. And I can tell you that I was the one that sat down at the typewriter and typed the following five or six pages.

Q. All right. If you would continue on

with your testimony with respect to this exhibit.

A. Okay. The first two pages are the drilling samples as reported by the driller. And there was a time when this hole was being drilled where I was the driller. I was there. And I'd like to point out that, while I was employed by AMAX on a full-time basis, I surveyed -- taken off on the survey from the underground mine -- to where this borehole from the surface should intersect the mine.

So I tied the underground survey into where we wanted this hole to intersect this underground mine, and then I tied in the existing surface surveys that AMAX had on their books. And when we drilled this hole, we came within 18 to 20 inches in the underground mine of where we surveyed -- or where I surveyed that it would come.

I put an "X" on the back of the mine, the underground mine, with some black paint. I was on the surface when we drilled into the mine. And the general mine superintendent was down there. And he came out of the mine, and he had a big smile on his face, and he said,

"Nelson, we got within less than two feet of where you surveyed that this hole was supposed to fall in the mine."

Q. The point to be made there, Mr. Nelson, is that surveying techniques are sophisticated enough that you can tell where you are with respect to surface installations and underground installations. And I would take it that also the surveying techniques have improved since this occurred; is that correct?

A. That is correct. I'm a Registered Professional Land Surveyor in the state of Arizona. And we did it with the old ways, Girdens tables, logarithms. As you point out, they've got new, modern techniques and lasers, and they can be be more accurate today than I was allowed to be eleven or twelve years ago when this occurred.

Q. Okay. Continue on.

A. I think the thing that's disappointing about the last -- or about the statement in the introduction to the "Miner's Bible" is borne out by the last three pages. If you turn to the next-to-the-last page, "AMAX Electrical Hole Drilling Progress Continued," page 2 out of 3,

you'll see that on January 29, 1989, I show that we ran 404 feet of new 13-3/8 OD casing and cemented with 400 sacks Denton Cement Company. And then the notation says, "Did not circulate."

What's disturbing to me is the fact that this hole was drilled with a cable tool rig. I drilled the hole. The hole was dry. And I tried to explain to the folks at AMAX that if we wanted to circulate cement, certain things had to be done. And I was told that they weren't interested in those certain things, such as loading the hole with mud, fluid loss additives, fluid calipers, you name it, we went through the whole gamut.

AMAX told me that they just wanted to cement the well and get it over with: Order 400 sacks of cement, Class C, pump it down the hole.

And then the same thing happened, if you look on the last page, on February 13, 1981: Run cement. Did not circulate. Ready-Mixed the backside with 8 cubic yards of cement, Ready-Mix.

What's disturbing to me again is the fact that I was told I could have 350 sacks of cement, and it wasn't important that the cement

be circulated.

I think there's two points to be made here. As I said, the "Miner's Bible" deals in yellow journalism, and this is a prime example of it because they say that this is proof positive that the cement didn't circulate. They didn't want the cement to circulate. And it's my conviction that if we'd have done this under the rules of R-111-P, the cement would have circulated. There's no real problem here.

And when you look at the facts, when you look at the science, when you look at the engineering, and when you look at the geology, as I've been trained to do, there's a simple explanation for what happened, and it's not what is written in the "Miner's Bible".

Q. Then it is your professional opinion that the conclusion drawn at page 23 of the "Miner's Bible" is false?

A. Totally false.

Q. And the potash companies had had control of that particular casing program and cementing job?

A. And that's an exhibit of their failure in my opinion.

Q. Now, you've also had other experiences, Mr. Muncy, with plugging wells out in the potash area for potash companies, have you not?

A. Yes. As I stated previously, AMAX -- one of the reasons that AMAX felt that I could contribute was the fact that I did have oil and gas experience. And during that time period, they had a lot of oil and gas wells that were being drilled in their general mining area.

And if you look at Exhibit No. 37, this again is a BLM notice, US Geological Survey. What I'd like to point out about this exhibit is that this particular well, known as the C. E. La Rue and B. N. Muncy, Jr., Culbertson & Irwin, Federal No. 1, located 2310 feet from the north line and 990 feet from the east line in Section 13, Township 19 South, Range 29 East, which would put the well in the northern part of the AMAX mine workings, was an active well when I went to work for AMAX.

The well was marginal due to economics. It did produce oil, and it did produce gas. And the good people at AMAX asked me, they said, "Perhaps you know these folks that are the operators of this well. Perhaps you can

talk to them. And go talk to them and see if we can't pay -- if AMAX can't pay to plug that well. We know it's a marginal well, and maybe it would help them decide to plug that well if we'd offer to pay for it. We would want you to supervise the plugging of the wells. And we know that if we supervise the plugging of the well" -- and actually what we ended up doing was filling the hole full of cement -- then AMAX, and I concurred with them, felt that they could mine right up to this well.

So that's exactly what we did. I got ahold of the operator. And in March of 1980 through April 4 -- or March 26, 1980, through April 4, 1980 --

Q. Mr. Nelson, I notice that the name of the operator is La Rue and Muncy. There's a familial connection there, is there not, Mr. Muncy?

A. B. N. Muncy, Jr., is my father. And I've never had any business relationships with him, but that was how we knew that the well was probably marginal.

Q. That does speak, though, to the history in your experience. You grew up in an oil

family; is that correct?

A. That is correct. And when I graduated from Artesia High School, I went to college and got a degree in business administration. And then I got a degree in mining engineering. And I worked in the mines, as I previously testified. And it was based upon that mining experience and that oil and gas experience that AMAX hired me, and they relied upon my expertise.

Q. All right. If you would continue on with what did you with respect to the plugging of this well.

A. Okay. Basically what we're going to see in this exhibit is how the well was plugged. And what we did is we cut the ace casing off. It was 4-1/2 inch casing below the AMAX mining zone, 1120 to 1169 feet, pulled the casing. And then I filled the hole full of cement. And then I felt confident and I feel confident today that you can mine right up to this well.

The company that I'm employed by, MYCO, has several active oil and gas wells near the AMAX mine. I see a lot of those folks there from time to time. They're still my friends. I go to some of the local meetings that they have there

in Carlsbad. And I brought this particular well up a month or two ago with some of the folks out at AMAX. And they tell me that they have plans this year --

MR. HIGH: Excuse me. I'm going to object. We're getting into rank hearsay now. I don't know who he's referring to or what. These are random conversations, and I object to it as hearsay.

CHAIRMAN LeMAY: We'll accept it and grade it accordingly, counsel.

THE WITNESS: I'll restate that a little bit. I felt that back when this well was plugged we could mine right up to it. In conversations that I've had with the mining engineering group at AMAX, they tell me that they're going to mine within 100 feet of it this year. It's in their mining plans.

Q. (BY MR. CARROLL) Now, Mr. Muncy, AMAX, or the principals of AMAX at the time this plugging operation was going on, did they participate with you in the design of the plugging operation and the cementing program for that?

A. They definitely did, and they concurred

100 percent. And their signature is on -- pardon me. I didn't mean to say that.

Q. But you were their employee and this was plugged under their supervision and according to the ultimate design that they were --

A. Yes. And AMAX paid the bill.

Q. Now, Mr. Muncy, you have prepared a third map, have you not, as an exhibit; that would be Exhibit 38?

A. Yes. My final exhibit is Exhibit No. 38.

Q. This is basically the same. It's actually an area taken from this larger map here on the right; is that correct?

A. That is correct. We just asked the computer to print a portion of the map that you see before you. But if you'd put it on the same scale, you could paste it right back on that map on the right-hand side, and it would fit exactly.

MR. HIGH: Excuse me, Mr. Chairman. This document contains what we consider to be confidential information. I don't know how far counsel plans get into it, but if he wants to show the map or display it on the wall or ask questions concerning the LMR, then we would ask

that that information be treated as confidential.

MR. CARROLL: Mr. LeMay, let me explain just so that you're fully aware where this information came from. This particular exhibit does have on it one additional piece of information. That information does concern the LMR but this came from public records.

If you will recall, Order R-111-P contains in it at -- I think it's right at the very last of it. I'm not sure. I-2, it says, "Mine Surveys." And this is under the heading, "Filing of well surveys, mine surveys, and potash development plans." It's on page 12 of the order.

It says, "Within 30 days after the adoption of this order and thereafter on or before January 31 of each year, each potash operator shall furnish to the Division two copies of a plat of a survey of the location of his leaseholdings and all of his mine workings, which plat shall be available for public inspection and on a scale acceptable to the Division."

I will represent to you that Mr. Muncy and Mr. Hutchinson went to the OCD and requested to see the public records there with respect to

the open mine workings. And they viewed all of that, and Mr. Muncy has told you that's how he gained the current mine workings.

New Mexico Potash was the only mine that did this, but with respect to their open mine workings, they included on each one of their update plats over a period of years, because there's more than one, they included their LMR on that plat. So it was available to us, not only what their LMR was prior to 1/1 of 92 but what it was after 1/1 of 92. That's the information. That's public.

Now, my position is confidentiality has been waived by the acts of New Mexico Potash. I do not intend to have this map stuck on the wall. The only people that have copies of it are -- the reporter will have a copy and the three of you and, of course, Mr. High and Mr. Muncy will testify to it.

I'm not sure if Mr. High wants to -- I'm not objecting -- I'm not trying to publish this material to all the public. I don't know that it's necessary to clear the room because my questions, I don't think, are going to detail the actual location of it. And it's more to describe

the exhibit and let the Commissioners draw their own conclusions.

So with that statement I'm not trying to oppose Mr. High in projecting it. I do take the position it's not public -- I mean, not confidential anymore because they've waived it. But I'm willing to work with him and whatever you, as Commissioners, tell me what to do. And I just seek that guidance with that history.

CHAIRMAN LeMAY: Since it was in our files, do you have a comment on that, Mr. High?

MR. HIGH: I do, Mr. LeMay. A copy of the LMR map was sent to your office, and it was disclosed by your office to Yates notwithstanding the requirements of R-111-P that that document be kept confidential.

CHAIRMAN LeMAY: Well, if they included it in what would be public record --

MR. HIGH: I don't know what records you put it in. As soon as I found out what had happened this morning, we sent someone to your office and asked for the open file. And, sure enough, the map that is in that open file is the LMR map, just like Mr. Carroll explained, because the LMR map that we filed is the one that has our

mine workings on it and we draw our LMR on it.

And that copy was sent to your office and was disclosed through your office. I'm not saying intentionally, don't misunderstand me. I'm just telling you how the events happened.

CHAIRMAN LeMAY: Well, do you have a preference on how we approach this thing?

MR. HIGH: My only preference is, I don't think there's any provision for waiver. The R-111-P is very specific with respect to the confidentiality of this information. All we're saying is we don't want it made public information.

And if Mr. Carroll is not going to get very specific about it, I don't have a problem with everyone staying. I just don't want this map to get out to the public.

CHAIRMAN LeMAY: Well, then if we continue on where he asks general questions without detailing any of the confidential nature of it, would that be acceptable to you? If we're getting into anything confidential, you could stand and raise an objection to it?

MR. HIGH: That would be perfectly fine with me.

CHAIRMAN LeMAY: Let's continue on with those guidelines.

MR. STOVALL: Mr. Chairman, to clarify the point, this exhibit is a confidential exhibit in this hearing and will not be part of the public record of this hearing.

MR. HIGH: We're asking that it be treated that way, yes.

CHAIRMAN LeMAY: I think we can accommodate that.

MR. HIGH: Thank you.

Q. (BY MR. CARROLL) Okay. Mr. Muncy, again, I had made some certain representations with respect to this map to the Commissioners, and this is Exhibit No. 38. I would like the record to reflect your interpretation rather than mine. So again could you describe what 38 is? And this map is different from the earlier maps, and if you would tell how it differs and how you arrived at that information.

A. Okay. As I stated previously, back in the second or third week of April of this year, as we previously heard, I went to the Public Record section of the NMOCD in this office. And I found, as I have previously talked about,

potash lease maps and updated mine workings for four mines. Narranda, Western Ag Minerals, and Mississippi Chemical had nothing in the file.

As we've previously heard, New Mexico Potash, the plat that was turned in with the open mine workings, had the LMR on it. And I'd like to emphasize that I also had treated this as confidential, and it's not my intention to harm anyone or let this information out because I used to make similar maps for AMAX when I worked for them. So I well appreciate what we're talking about here.

What I did is I made sketches and notes of the LMR. And if you'll look on the map and in the legend, it says, "New Mexico Potash LMRs 1/7/92." And that would be the broad red line on the map, and the map is exactly the same as the map on the wall, the previous exhibit with the exception of the New Mexico Potash LMR.

Q. Now, the LMR line then is the dark red line that we see here. And it has little lines running perpendicular out from it, the main baseline; is that correct?

A. Yes. And if you just take an example, kind of in the bottom middle portion of the map,

you see 22 and 23 and 27 and 26. And you see an oblong eclipsed looking barren zone in there. And I think that the little arrows point to the outside. And what they're trying to say is that area as well as other areas that are depicted in the same fashion is barren.

Q. All right. So you were then just addressing the purpose of these little -- short little hash marks, and they are an indicator to you, as a mining engineer?

A. That is correct.

Q. All right. So the side of the line that has the little hash marks, everything within that would you consider to be the life of mine reserves, in your opinion?

A. In my interpretation of the legend, which I viewed on the specific map in question, yes.

Q. All right. Let's talk about our Section 2 that we're concerned with here with the four -- where the four well applications are being made. Based on what you have just described, Section 2 then falls within New Mexico Potash's LMR?

A. The way I read the map, there's no

question about it, it does fall -- Section 2 does fall within their LMR. And it extends and spills over into Section 10 and Section 11 below and to the left.

Q. The yellow that is now on this particular Exhibit 38, what does that depict, the yellow coloring?

A. The yellow coloring is the acreage which Mr. Patterson described in his testimony yesterday that's of question in this hearing today in Section 2.

Q. That is the two -- that yellow area comprises the two leases, which we have heard earlier testimony, upon which the four wells will be drilled?

A. That is my understanding, and I can guarantee you that is correct.

Q. Okay. Now, that coloration is not on your legend. This was just some additional information that we put on there to help acquaint the Commissioners with the area of concern?

A. That is correct. It is not on the legend.

Q. Now, we've also heard testimony, Mr. Muncy, concerning the acquisition by Yates

Petroleum and Pogo of certain potash leases last month at a federal potash sale.

A. Yes. I attended that sale. It was in Carlsbad at the Hotel Stevens. And without divulging any confidential information about the New Mexico Potash LMR, as I've previously stated, part of Section 10 and part of Section 11 are depicted in their LMRs.

And when I attended that sale and Yates and Pogo bought 5280 acres, which is depicted in red on the map here -- and it's also not on the legend; we added that after we made the map. The red shows the Yates-Pogo potash lease that was purchased at the sale, 5280 acres more or less. It's easy to see that what Yates and Pogo bought is in the New Mexico Potash LMR as far as 10 and 11 is concerned.

And I attended that sale, and I'm here to tell you that New Mexico Potash did not bid on that lease. And I didn't notice anyone that I recognized from New Mexico Potash at that sale. They may well have been there, but they certainly did not bid on the lease.

Q. Now, Mr. Muncy, again this red coloration is not something that is on your

legend, but it was something that we did to help acquaint the Commissioners with the relationship of this newly acquired lease with respect to the questioned area of the drilling permits and also the location of the LMR?

A. That is correct.

Q. And this LMR, your information was as of 1/7/92; is that correct?

A. The letter that transmitted the LMR and file which I read was, if I recall, dated the 14th of January, and the LMR was dated 1/7/92.

Q. On the date of 1/7/92, the acreage that is depicted in red was unleased; is that correct?

A. That is correct.

Q. And now Yates Petroleum and Pogo have bought that lease, and a lease is pending as of this date?

A. That is my understanding based on Mr. Patterson's testimony.

Q. Now, Mr. Muncy, I just have one copy of this. You have the black potash exhibits, do you not?

A. Yes, I do.

Q. I'd ask you to turn to their Exhibit 12.

A. I have found that exhibit, and I have it before me.

Q. You have reviewed that letter, have you not?

A. Yes, I have.

Q. What is the date of that letter?

A. The date of the letter is the 27th day of December 1991.

Q. Ten days prior to the date of this LMR; is that correct, of 1/7/92?

A. That is correct.

Q. Or maybe it's eleven days?

A. Ten days, more or less. How's that?

Q. Ten days more or less, all right. This letter is on IMC Fertilizer stationery, is it not?

A. The copy that I have has the IMC logo and doesn't give the address or the phone number, but I would have to assume, unless shown different, that that is correct.

Q. The letter is addressed to whom?

A. The letter is addressed to New Mexico Corporation in care of Mr. Walt Case.

Q. You are familiar with and know Mr. Case, do you not?

A. Yes. He is sitting in this room at this time to the left of Mr. High.

Q. And the letter is signed by Dan Morehouse; is that correct?

A. That is correct.

Q. You also know Mr. Morehouse, do you not?

A. I know of Mr. Morehouse, but I do not know him personally.

Q. You are aware that he is presently the mine manager or mine engineer for IMC?

A. I can't tell you his exact position, but I do know that at this particular time I understood that he was employed by IMC.

Q. What is your understanding of the contents of this letter, Mr. Muncy?

A. Well, it's got a magic word in there. It's got the word "assignment." And that tells me that this Section 2, which is the subject of this letter, Township 22 South, Range 31 East, New Mexico State Potassium Lease M-14957 has been conveyed.

Q. Mr. Muncy, when you went up and viewed the open working mine plats of New Mexico Potash, there were earlier plats also in that file, were

there not?

A. There were earlier plats in the file, yes.

Q. And those earlier plats also depicted the LMR designation?

A. That's correct.

Q. The plat that was in effect for the time period that would have covered December 27, 1991, did it include Section 2 within their LMR?

A. I'd like to leave the answer to that question to Gary Hutchinson because he looked at that more than I did. And I want to be able to be a reliable witness and tell you exactly what I know. I think he looked at that in depth and would be better able to answer that question.

Q. But, at least from that information, one could determine whether or not Section 2 was included in an LMR as of December 27, 1991?

A. That is correct.

Q. And it's just your recollection fails you right now as to that?

A. I want to be perfectly candid.

Q. All right. Mr. Muncy, during the period of time that you were working in conjunction with the potash industry, I believe

you told me you cored something like 20 coreholes for companies, and you plugged a number of wells out there; is that correct?

A. That's correct.

Q. During any of that period of time, did you ever see or encounter problems caused by subsidence in the basin, in that basin in that area?

A. With respect to --

Q. Oil and gas wells.

A. -- oil and gas wells, I did not.

Q. With respect to the ones that you plugged, are you aware of any problems with subsidence that has occurred either then or up to the present?

A. None whatsoever.

Q. I would ask to you turn back to your Exhibit 35. I want to make something just real clear here for the record. This was in your exhibit from the SME Mining Engineering Handbook, that is 35. You read what the SME thought the groupings were, measured ore, indicated ore -- what the criteria was. And you rendered the opinion that you didn't feel that the BLM's criteria matched this.

That statement and that interpretation is actually contained and your representations about that is actually contained in the paragraph just above where it starts the detailing of measured ore, indicated ore, et cetera; is that correct?

A. That's correct.

Q. And so basically that interpretation was a reiteration of what has been published by the Society of Mining Engineers?

A. Yes. And that's why I chose to copy so many pages so that people could read it and see what was there.

Q. So it wouldn't be taken out of context?

A. I didn't want to do that.

MR. CARROLL: All right. Chairman LeMay, I would move at this time admission of Mr. Muncy's Exhibits 28 through 38. And I would also move admission of the Potash Company's Exhibit No. 12.

CHAIRMAN LeMAY: Without objection those exhibits will be admitted into the record with the stipulation that Exhibit No. 38 will be kept as a confidential document.

MR. CARROLL: I'll pass the witness at

this time.

CHAIRMAN LeMAY: Are you all through?

MR. CARROLL: Yes, sir, I am.

CHAIRMAN LeMAY: Let's take about a 15-minute break and come back for cross-examination.

[A recess was taken.]

CHAIRMAN LeMAY: Just some little housekeeping measures.

[A discussion was held off the record.]

CHAIRMAN LeMAY: Mr. High, your witness.

MR. HIGH: Thank you, Mr. LeMay.

CROSS-EXAMINATION

BY MR. HIGH:

Q. Mr. Muncy, are you claiming to have any special expertise with respect to potash mining, or would you characterize your experience in that area as limited?

A. It's definitely not limited.

Q. It's not limited?

A. Definitely not limited.

Q. How much experience do you have with respect to underground mining, to start with?

A. I spent part of the time -- do you want

to go down my resume here?

Q. I'm just asking you, how many years do you have --

A. At least five years.

Q. Pardon me?

A. At least five of the nine, probably six.

Q. And those five or six years of underground mining would have been spent with what types of mines?

A. Porphyry copper deposits.

Q. That's in an underground mine?

A. Uh-huh.

Q. Okay.

A. Chrysotile mining in Gila County, Arizona, and the potash mines in the Carlsbad Basin.

Q. So out of that five or six years of underground mining, the amount of time underground in a potash mine would have been how long?

A. Well, that's subtracting from the nine to get five or six, sir. I'm the type of person that I'm going to get down there, and I'm going to find out what's going on. And that's what

happened when I worked for AMAX. I spent a lot of time underground.

Q. My question is: How long did you spend with AMAX?

A. In excess of one year.

Q. Other than in excess of one year, do you have any experience being employed by any potash mine in the basin?

A. Absolutely not.

Q. So the total limit of your employment by an underground potash mine is this roughly one year by AMAX?

A. That is correct.

Q. And you said that you were hired, at least in part, I think you said because of your oil and gas knowledge and experience; is that correct?

A. That is correct.

Q. I take it then at the time you were hired, AMAX had some concern over the oil and gas wells in and around its mine?

A. AMAX noted that there were some oil and gas wells being drilled in the area. I don't know what you mean or want to define by the word "concern."

Q. Well, do you think if they were in fact looking for someone to work for them that had oil and gas knowledge, that they wanted to take advantage of that knowledge?

A. I think that fact that I had oil and gas knowledge was just part of the package that I had to offer. I had mining experience as well.

Q. I understand that. But your testimony a minute ago was that AMAX hired you because of your experience in oil and gas; that's what I understood you said earlier?

A. Maybe that was a misnomer. That was just part of the reason that they hired me is because I did have experience in oil and gas.

Q. Okay.

A. I spoke both languages, I believe, is the way I worded it.

Q. And if AMAX hired you because of your oil and gas experience, would you assume that they had some reason for wanting someone with oil and gas experience?

A. I think it would have been of benefit to them. But to make an assumption, I'm not in a position to do that.

Q. All right. They weren't -- AMAX was

not operating any oil and gas wells out in this potash mining area, were they?

A. At that particular time I don't think so, but since then they have.

Q. So the only connection that AMAX would have had with an oil and gas well at the time you went to work for them is with respect to the oil and gas wells on the mining property?

A. On, near the mining property.

Q. Your definition of ore -- by the way which we have no problem with -- out of the SME Handbook, is really getting ore at a profit. That's the definition you used; correct?

A. Present day.

Q. Right.

A. Yes.

Q. So anytime you used the word "ore," implicit in the use of that word is that you can take it out of the ground at a profit?

A. The connotation is so implied.

Q. And New Mexico Potash, as far as you know, has been mining in the potash basin for a long time; right?

A. They took over from Kerr-McGee.

Q. And they're still mining today, as far

as you know; right?

A. I know they are.

Q. Paying the light bills, paying employees, and plugging right along?

A. I have no information from which to speak.

Q. Do you have any reason to believe that they are not operating at a profit?

A. I have no reason either way to render an opinion.

Q. So you don't know if they're making money or losing money or anything about it?

A. I've never investigated that.

Q. How about AMAX? Was AMAX operating at a profit when you were there?

A. They sold the mine to Horizon for $3 million, so I have to assume for some reason they got rid of it.

Q. Do you know whether or not AMAX was mining the ore at a profit?

A. I wasn't privy to the books.

Q. Now, on your Exhibit No. 30, the computer-generated map -- I'm sorry. Let's go to 31 first, and I'll come back to 30. 31, that's the one that has the different orange shades,

different shades of orange, I believe, the large one over here?

A. Yes, sir. That would be the one on the far right.

Q. I understand you updated the mine workings from the 1984 BLM map?

A. To the best of my ability, based upon public information.

Q. Okay. And the point I'm getting at is I'm just trying to understand how your Exhibit No. 31 differs from the 1984 BLM map. The mine workings would be different; right?

A. That's one way that it differs.

Q. Are there other ways it differs from the 1948 BLM map?

A. Yes. We put the well spots on there, which we got from PI commercial data base, effective 4/30/92. And the legends for those wells are in the map legend on the bottom left-hand corner.

Q. How many wells did you put on here?

A. How many wells did I put on there?

Q. Yes, sir. This is on 31. Is this all the oil and gas wells in and around the KPA?

A. That is every oil and gas well that was

in the PI data base as of 4/30/92.

Q. Okay. And, of course, the 1984 BLM map doesn't have oil and gas wells on it, period; correct?

A. No, sir. That was one reason for making this map.

Q. Okay. Is the ore, as shown by your legend on Exhibit No. 31, different from the ore shown on the 1984 BLM map?

A. The nomenclature is the same, but as far as the symbols and colors go, they're not exactly the same. I've got a copy of that 84 map right here.

Q. Well, what I'm getting at, Mr. Muncy, is did you change any of the areas on this Exhibit 31 from blue to green, green to blue, red to -- anything like that from the 1984 BLM map?

A. No, sir. Absolutely not. It was digitized via computer means. And, to the best of my ability, because I did it, we copied the 84 map. And there was no reason to change anything.

Q. Okay. And you and I both know that that 1984 BLM map is woefully out of date?

A. It's the best that we have.

Q. But we know that there's data that's

become available since 1984 that has and will change some of the indications on the BLM map from one color to another one; you know that, don't you?

A. I don't really know that, because when I talked to the folks at the BLM and asked them those questions that you're asking me, all I hear is they're out of money and they don't have time to worry about it. That's why I made the map.

Q. Now, you testified, Mr. Muncy, that the BLM does some things that you don't really like?

A. Pardon me?

Q. You don't agree with some of the things the BLM does, do you?

A. I don't agree with some of the things that a lot of people do, and I think that's kind of an open-ended question.

Q. Well, you didn't testify about anybody else other than the BLM this morning, did you?

A. I hope I did.

Q. Let's narrow it down to BLM. You don't think they correctly applied mining standards in the known potash area, do you?

A. It's my personal opinion that they don't.

Q. And I understand you gave an example this morning that the BLM used ore on one -- on the first ore zone, combined it with ore on the third ore zone, to get 4 feet of 10 percent to make the map blue; did you say that this morning?

A. That's what I said. I get the example of 2 feet here and 2 feet there, 30 feet apart, they combine it and call it 4 feet.

Q. Is it your testimony that that's the procedure the BLM follows?

A. It's my understanding that that is part of the procedure that they follow.

Q. All right. Of course, you've never worked for the BLM, have you?

A. No, sir, I have not.

Q. Let's look at your Exhibit No. --

A. 32?

Q. Copy of the BLM map. I misplaced my copy here. Do you have Exhibit No. 32 in front of you, Mr. Muncy?

A. Page 2?

Q. That is simply a photocopy of the 1984 BLM map?

A. That is correct.

Q. All right. Look on the second page of

that document, if you would please, sir, top right-hand corner. You referred to this earlier in your testimony where it says -- the little blocks that are shaded -- the first one says, "Measured Potash Reserves." If you look at the last sentence with respect to measured ore, Mr. Muncy, it says, "A minimum of three data points in any one ore zone meeting quality and thickness standards no more than one-and-a-half miles apart have been used to delineate measured reserves."

Now, that's contrary to what you testified this morning that the BLM does; right?

A. It's my opinion that they don't follow that.

Q. But you will agree that, at least on Exhibit No. 32, the BLM procedure for determining measured ore is that there has to be sufficient thickness and quality on one horizon to make it blue on the BLM map?

A. That's correct.

Q. And that you cannot combine two ore horizons, like you said this morning, according to what's on Exhibit No. 32?

A. I'll agree with that, yes.

Q. Thank you. Now, you also referred to

an exhibit out of the SME Handbook, Exhibit No. 33. And you talked about exploration on centers of -- what was it?

A. One mile centers for exploration and ore reserves can be blocked out on four holes per section.

Q. Okay. Did you follow that when you were with AMAX?

A. We did a little better than that. We got closer to five.

Q. And how many areas did you put five coreholes down in one section?

A. Before this hearing -- and I think we've got later testimony that pointed out exactly -- I counted the coreholes that fell over the horizon, or if you want to call it the AMAX mine in the upper left-hand portion of the map, just the coreholes that fell over the first or second mined area, and I recall that I got somewhere between four and five coreholes.

And when I cored, I cored for AMAX some twenty holes looking for the third ore zone, as I previously testified. And we felt comfortable when we would get greater than four holes per section.

Q. Is it your testimony here as an expert that that standard is followed in the potash basin?

A. For two reasons.

Q. Well, what's the answer first?

A. Could you ask --

Q. Is it your testimony that that standard of four holes per section is followed in the potash basin?

A. I think that in a lot of cases they exceed that.

Q. Okay. And that's based --

A. Also it depends on -- we're talking about with the AMAX mine, we're talking about sylvite. And I think when you get into the langbeinite, you'll find they need more holes.

Q. Would you agree with me that the number of coreholes that you drilled and the spacing between those depends upon the purpose you're tying to achieve?

A. When you're talking about the banker, you're trying to make certain.

Q. Would you agree with me that the number of coreholes you drilled and the spacing depends upon the purpose you're trying to achieve?

A. Which could be a multitude of purposes, yes, I agree.

Q. If you wanted to know absolutely positively overnight that ore is out there, you'd drill more coreholes than you would if the purpose were something else?

A. That's a fair statement.

Q. And if you wanted to know whether or not there was a possibility of ore being out there, you'd drill less holes than you would if you were trying to make absolutely, positively sure there was ore out there?

A. Yes. And I think that's what this exhibit says.

Q. And from coreholes you can get trends; correct?

A. You can't predict salt horse in an evaporite deposit like potash, so I don't know that I entirely agree with that statement.

Q. And a salt horse is simply an occurring group of salts in the potash basin; right?

A. Yes.

Q. Do you know of any ore horses in the basin?

A. I think that's every miner's dream, but

I don't know of any.

Q. There are salt horses in the basin but not ore horses; right? Would you agree with that?

A. I can only speak to the fact that I am knowledgeable that there are salt horses in the basin.

Q. Do you know how long the BLM has followed the standards set out in the exhibit you referred to this morning?

A. That would be Exhibit 32?

Q. Yes. Three coreholes on any one horizon spaced on a mile-and-a-half apart?

A. I'm only familiar with the legend on the 84 map.

Q. So is the answer to my question no, you're not familiar with how long they've been following it?

A. Not to the exact number of years, no.

Q. Do you know whether or not it's more than ten years?

A. No, sir, I don't.

Q. You just don't have any idea how long they've been following it?

A. No, sir.

Q. Now, you also said that it was your opinion that there was a problem because the uninitiated equates BLM standards with proven reserves. And again I don't know if "uninitiated" was your word or Mr. Carroll's. And I don't want to put words in your mouth.

Do you see a difference between the measured reserves used under the BLM standards and the proven reserves that you talked about here this morning?

A. I think that this 84 map is a leasing criteria map and that was the thought that I've tried to convey with my statement.

Q. Let me refer you to page 2 of Exhibit No. 35 under the section that you implied earlier this morning, 32.2.4. Go down to the bold paragraph that says, "Ore Reserve Classifications," and then drop down to the second paragraph that starts on the left-hand margin that starts with, "The classification," do you see that?

A. Yes.

Q. I'll quote here, "The classifications used by the Geological Survey and the Bureau of Mines are summarized in the material which

follows." Now, is that the "measured," "indicated," and "inferred" that you talked about?

A. Well, it goes on to say that, "The SEC also used" --

Q. I understand that, and I'll get to that in a minute, Mr. Muncy. But my question to you is, is the classification used by the USGS and the Bureau of Mines, the measured and indicated, and it's also used by the BLM, or do you know?

A. I think what I'm trying to say -- I'll go slow. On the map on the legend, Exhibit No. 32, they use the words, measured, indicated, and inferred.

And I think what 32.2.4 is saying is that, if they're going to use those words, they need to talk about ore, which is commercial, and it's really proven, probable, and possible. And I think it's the loose misinterpretation that I've addressed.

Q. Well, immediately following the paragraph we're talking about -- and I would beat this to death -- it's talking about the measured ore and indicated and inferred ore, just like the BLM; right?

A. That's right.

Q. The paragraph goes on to say that, "The Securities & Exchange Commission also uses classifications of proven ore and probable ore in its work to interpretation of ore reserve appraisals and stock market listings of mineral deposits."

And then the last sentence says that their respective meanings are the essential equivalents of measured ore and indicated ore as such designations are employed by the Bureau and the geological survey. So there's some similarities between measured ore and proven ore?

A. Yes. It's the interpretation which I take issue with.

Q. And you don't think the BLM interprets it correctly. I guess that's the problem you have with it?

A. Yes.

Q. R-111-P doesn't say anything about proven ore deposits, does it?

A. I'd like to refrain from answering that question.

Q. Is the answer that you don't know?

A. Yes.

Q. As you sit there today, do you know the standard to be used for designating LMR under R-111-P?

A. Yes, I do.

Q. What standard is that?

A. I think to quote you, it's ore that's being mined today in the basin.

Q. Does it have to be proven?

A. With respect to someone's opinion or R-111-P?

Q. According to R-111-P, which we have to go by here today.

A. I think it does.

Q. Does Section 2 contain commercial potash? Does Section 2 contain commercial potash ore? Or do you know?

A. The Section 2 that we drew --

Q. That's in issue in this case.

A. Yes.

Q. Does it contain commercial potash ore? Or do you know?

A. In order to answer that question, we're going to have to talk about whether you've got a mine or you're going to have to put a mine in there and who's going to mine it. And I think

that's what I talked about in my testimony.

Q. My question is, does Section 2 contain commercial potash ore?

A. I don't think that all of it does.

Q. Are you familiar with corehole 162?

A. Yes, I am.

Q. Does it indicate the presence of ore that New Mexico Potash can mine?

A. That specific hole, 1 inch around the wellbore, I would agree with you, it does.

Q. So if you limited yourself to the results of corehole 162, that shows ore that New Mexico Potash can mine?

A. In the tenth ore zone.

Q. Yes, in the tenth ore zone.

A. Yes, I agree with that just with respect to that corehole.

Q. Okay. And how much influence do you give a corehole in determining what ore is out there?

A. I think we just talked about the fact that if we're going to explore, we can do it on a mile. And if we're going to delineate the ore reserve, minability, we're going to have to talk about four or five coreholes per section.

Q. Well, if you wanted to interpret the ore out in and around corehole 162, you would give some credence to the measurement already out of 162 for a certain distance, wouldn't you?

A. We would have to view 162 in relationship to the other coreholes in the area, and we've got to later witness which is exactly going to do that.

Q. And my question is direct to you, Mr. Muncy, do you know what distance that you generally apply in the potash basin for interpreting coreholes? How far out do you interpret that data, if you know?

A. I guess I'm a little lost with your question. And I'm not doing this on purpose; I'm trying to cooperate with you.

Q. Let me ask it again. You testified that you drilled some coreholes at AMAX; right?

A. We were looking for the third ore zone, that's right.

Q. You drill the hole and you get the data back; right?

A. That's right.

Q. Now, in a potash like you find, in a deposit like you find in a potash basin, you

don't have to drill coreholes as close together as you would, for example, if you're looking for gold, do you? Or do you know?

A. I exactly know because I've core drilled for gold also.

Q. Okay. So the coreholes don't have to be as close together when you're looking for potash, do they?

A. Well, to me, that's kind of open-ended. I think you're going to have to have at least four coreholes per section.

Q. I'm not asking you that. My question is very simple and straightforward: Do you have to have as many coreholes when you're looking for potash as you do for gold, in your opinion?

A. It depends on where you're looking for the gold.

Q. Do gold and potash occur in the same type deposits? Are they both laid down the same?

A. No, sir.

Q. Potash is an evaporative; right?

A. It's an evaporite deposit as a result of the rhythm of the Permian Seas.

Q. And you expect to find it across a wide section of the potash basin, don't you?

A. More so in Canada where the deposits are 50-feet thick than here in the basin where it's just a few feet thick.

Q. You expect to find it across a wide area in the potash basin, don't you?

A. I would hope to expect to find it in a wide area.

Q. Now, the same is not true for gold, is it?

A. It depends upon the deposit, whether we're talking about placer gold where you've got a big giant river over a wide area.

Q. Do you know how far out the BLM will interpret corehole data?

A. The only guidance that I have is this 84 map here. And they talk about three data points in any one zone, mile-and-a-half.

Q. Which would mean for each of the coreholes in that three data points, the BLM is extending that data out for what length of distance?

A. Well, I don't think they extend it out in that fashion because they use the polygon method and they take half the influence to the next hole.

Q. Okay. Then let's talk about the polygon method. When you use the polygon method, how much distance do you give the results of one corehole?

A. Okay. Assuming that they're exactly a mile-and-a-half apart?

Q. Yes.

A. I would hope that what I'm reading here and what they tell me is they divide by 2.

Q. Okay. A mile-and-a-half divided by 2 is what?

A. 5280 times .5 divided about 2.

Q. Okay. If we use that same standard in Section 2, if we took corehole 162, which you said by itself showed potash that New Mexico Potash could mine, and we gave the same influence to that hole that the BLM would, in other words, extend that corehole data out three-quarters of a mile -- do you understand me?

A. Uh-huh.

Q. -- it would cover up almost all of Section 2, wouldn't it?

A. But according to what we just talked about --

Q. Wouldn't it?

A. -- the polygon method, you've got to look at the other holes.

Q. Wouldn't it? If you used the BLM method, three-quarters of a mile, and extend out from corehole 162, it would cover almost the entire section, wouldn't it, Mr. Muncy?

A. If you extend it out from the corehole -- I'm not going to use the words "BLM method."

Q. Okay.

A. -- it would. But you've got to take the influence of the other holes.

Q. If you extend it out one-half mile from corehole 162, it would take in almost all of Section 162, wouldn't it?

A. You mean Section 2? Yes.

Q. I'm sorry. Did I say -- yes. If you took corehole 162 in Section 2 and simply gave it a half-mile influence, gave that corehole data a half-mile influence, you're going to cover up almost all of Section 2, aren't you?

A. If someone chose to do that, yes.

Q. Do you think the corehole data in 162 is entitled to some influence away from where the hole went into the ground?

A. And that influence is dependent upon

other coreholes in the polygon method.

Q. Now, let's look at your Exhibit No. 37, Mr. Muncy. Do you have that in front of you?

A. Yes, sir, I do.

Q. You say this well is in the northern part of AMAX, this property, when you were there?

A. Section 13, Township 19 South, Range 30 East. How about the right-hand side of it to the west.

Q. I beg your pardon?

A. Sir?

Q. I didn't hear what you just said.

A. Well, you asked me if I said it was in the northern part. If you look at that map, it's more on the right-hand side. I'm not going to quibble about that.

Q. I'm not quibbling either. I'm just confirming where it's located. And this is a well that you were involved in plugging, as I understand it?

A. I was asked by AMAX to make the arrangements with the oil and gas operator to plug the well.

Q. Is it the implication of your testimony, Mr. Muncy, that what happened here --

it may be what you're actually saying -- that this well, what happened to this well supports what you guys want to do down in Section 2 in the Delaware?

A. I think what it supports is the very simple fact that AMAX concurred, and I concur today, it's my professional opinion that if you plug a well in the similar fashion, you can mine right up to it and there's not going to be any problem. We filled this wellbore full of cement.

Q. Let's talk about this for a few minutes because we're going to disagree about it.

A. Okay.

Q. So let's find our areas of disagreement here. What's the total depth of the well shown in Exhibit No. 37?

A. 2273 feet.

Q. And what would you expect the bottomhole pressure in that well to be, Mr. Muncy?

A. This was a Grayburg well, and it had to be pumped. And I didn't do a P Star or a Horner Plot or anything like that on it, and I don't think anybody else did, but merely a few hundred pounds.

Q. But drawing up on your oil and gas expertise, would you say that a few hundred pounds is a pretty good shot at it, a pretty good guess at it?

A. For this specific well --

Q. Yes, sir.

A. -- in the Grayburg? I can't be exact on that because, like I say, I made no measurements.

Q. I'm just looking for your professional opinion.

A. The well had to be pumped; it didn't flow.

Q. Now, when this well -- I notice it was shut-in at one time. When this well was shut-in, what would you expect the drill casing pressure to be at the surface?

A. You mean the production casing strength to surface?

Q. If it's shut-in, if the well were shut-in, what would you expect the pressure inside that well casing to build up to, if anything?

A. We normally, I think, refer to that SITP, shut-in tubing pressure, or SICP, shut-in

casing pressure. And I don't remember the exact reading that was on this well. I don't know that it was ever recorded.

But that's kind of an erroneous number because if the fluid is full of water, the hydrostatic pressure can reduce it. It depends upon the day you look at it. There's a lot of variables, so I don't think it was very much.

Q. Be more than a few hundred pounds?

A. I'm just not in a position to testify to that because I just have no specific knowledge about that.

Q. Do you think that's something that would be pretty important for people to want to know?

A. I think that -- I was employed by AMAX, and if they'd been interested in it or if I had thought it was important at the time, we would have recorded it. But I really think -- you know, I'm trying to be honest with you -- I think it was negligible.

Q. I'm trying to be honest with you, Mr. Muncy. I'm asking you questions here because we are interested in these things. Do you know or do you think the bottomhole pressure in the

Delaware in Section 2 is something we ought to be interested in, the potash people?

A. The answer to that question is yes.

Q. And do you know the bottomhole pressure is over in the Delaware in and around the depths you'd find it in Section 2?

A. I haven't been privy to any of the specific Horner plots that have been run, so I can't tell you what the extrapolated bottomhole pressure is.

Q. Well, let's draw upon your oil and gas expertise, and let me ask you your opinion as to what you believe the bottomhole pressure would be in the Delaware which occurs at the depths you'd find in Section 2?

A. Much less than you would find in a Morrow well of a greater depth, say 14,000 feet.

Q. All right. And let's see if we can't hang some numbers on it.

A. I'd rather not do that because I'm not in a position to do that. And I just don't have that information.

Q. Can you give me a range?

A. I'd rather not do that because I just don't have that information. If you'd give me

five minutes, I could look here. But I just can't hang a number on that, and I don't think it would be fair if I did.

Q. Would you expect it would be more than 4,000 PSI?

A. Again the same answer applies.

Q. Do I take it you wouldn't have any earthly idea of what the pressure would be inside the well casing in one of these Delaware wells that you guys are opposing if it were shut-in, do you?

A. The pressure at the surface? Is that what you're --

Q. Yes, sir.

A. I'd rather stay away from that answer.

Q. All right. Would you agree with me that the bottomhole pressure and the pressure of a shut-in well in the Delaware would be higher than the well shown in your Exhibit No. 37?

A. Yes. And the reason for that is this well is less than 3,000 feet deep, and we're talking about 7- or 8,000 feet for the Delaware wells.

Q. Would you consider this well a dry hole?

A. I think that this well was completed. I know it was completed, and a small amount of oil was sold from the well. And it was uneconomic, and that was the reason it was plugged and abandoned. Had oil been $40 a barrel, like we've seen it since then at certain times, maybe the well would not have been plugged.

Q. So if oil prices had been up, it might not have been plugged?

A. That's a given.

Q. Turn to page 3 of your exhibit, if you would, Mr. Muncy. Is that your signature at the bottom, by the way?

A. No, sir, it's not.

Q. Do you know happen to know who that is?

A. That's B. N. Muncy, Jr.'s, signature.

Q. Is that your dad?

A. That is correct.

Q. Now, paragraph 24 of this form shows the producing interval to be 2201 feet to 2209 feet; is that correct?

A. To preparations, yeah. Uh-huh. That is correct.

Q. And the well was completed, according

to paragraph 17, on July 7 of 78?

A. July 7 of 78, as the form stands corrected.

Q. And it was plugged and abandoned -- well, no. Let's go down below. On paragraph, I guess it's 33, in the production at the bottom. It was shut-in. Can you tell when it was shut-in?

A. I recall a little bit of the history about this well. And I think it was swabbed sporadically for a long period of time. And they finally put a small 2500 series pumping unit on it with an Ajax motor. So I don't know if I could really answer that question.

Q. Well, can you tell from Exhibit 37 when the well was shut-in?

A. For the reasons that I've just stated, I don't really think that the record that's here as Exhibit 37 will reflect an answer to your question.

Q. Can you tell from Exhibit 37, same page, what the oil production was out of this well?

A. No. The only thing you can tell -- and I think there it shows in Section 33 --

production method, swab. They swabbed it. And looks like they got a rate of 2 barrels of oil per day, 15 barrels of water, and gas was TSTM, too small to measure. And I think that's about all you can find in reference about the production.

Q. This was, for all practical purposes, a dry hole, wasn't it?

A. I think that the reason it was plugged is because it was uneconomical. And 2 barrels a day under certain economic conditions can be profitable.

Q. But not at $40 a barrel?

A. At this depth it could be.

Q. And you really believe that what happened here -- there's no difference between this type of a well and the Delaware well that you're proposing over in Section 2?

You don't think there's any difference between the well like the one in Exhibit No. 37 and what you're proposing over in Section 2?

A. Well, I think we just talked about the fact that there's a difference in the depth.

Q. You think that the two type wells present different hazards to underground miners?

A. Well, I think the issue here is that if it was plugged properly, there is no hazard.

Q. Do you agree with me that the two wells present different types of hazards to miners? If you don't, just say no.

A. I don't know two wells that are the same, so it's hard for me to answer.

Q. Does a well that's drilled to the -- let's say 8500 feet, does it present a different or greater hazard to underground miners than a well that's drilled at 2201 foot in your opinion?

A. In my opinion, when you follow R-111-P, no.

Q. Does depth have anything to do with the degree of the hazard in your opinion?

A. No, sir.

Q. So you'd feel just as comfortable whether it was 14,000 feet over 1400 feet?

A. When you follow R-111-P, I think that that's a fair statement for me to make.

Q. Now, the wells that you referred to earlier, being in the AMAX -- on AMAX property, you used the word that you listed them. Did you list these wells somewhere?

A. Well, what I did is I got a little book

and I counted the wells. And I didn't submit that as an exhibit. And I counted 16, and I categorized them by first mine, second mine.

Q. And out of these 16 wells, do you recall when those wells were drilled?

A. I very quickly am perusing the reports, and I see some 1950s. If you'll bear with me a minute: 65, 67, 66, here's a 70. And I guess that 70 talks about when the well was plugged. But they were drilled and cased not under -- I think this is fair to say -- most of them weren't cased under R-111-P.

Q. And those wells are through the mining horizons of AMAX?

A. Yes. And if you'll look at Section 16, it's chock-full of holes like that.

Q. Do you know whether or not there's been any changes in the mine safety and health standards since 1966, 67, and 70?

A. I guess what you're referring to is the classification of mines as Gassy Category 3.

Q. I'm just asking you if you're aware of any changes in the mine safety and health regulations since these dates.

A. Well, there are dynamics of answers,

yes.

Q. Are you aware of the changes and regulations concerning methane gas in underground mines since you even left AMAX Potash Company?

A. I think so.

Q. When you were working at AMAX, the regulations on methane getting into potash mines was virtually nonexistent, wasn't it?

A. It was nonexistent, but common sense told you that you better respect it.

Q. I'm talking about governmental regulation, not common sense.

MR. CARROLL: I agree with that.

MR. HIGH: Don't confuse the two; right?

Q. When you left in 1980, government regulation was virtually not existent; right?

A. They weren't virtually nonexistent, but they've changed since then. And I agree with the point you're trying to make.

Q. Underground mines always do things in a way they believe or hope is safe?

A. Yes.

Q. And you are aware that after you left the gassy mine regulations were imposed on all

mines including potash mines?

A. I understand that you fought that for many years and you were finally successful in getting the potash mines out of that category.

Q. And you understand that the consequences of getting methane in these potash mines down here is pretty severe to the potash industry, don't you?

A. Oh, definitely.

Q. And based on the experience that you had in the potash basin, do you have any idea what requirements or additional requirements a potash mine would have to comply with if they were changed on the gassy mine regulations?

A. I think I read a quote one time and recalled you speaking at the meeting we had at the Pyramid Hotel in Albuquerque back in April of this year, about that time period. $80 million, non-sparking electrical is the number you threw out that got classified as Category 3 we'd have to spend for all the potash mines in the basin. Is that what you're talking about?

Q. That's correct.

A. I understand that.

Q. Do you have any basis upon which to

disagree with the fact that the potash industry would have to spend that kind of money to meet these new regulations?

A. Well, I don't know how much money they'd have to spend because costs are dynamic, and I've never researched it. But I do agree with you that you would have to make some additional capital investment. How much, I'm not qualified to talk about.

Q. You do know what permissible equipment is, don't you?

A. Non-sparking.

Q. And permissible equipment is used in some mines so it won't spark and provide a source for an ignition in an underground mine?

A. Yes, I'm well aware of that.

Q. And you're aware also that the mines in the potash basin don't have that kind of equipment?

A. The mines that I'm familiar with don't.

Q. And if they were changed from Category 4 up to Category 3 because of methane getting into the mines, they would have to buy all new equipment; right?

A. Well, I think it's safe to say they

would have to make some changes.

Q. And given your experience in the basin, those changes would be fairly significant, wouldn't they?

A. Well, a minute ago I didn't have any experience, and now I've got experience so it's kind of hard for me to answer that question.

Q. No. I'm asking you based on your experience, ever how limited or great it may be, and we can debate that, but based on the one year or so you spent in the basin, that's all I'm asking you for, would that be a significant expenditure on behalf of the industry?

A. I think they'd have to spend some additional money, but I can't speak as an expert as to how much.

Q. Okay. Do you have an opinion on whether or not the potash industry could economically survive if they had to comply with those gassy mine regulations?

A. Today at this point in time, no, I do not have an opinion because I'd have to make an in-depth study and evaluation. That would be the only fair way to do it.

Q. Would you agree with me that the way

you go about doing certain things may change depending upon changes in governmental regulation?

A. We see that daily.

Q. Now, I'm going to ask you a few questions about your Exhibit No. 36, and I really don't want to dwell on this one. You characterized the industry -- and I assume you're referring to industry comments on drilling oil and gas wells in and around the potash basin as being the "Miner's Bible"; is that what you called that?

A. I think Mr. Carroll made that definition yesterday, and yes, that's the same definition that I'll go by.

Q. Wel, I'm going to offer that as an exhibit later on just so we'll have it in the record so we'll know what we're talking about here. You characterize that yellow journalism?

A. No. Yellow journalism.

Q. Maybe I don't speak the same way. That's what I intended to say. Maybe we just have a different accent sometimes. Are you saying that there's some facts in that package that are false?

A. Well, you know, the term yellow journalism originated back in the late 1800s. And we had the tabloids that were penny newspapers, and they specialized in half-truths and sensationalism. And I think in my testimony I pointed out specifically in Exhibit No. 36 where it says we assume they can't cement the wells, I think that's proof positive based upon my own personal experience.

Q. All right. Well, I want to follow up on this yellow journalism a little bit. Do I take it from that that you question the sincerity of the potash industry's concern over safety from this methane gas?

A. No, sir. What I questioned is the lack of the application of good science, good engineering principles, and sound geology. I don't think we've seen that. And the whole thing, I don't take issue with the whole thing, just specific parts.

Q. All right. Then let's go back in history, Mr. Muncy, and let me just see if we're on the same wavelength. There were major changes in the mining laws in 1959; do you know what caused those?

A. I guess what you you want me to say is Kellogg, Idaho, and the Sunshine fire.

Q. There were major changes in the mining laws in 1969. Do you know what caused those?

A. Oh, you said --

Q. I'm up with you now.

A. Okay. Well, I thought you said 69. Pardon me. I worked too long underground, and it's hard for me to hear.

Q. I'll forget about 59 and we'll just stick with 69.

A. Okay.

Q. You just told me what caused those changes in the mining laws; it was disaster?

A. That's how we got the self-rescuer.

Q. That's because of people dying before the regulations were changed, the laws were changed; right?

A. Well, I assume there's going to be somebody dying in a mine tomorrow, and that will be before the regulations are changed. But, yes, I'll agree with that.

Q. And you know what happened in 1979 at the Belle Isle mine?

A. Well, I pronounce it Belle Isle, but

yes, I think so.

Q. Do you know whether or not that mine was required to comply with any methane gas regulations before it blew up?

A. Well, it's in a salt dome, and I think that's what my statement was all about. I don't dissipate the seriousness of what happened. I don't dissipate it. I don't pour cold water on it. I take it very serious.

Q. So when you use the words "yellow journalism," talking about this "Miner's Bible" that you guys have tagged on it, you're not questioning the fact that methane gas is a very, very serious matter in underground mining, are you?

A. I think we're on the same wavelength.

Q. It is a serious matter, isn't it?

A. Yes.

Q. It is something we ought to be concerned about as an underground mine; we ought to be concerned about it?

A. No question.

Q. You're familiar enough with the geology, I take it, of the potash basin to know that we really don't have a significant hazard

from naturally occurring methane; would you agree with that?

A. I think previous testimony affirmed that, and I also agree with that.

Q. That's precisely what George Griswald looked at back in 1982 to see whether or not the natural occurrence of the potash beds and the overburden was such that there would be a source of some carbonaceous material that might generate methane to naturally get in their mines; you understood that to be the focus of George Griswald's study; correct?

A. [Nodded.]

Q. I'm sorry, you need to speak up.

A. Oh, pardon me. Yes.

Q. So if we get any methane in our potash mines, would you agree with me that it's probably going to be from some artificial source, like the oil and gas industry, given the geology that we know about?

A. Given the geology that you know about, given the fact that I can't tell you how high up is, I can answer yes to your question.

Q. And since the only thing, the only source of methane we see in the potash area down

there is oil and gas people, do you know of any other artificial creation of methane in the known potash area other than oil and gas drilling?

A. I think the welders take a similar form of that down in their bottles. They introduce acetylene into the mine.

Q. For use during the mining operations?

A. Yes.

Q. Other than that the principal source of methane that the underground mines have to be concerned with would come from the oil and gas drilling, would it not?

A. Yes.

Q. And you agree with me, I take it, that things can go wrong when you're drilling oil and gas wells?

A. When you follow R-111-P, I'm convinced that the things that you've alluded to in your previous questions won't go wrong and you don't have to worry about them.

Q. Well, let me just go back directly to Exhibit No. 36. You pooh-poohed a little bit our concern over losing circulation when we were drilling this hole down through the salt cables and things. We lost circulation in trying to

cement that hole, didn't we? Would you agree with that?

A. Well, I did it, and I was there.

Q. Did you lose circulation? Let me ask you a little differently.

A. This was drilled dry with a cable tool for both strings. And are you talking about the cement phase now?

Q. Did you lose circulation when you were trying to cement it back to the surface?

A. We never tried to gain circulation. All we did is pump cement down the hole, and we didn't make any calculations. So there's no basis for me to answer that question. I advised them the right way to do it, and they didn't listen to me and didn't care. But they did understand what I was talking about.

Q. You had no idea when you poured the cement down that casing where it might come back up to?

A. I predicted that it wouldn't come back up.

Q. So you had no idea where it would come up to?

A. Well, you can say I drilled X-sized

hole and you can calculate the OD of the casing and convert the cubic feet of the cement, which was Class C, and you can go that route and you can make an estimation. But we didn't have the hole -- the hole was completely dry.

Q. Anything else wrong with it?

A. I thought it was a good hole. We got within two feet of the mine.

Q. Were you concerned about where you were going to come out underground?

A. No, sir.

Q. You weren't nervous about the survey?

A. I don't think I was. I had faith in what I did, and I did it according to scientific fact and engineering principle.

Q. Were they actually relying upon you to cement that spot hole?

A. They asked me my opinion, and then they told me what to do.

Q. Is the answer to my question no? Are they relying upon your expertise in the oil and gas business to put down that casing and cement?

A. They were relying on my expertise to drill and case the hole. And when it came time to cement both strings of casing in the hole, I

gave them my professional opinion as to how it should be done. And they chose, after understanding what I told them, not to adhere to my recommendations.

Q. Referring to your Exhibit No. 38, which is the map that has the LMR on it?

A. Do you have a copy of that in front of you?

A. Yes, sir, I do.

Q. You testified, Mr. Muncy, it seemed to be with some degree of authority, that the LMR of New Mexico Potash included portions of Sections 10 and 11. Did you not say that?

A. That's the way I found it in the public records of the NMOCD.

Q. That's your interpretation of the documents that you looked at when you erroneously were given those from the OCD; correct?

A. I won't hold it up and show it to you, but that's where the lines go.

Q. I understand that, but I'm trying to get at the source of your information.

A. There was a--

Q. That solely is the paper we're looking at or the map that you got; right?

A. I've got my notes right here.
Q. You don't have to get them. If you'd just answer my question, we'll move on.
A. There was a legend in the bottom right-hand corner of that map.
Q. Okay.
A. And that's what the legend depicted.
Q. Then can we agree that the only thing you relied upon for your conclusion that parts of Sections 10 and 11 were included in New Mexico Potash's LMR was this map that you got and the legend on it?
A. That's correct.
Q. No one from New Mexico Potash told you that Sections 10 and 11 were part of their LMR, did they?
A. They told me that because I know how to read maps.
Q. Did anyone from New Mexico Potash tell you that parts of 10 and 11 were in their LMR?
A. The signature on that map was by R. H. Lain, and he told me that because I know how to read maps.
Q. Did anyone from New Mexico Potash speak words to you that went in your ears that said

parts of 10 and 11 were in their LMR?

A. No verbiage was conveyed.

Q. Now, the bottom portion of the map that you looked at on the LMR is not closed, is it?

A. It's open-ended, as you described it.

Q. So the part that goes out into Sections 10 and 11 is not closed with any of those little markers you indicated showing where the LMR is; correct?

A. That's correct.

Q. Do you know why there's an opening between those two lines at the bottom of that LMR?

A. I do not know why specifically they did that, but if you'd like me to ask me as to my opinion I would venture an opinion.

Q. Do you think it would have been important, Mr. Muncy, to try to find out why those two lines were not joined together before you get up here and give an opinion that those two sections are included in New Mexico Potash's LMR?

A. I was told that this was something that I couldn't talk to the folks at New Mexico Potash about. I would have been glad to do that if I

thought the door was open.

Q. Now, let's look for a minute -- I'm almost through here -- look at New Mexico Potash Exhibit No. 12.

A. The letter dated December 27, 1991, I have it before me.

Q. Did I detect from the tone of your testimony, Mr. Muncy, that you or you and Mr. Carroll felt like New Mexico Potash was doing something kind of sneaky here?

A. I only testified to my interpretation of the language in the letter. I saw the word "assignment," and I believe that's the way I started off my testimony.

Q. Well, do you think that New Mexico Potash would do something evil or sinister or less than above-board here? Do you understand what I'm getting at? I detected that in your testimony. That's why I'm asking you.

A. I don't think you did. If you did, that was a misinterpretation.

Q. Well, the reason I ask that is because Mr. Carroll asked you some questions about December 27, I thought he said, of 91 -- no, I'm sorry. Ten days before this letter, which would

have been what?

A. No. Ten days after the letter -- or eleven days before the letter, right. Ten or eleven days.

Q. What happened eleven days before this letter?

A. You mean after the letter?

Q. No. Before the letter.

A. I think what --

Q. No. I'm sorry. The LMR map, the changes in New Mexico Potash. This letter occurred prior to those changes in that map?

A. It preceded the changes in map. I think that's the only point I was trying to make.

Q. Okay. Are you trying to say that this letter generated the changes in New Mexico Potash's LMR in January of 1992?

A. I'm just trying to say that as of December 27, 1991, this letter tells me they conveyed Section 2 to IMC. And then we find the map, that the date on it of the 14th of January on the letter of conveyance, the map dated 1/7/92, which showed Section 2 in the LMR for New Mexico Potash.

Q. Were you involved in the discussions in

the fall of 1991 concerning Section 2 between the potash and the oil and gas people?

A. No, sir. That was prior to my entrance into this.

Q. Were you even aware that they were going on?

A. Remotely.

Q. You've since learned that there was some talk about Section 2 even prior to December of 91?

A. Remotely.

Q. And you knew that IMC wanted to get the langbeinite ore on the east side of WIPP?

A. No, sir.

Q. Do you know whether or not IMC wanted to get Section 2 as part of that entire lease on the north and east of WIPP?

A. The corehole in Section 2, corehole 162 is sylvite.

Q. Do you know why that corehole 162 was drilled?

A. I assume it had to be drilled looking for potash.

Q. Do you know what prompted that drilling --

A. No, sir.
Q. -- that corehole 162?
A. No, sir.
Q. Do you know when it was drilled?
A. I'd have to refer back to my notes. I know it was drilled in about two days.
Q. Let's just refer back to the exhibit in front of you there, Exhibit No. 6. Go to page 2 of that document, if you would.
MR. HIGH: Mr. Chairman, I'll point out that this document is also marked confidential, and I've stamped each copy of it.
Q. Do you find that in front of you, Mr. Muncy?
A. Yes, sir, I do.
Q. When was that corehole started?
A. According to this document, it was commenced on the 11th day of the 12th month of 1991.
Q. When was it completed?
A. The following day.
Q. And that would have been December 12 of 1991; right?
A. Uh-huh.
Q. Well, let's look at this corehole data

and just tell me, if you'll look down -- and I'm not going to get into numbers -- but I'm just going to ask to you look at the results shown for corehole No. 162 down toward the bottom for the tenth ore zone. Do you see that?

A. Where we talk about before the insolubles are subtracted, 16?

Q. Yes. Those numbers before the word "Insolubles."

A. Uh-huh.

Q. In your opinion is that ore that can be mined in a potash basin?

A. Yes.

Q. Can be mined by New Mexico Potash?

A. Pardon?

Q. Can be mined by New Mexico Potash?

A. I have to assume that they were the ones that wanted to mine it because they put in their LMR. If you look on this map, it is four miles, I think, from the nearest workings and a lot greater distance than that from New Mexico Potash's shaft. We could count it off if you'd like to.

Q. I don't want to do that. Is the percentage shown from this corehole test higher

as a general rule or lower as a general rule to the ore you've seen mined in the basin? How would you characterize it?

A. With respect to the first ore zone at AMAX, it's probably close to the same or a little lower. And with respect to the third ore zone, it's a little higher.

Q. It's good ore; right? Would you agree with that?

A. Yes.

Q. Now, how many days after the completion of this corehole was the new LMR designation filed by New Mexico Potash?

A. The one that I found, letter of conveyance signed by Bob Lang, and I again refer to the notes that I made, 1/14/92.

Q. Okay. So it would have been roughly a month after the completion of this corehole showing ore New Mexico Potash filed a new LMR; correct?

A. That's my understanding of what I found in the public record.

Q. And are you aware that R-111-P allows the changing of LMRs?

A. What I realize about R-111-P is by the

31st day of the first month of the year, you have to file them.

Q. And January 14 of 92, when New Mexico Potash filed this new LMR, would be prior to the 31st day of the year following completion of this corehole?

A. But it did supercede a previous filing.

Q. Okay. But the new LMR was filed on or before January 31, after this new corehole data was completed on December 12 of 91, wasn't it?

A. As far as my investigation into the NMOCD records, the public record section, yes.

Q. Now, look back at Exhibit No. 12. I want to follow up on the word "assignment." You said that New Mexico Potash assigned something to IMC that you read in this letter; isn't that what you testified to earlier?

A. That's what I testified to earlier.

Q. Have you had a chance to read and study the letter, let's say, before today?

A. No. I haven't seen it until today.

Q. So the opinion that you gave earlier was just based upon the small amount of time you saw it this morning?

A. It's only two paragraphs.

Q. All right. Let's just talk about it. The first sentence, the fourth word, what's the fourth word?

A. Proposed agreement.

Q. All right. Do you know if that was ever finalized?

A. I have no evidence.

Q. Well, would it be important to your opinion, Mr. Muncy, before you come into this hall and give an opinion to these people, that this is an assignment that you'd know whether it is in fact a final assignment?

A. I didn't go search the state or federal records, no.

Q. And what does the last paragraph say in Exhibit No. 12, Mr. Muncy, in talking about this possible sublease of langbeinite between New Mexico Potash and IMC? What does the last paragraph say?

A. Where it starts out, "We look forward"?

Q. Yes. Go ahead and read the rest of it.

A. -- "to working with you on this matter and hope to hear from you in the near future."

Q. Would that suggest to you that that matter, at least as reflected from Exhibit No. 12, was not a final, quote, "assignment"?

A. I don't know what conclusion to draw from it along those lines. It appears to me that an assignment was made, conveyance was tendered. It was tendered.

Q. Now, the final area, I believe it is, that I want to ask you a few questions about is Mr. Carroll asked you if you had seen any problems in Carlsbad caused by subsidence to oil and gas wells. I believe your answer was no?

A. Based upon my personal experience, no.

Q. Have you -- and that's all I want to limit it to, is your personal experience, Mr. Muncy. In your personal experience have you observed any change in the ground in and around Carlsbad caused by subsidence?

A. I have observed it on the highway. I think we call it 360.

Q. And as you're driving down Highway 360, you see the effects of subsidence, don't you?

A. Very limited, but I see them.

Q. You see them where the ground has literally fallen from the surface downward?

A. I didn't observe that, but I saw where the Highway Department had worked on the road.

Q. And had the subsidence damaged the highway?

A. I don't know because I wasn't there.

Q. Do you know of anything in that area out there that has ever been damaged by subsidence: highways, telephone poles, or anything?

A. Nothing about telephone poles or anything. And the only thing I can talk about is the fact that I saw that some work had been done on 360.

Q. So you don't know of any damage done to anything caused by subsidence; is that what you're saying?

A. With respect to my personal experience --

Q. That's all I'm asking about.

A. -- and that's my answer.

Q. Have you gone out and inspected any oil or gas wells that have been in an area where there has been subsidence?

A. Not to my recollection.

Q. Then would you agree with me that there

may in fact be some damage to oil and gas wells in the potash basin if they are in the area of influence and subsidence and we simply don't know about it?

A. If you put the question in that fashion, I have no choice but to answer it, yes.

MR. HIGH: Thank you. That's all the questions I have.

CHAIRMAN LeMAY: Thank you, Mr. High.

Additional questions of the witness?

MR. CARROLL: I have just a couple.

CHAIRMAN LeMAY: Fine. Mr. Carroll.

FURTHER EXAMINATION

BY MR. CARROLL:

Q. Let's turn back to Exhibit No. 6 of New Mexico Potash Company's list of the confidential sundry notices report on the corehole 162.

MR. HIGH: Do you understand that document is confidential?

MR. CARROLL: Yes. That's why I said confidential.

Q. (BY MR. CARROLL) Mr. Muncy, you performed an investigation of your own into the drilling of this particular corehole, did you not?

A. Yes, I did.

Q. First of all, looking at the time the well was started 12/11/91 and completed 12/12/91, did that cause you some concern?

A. It was a lot faster than my previous experience had shown me.

Q. In other words, this well was drilled over the period of somewhat less than two days?

A. That is affirmative. It was drilled very fast.

Q. Is what is the normal time frame to drill these kind of coreholes?

A. If you run two shifts a day or three shifts a day, it's dependent upon the depth, but for this particular hole, had I been in charge of core drilling it, like I was when I worked for AMAX and we used Pennsylvania Drilling Company, I would expect that it would take at least two to three times longer in the normal course of events.

Q. Now, there's something also peculiar about this corehole with respect to the casing of it or the lack thereof.

A. Yes, there is. I never could find -- I investigated it pretty thoroughly, and I never

could find where my casing at all was put in the hole.

Q. In the well that you talked about drilling, the electrical shaft, you cased that hole, did you not?

A. Two strings.

Q. The coreholes that you drilled, the 20 some-odd, did you case those holes?

A. We shut off the freshwater, and I just didn't see where they protected the freshwater with this hole. Maybe they failed to report it, but I couldn't find it in the public records.

Q. The time frame that this well was drilled in, would that also indicate that there was no casing run, cement run, cement allowed to set, that kind of thing?

A. It would lead one to tend to believe that, but I wasn't there.

Q. And if this corehole actually tested the zones which we would someday hope to mine, that if there was just some problem with pouring cement in the hole and the infusion of anything from above that hole into it, do you have an opinion as to what kind of problem that seemed to pose for the company drilling this hole in this

matter?

A. Well, this hole was bare naked and was never cased and when you look at the -- well, they haven't provided it here. I guess this is not the complete -- I've got the complete form. But, yes, it would because just in the manner in which it was not cased and plugged.

Q. Doesn't this also -- in your opinion does this tell us something about the regard that this company had with respect to the issue of the safety of miners?

A. It has to.

Q. And what is that, your opinion?

A. They just went out there and blatantly drilled a hole and cored it and went home.

Q. Now, Mr. Muncy, would you turn to Exhibit 12. Would you read paragraph No. 2?

A. "Also included are the assignments of mineral lease, three signed originals required and the affidavit of consideration received, one signed original required, both of which are required by the State Land Office."

Q. Mr. Muncy, doesn't that strike you as strange that these companies were apparently that close to an agreement and that just a short few

days prior to that that the same company or one of the parties is out drilling very rapidly a corehole such as 162?

MR. HIGH: Objection. That's argumentative.

Q. (BY MR. CARROLL) Do you have an opinion as to whether or not that is odd in your experience?

A. Okay. Based upon my personal opinion, it is odd.

Q. Do you feel that the fact that an LMR was changed within a few days after these events also odd?

A. Very odd in my personal opinion.

Q. Mr. Muncy, the highway that you spoke about that collapsed or at least had suffered damage, that was directly over the mine workings, was it not?

A. It was directly over the mine workings, and I think in the case of the mine involved, it was AMAX. And I don't want to get into hearsay. I'm kind of at a loss as to how to word this, but I will tell you that I talked to some folks who worked there, and it was their opinion that resulted from pulling some pillars directly below

the road.

Q. Now, Mr. Muncy, when you and Mr. High were in an exchange, and this was talking about the Section 2 and the ore in that Section 2, and you used the word "ore." Now, did you misspeak? And I want you to go back and consider, or were you trying to imply to the Commission that you felt that as you defined ore at the very beginning that such is found in Section 2?

A. With respect to the word "ore," and the percentages that were reported in the tenth ore zone for the sylvite, based upon the definition of proven, can be mined at present day -- it can be mined presently today economically, I would have to call that particular corehole ore.

Q. What about Section 2, though, all of the potash in Section 2?

A. All of the potash in Section 2 in my opinion is not ore.

MR. CARROLL: That's all I have.

CHAIRMAN LeMAY: Thank you.

MR. HIGH: Just a few follow-ups, if I may.

CHAIRMAN LeMAY: Mr. High.

FURTHER EXAMINATION

BY MR. HIGH:

Q. Mr. Muncy, I thought we'd put it to rest and maybe I just used the wrong words. I was trying to find out a minute ago from you whether or not you thought New Mexico Potash did something -- I think I used the word "sinister" and that sort of stuff. But I didn't use the word "odd," and Mr. Carroll did, and you said yes.

Is it your belief that New Mexico Potash did something -- and I'll use different words -- odd or wrong when it changed its LMR in January of 1992 based upon the corehole data they got the prior month? Are you saying that's odd?

A. I say that it appears, based upon the data that we've just talked about, the facts, it was a hurry-up job. It was done in two days. I did call the drilling company that performed that, and they told me that all the data was confidential, but they would tell that the dates were right.

So I did confirm that it was done in two days. They didn't convey to me any of the particulars; that they were in and out in two days.

Q. Are you aware of the fact that the corehole data that existed prior to hole No. 162 showed, if anything, langbeinite in Section 2? Are you aware of that?

A. I think we'll have someone that can speak directly to that after me.

Q. My question is, are you aware of that?

A. There might have been an indication that I was aware of it.

Q. And would you know that prior to hole 162 being drilled in Section 2, Section 2 was not in the LMR of New Mexico Potash, was it?

A. Based upon what I found in the records, yes.

Q. And New Mexico Potash doesn't mine langbeinite, does it?

A. They mine the tenth ore zone, which is sylvite, according to public record.

Q. And when corehole 162 was put down in Section 2, it showed sylvite as well as langbeinite; correct?

A. That is correct.

Q. And yet you find it odd that after finding or discovering that Section 2 had sylvite, that New Mexico Potash would within the

next month extend its LMR down to include ore it could mine? Do you find it odd?

A. I find it odd because of the way the coreholes were in there. And if you look at the polygon method, I think they're too far apart.

Q. And you know that New Mexico Potash had told Yates that we are going to drill this hole and we'll let you know whether or not we object to these wells. It told Yates it was going to drill this hole; right?

A. The only thing that I know about that is what was testified to yesterday.

Q. You're not suggesting that New Mexico Potash went out and sneaked out and dug this hole, overnight type of thing, are you?

A. The only thing I'm suggesting is that they drilled it and cored it in two days. And based upon my experience that was fast.

Q. And you know at this time in December of 91, Yates wanted an answer as to whether or not anyone would object to some wells down there?

A. I couldn't testify as to the exact time frame.

MR. HIGH: All right. That's all I have, Mr. LeMay. Thank you.

CHAIRMAN LeMAY: Additional questions of the witness?

Commissioner Carlson?

COMMISSIONER CARLSON: Yes, couple of questions.

EXAMINATION

BY COMMISSIONER CARLSON:

Q. If you go to your Exhibit No. 34 and your map, Exhibit No. 30, I take it Exhibit 34 comes from essentially your calculations based on -- I take that back. Your map, Exhibit No. 31 -- but your calculations on Exhibit No. 34 basically is a compilation of what's shown on the map; is that correct?

A. Yes, sir. That is a compilation by columns of the way that I found the 1984 BLM map, which would be the exhibit on the right.

Q. Now, if you were redrawing this map in the blue and the green and what's shown for indicated potash, applying the definitions that you -- the BLM definitions that you say should have been used for measured ore and inferred ore and indicated ore, you would draw that map substantially different; right?

A. Yes, sir, I would.

Q. Do you have numbers similar to Exhibit No. 34 for your estimate of measured ore, inferred ore, and indicated ore?

A. Not for the whole area because the bulk of the potash coreholes are confidential. And just -- I mean, that's part of the problem that I've talked about today. If we had them, yes, I could give you an answer.

Q. What about Section 2 specifically? If I look on the map here, it's roughly divided into three parts. I guess the northwest is barren, and more or less the east half is inferred, and the measured ore is in the southwest portion. How would you draw those lines on Section 2?

A. We will do that with the later witness. But, as I have previously testified, I think that in round numbers you would have to take out the northwest quarter generally speaking -- or pardon me, the northeast quarter of Section 2.

Q. But you do admit the corehole data they have does show some commercial deposits, and I guess that's in the southeast quarter of Section 2; is that correct?

A. Yes, in the tenth ore zone.

Q. So, by your own admission, if there are commercial deposits within Section 2, is it your testimony that wells can still be drilled in commercial deposits without wasting those commercial deposits?

A. It definitely is because I think, when we look at the time frame, that Section 2 could possibly be mined. That would give us time to develop the oil and gas and plug the wells properly, as I previously talked about, and we would have what I would call multiple use.

Q. So basically your approach to this is your questioning if there are commercial deposits; you admit there are some at least in the southeast quarter around that drill hole. And if even if there are, you can still develop the oil and gas reserves and later mine right through those drill holes?

A. I think so.

Q. You say a later witness will get into the actual amount of measured reserves within Section 2?

A. Yes. We have a definite opinion about that, and he will be glad to talk about it.

Q. You testified that there were a lot of

oil and gas wells within existing potash mines in the basin; is that correct?

A. Yes. And if we look at the Exhibit 31, the map on the right-hand side there, the bulk of them tend to be on the left-hand side, which would be the west.

Q. Were those wells drilled after the potash mining occurred or before? I'm unclear as to the sequence of --

A. I think that a lot of them were drilled in the 50s, in that era. But when I worked for AMAX, on the right-hand side, which would be the east side of the AMAX workings, during that time period there were some deep gas wells drilled by Southland Royalty, which is now Meridian.

Q. Into the mine operations themselves?

A. No. Just out ahead where mining might possibly occur.

Q. When were those wells drilled? In the 50s?

A. I think the ones that are right in the mine workings, the 16 that I spoke about, were all in the 50s prior to the R-111-P casing requirement.

Q. And that was prior to the actual area

of being mined?

A. Yes, I think so.

Q. And since then the mine has gone right through some of those?

A. Well, they haven't gone right through them. They've left some sort of a pillar. I was down there one time when they accidentally mined into one that had been plugged, and it didn't present a problem.

Q. How big are those pillars? What kind of --

A. Well, with respect to the mine that I specifically talked about, this -- or I mean the well that I specifically talked about, this Culbertson-Irwin well in Section 13, I think we planned on a 100-foot pillar. And call it hearsay, if you may, that's what they plan on doing this year, is leaving a 100-foot pillar.

Q. But there's other wells there that they have done the same thing with?

A. No. There are other wells there where they have done the same thing. Now, on the deep gas wells, I don't think any of those that I'm familiar with lie directly in the works, in the mines, the mined out areas.

Q. But there are some that do lie in the mined out areas?
A. Not deep gas wells.
Q. Not deep gas wells?
A. [Nodded.]
Q. Are they gas wells?
A. Yes. I think they were Morrow gas wells.
Q. Morrow gas.
A. But I'm not aware of any of those that lie in the mined out areas, and my study didn't show that.
Q. I'm still unclear. There are wells that did produce gas that are in the mined out areas that they have just mined around leaving 100-foot, 100-foot radius around those wells?
A. In some cases, yes.
Q. How many cases? Do you know?
A. According to the public record, which I did and I've got it tabulated, I grouped it between first and second mine. And with respect to Horizon, I found seven wells that were drilled in the early days, the 50s, let's say, generally speaking, seven that were in the first mined area, four in the second mined area, five in the

measured ore zone, according to the 84 map, for a total of sixteen.

Q. Are you familiar with the plugging and cementing program that was used on those wells?

A. I have direct knowledge of only the well in Section 13, which I referred to. I do have some of the copies of the plugging reports that went with the specific 16 wells I'm talking about.

COMMISSIONER CARLSON: I guess that's all.

CHAIRMAN LeMAY: Commissioner Weiss?

COMMISSIONER WEISS: Several questions.

EXAMINATION

BY COMMISSIONER WEISS:

Q. I don't get the significance of 30 or 70 feet between the tenth and the third zone, or whatever you mentioned earlier in your testimony.

A. Okay. I guess I'll go real slow and try a little harder to explain it. The first ore zone is the bottom zone. And on the AMAX side of the basin we found the third ore zone to be approximately, more or less, 30 feet higher than

the first ore zone.

Q. Can you mine the two at a time?

A. You cannot mine them simultaneously.

Q. Okay. That's my question. That's the significance of it?

A. Yes, that's the significance. And I apologize for the confusion.

Q. Are there any maps with -- public maps, with the coreholes posted? Not the analyses, just the holes.

A. I have in my possession three maps that show all of the coreholes in the potash basin with the exception of 15 or so, and I've got that list. So I can tell you where the coreholes are, and we've got a later witness that will probably point them all out. But the data has been confidential for the large part.

Q. The location of the holes is confidential?

A. No. The location of the holes is not, but the data with respect to the core.

Q. Well, that might be helpful to see those. Oh, I have a question here. Does a single corehole in 100 square miles have any meaning?

A. It's just merely an indication.

Q. Can you tell whether it's commercial based on one corehole in 100 square miles?

A. No, sir.

Q. And then on the wells in the -- you may not know this, but I'm going to ask you -- in this Benson-Yates east field, they were drilled in the 50s from the Grayburg, you say. And I see here the gravity of the oil was 31 degrees in 1978. Do you know what it was initially and what the GOR was and how much gas they made?

A. No, sir. It was probably pretty low, but I don't have any specific --

Q. And how much methane has been detected in the AMAX mine during the 20, 30 years of production of these wells?

A. To my knowledge, and again we're just going to have to talk about my personal knowledge, the only time that methane has been detected is when they ran into the nitrogen pockets that naturally occur when they mine.

Q. And they find methane in that?

A. It has a small amount of methane in it, and I think it's been pointed out that we don't feel that that's a hazard.

COMMISSIONER WEISS: That's all the questions I have. Thank you.

CHAIRMAN LeMAY: Just a couple.

EXAMINATION

BY CHAIRMAN LeMAY:

Q. You were at that potash sale. It was described before, the one where Yates and Pogo, I guess, bought that tract. Was that an oral sale or written?

A. That was an oral sale held at the Stevens Motel on a Tuesday morning at 10:00 o'clock.

Q. So anyone could bid, and no money was left on the table?

A. That is absolutely true.

Q. Did they have a minimum bid? Do you know?

A. I think the minimum bid started at $1.

Q. Another question. Have you got an idea of how much it cost to drill a corehole, a 2,000-foot corehole and core the respective horizons?

A. I'll give you a range because I haven't updated it since that time. But somewhere in the neighborhood -- and I'll do it by feet --

somewhere in the neighborhood of $5 to $10 a foot.

CHAIRMAN LeMAY: Thank you. That's all I have.

Q. (BY CHAIRMAN LeMAY) That's from spud to completion; right?

A. The right-of-way and the plugging and the abandonment.

Q. And the cementing of the surface casing?

A. Right. And in the case of AMAX, a lot of times we'd just mud it in and pull it, but we did protect the freshwater.

CHAIRMAN LeMAY: Okay. Additional questions of the witnesses?

MR. HIGH: I have one, if I may.

FURTHER EXAMINATION

BY MR. HIGH:

Q. Mr. Muncy, do you know the depth -- first of all, do you know the name of the field, the oil field where the wells are on the west side by AMAX mine? Do you know the name of that oil field?

A. There are several pools in there.

Q. Do you know if that's the old Getty

field?

A. No, sir.

Q. Do you know how deep the wells are there in and around the AMAX mine?

A. Somewhere in the neighborhood, give or take, 2,000.

Q. They're not 8,500 feet deep, are they?

A. But there are some that I previously mentioned that were drilled to the Morrow that are deeper than that.

Q. Not within the mine workings, are there?

A. No. No.

Q. I'm talking about the ones that you said were within AMAX's mine workings. Those are what -- those were very shallow wells, are they not?

A. They're classified as shallow pool wells because they're less than 5,000 feet in depth.

Q. And when was the mining done in and around those wells, if you know?

A. It was going on when I was out there twelve years ago, and it's going on today.

Q. As far as you know?

A. As far as I know.

MR. HIGH: I have nothing else.

CHAIRMAN LeMAY: Additional questions of the witness? If not, he may be excused.

Let's come back at 1:15.

[The lunch recess was taken.]

CHAIRMAN LeMAY: Mr. Carroll.

MR. CARROLL: Thank you, Mr. LeMay. Our next witness will be Leo Lammers.

LEO J. LAMMERS

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

EXAMINATION

BY MR. CARROLL:

Q. Would you, please, state your full name, occupation, and place of residence, sir?

A. My name is Leo Joseph Lammers. I reside at 40 Riverside Drive, Roswell, New Mexico. My occupation is an independent consulting geologist.

Q. How many years have you practiced as a petroleum geologist -- or a geologist, excuse me?

A. I have been a practicing geologist for over 36 years.

Q. Would you relate to the Commission your

educational background?

A. I have a bachelor of science degree in geology with a minor in chemistry from the University of Dayton and a master of science degree in geology from the University of Michigan, which I received in 1956.

Q. Did you do a thesis for your master's degree?

A. Yes, I did do a thesis for my master's degree.

Q. And what was that on?

A. I did an analysis of a salt corehole provided to the university by the International Salt Company, which they were drilling to extend a new mine site at the Wayne County Airport, which is southwest of Detroit.

Q. Could you relate to the Commission your work experience?

A. I have 31 years of oil and gas experience and over 5 years of mineral exploration experience. My first 18 years were with Atlantic Richfield. I started out, about 7 years, in the Roswell District. I worked mostly the Delaware Basin, a little bit on the Central Basin platform.

The next year I moved to Lafayette, Louisiana, worked offshore. Then I got moved to Houston into our sulfur group. And then I got moved into the minerals exploration group on staff in Dallas, where I was senior minerals geologist, primary responsibility being potash and sulfur.

Then I moved back to Houston, and at that time I went to work for Tesoro Petroleum for about three years. I was group leader for eastern US -- the eastern US in their exploration and research department. And since about 1978 I've been either working on retainer or contract as an independent geologist.

Q. At the times that you were the senior minerals geologist for Atlantic Richfield, could you describe or elaborate what your duties were with Arco?

A. My main job was to explore in areas for potash and sulfur. In potash it was kind of a two-pronged effort. I looked in old basins, such as the Carlsbad Basin and to some extent in the Canadian Basin.

And the second part that I did in those five years was to explore new basins, such as

Michigan Basin. We looked in there. We went to eastern Canada, and we did a little bit in Kansas in the Salt Basin there.

Another thing, we had a big research group, which we called our geoscience group at that time. I worked -- we had four petrophysical engineers or log analysts. I worked with them and designed a log program for potash and for sulfur.

Q. All right. Mr. Lammers, could you expand upon your specific experience with respect to the Carlsbad Potash Basin?

A. Yes. During the period, from 1966 to probably late 1968, Arco drilled about 33 coreholes in the Carlsbad Potash District. At that time we had two potash geologists in our Roswell District Office.

My duties were to coordinate the data from the Carlsbad District from what we got in the Roswell District and present it to the Dallas management. I made periodic visits to the quarrying operations, presented the results to management, and I helped lay out our future corehole program.

We also in our minerals group had a --

I worked -- we had a mining engineer and a mineral economist, and the three of us worked together on this project.

Q. Mr. Lammers, do you belong to any professional organizations or societies?

A. Yes. I belong to the American Association of Petroleum Geologists. I'm a Certified Petroleum Geologist. I've been a member of the American Institute of Geological Scientists for over 25 years. I'm a Certified Professional Geologist with specialties listed as oil, gas, potash, and sulfur.

Q. Now, you have had an occasion to testify before the Oil Conservation Commission, have you not, in the past?

A. I believe I last testified in October of 1963.

Q. Did you have your credentials accepted at that time?

A. Yes, I did.

Q. As a geologist?

A. Yes.

Q. And you have worked continuously as a geologist since that period of time?

A. Correct.

MR. CARROLL: Chairman LeMay, I would offer Mr. Lammers as an expert in the field of geology.

CHAIRMAN LeMAY: His qualifications are acceptable.

Q. (BY MR. CARROLL) Now, Mr. Lammers, one of the things that I think you've touched upon in listing what you were doing when you were working for Atlantic Richfield was your work with the Atlantic geoscience program or logging program for minerals; is that correct?

A. Yes.

Q. Could you explain what that program was and what the results were of the research and study that you were involved in?

A. In natural occurring rock you have three elements that can cause radioactivity: uranium, thorium, and potassium. In the Salado Formation in the Carlsbad District, this radioactivity is probably due to the various potash beds.

Therefore, you can use the gamma ray log to correlate the marker beds to pick barren zones and the mineralized zones and to some degree you can tell if you have mineralization.

You cannot tell the degree or the percent of mineralization.

Q. But you can tell whether or not the mineralization of potash that we refer to as potash is present; is that correct?

A. Yes.

Q. Okay. So then it would be your professional expert opinion that you can use well surveys that are normally performed in oil and gas wells to determine whether or not mineralization occurs?

A. Yes.

Q. All right. Now, have you performed any studies with respect to well logs in the area of concern? And I guess I should ask you the preparatory question: You are familiar with the four applications that Yates Petroleum has filed and is being heard by the Commission?

A. Yes, I am familiar with those.

Q. All right. Then with respect to the area of Section 2 that we have been discussing, where all four well applications are, have you performed a study in and around that area?

A. Yes, I have studied quite a few logs in there. And my exhibit, I think it's marked

Exhibit No. 40 --

Q. If I could, just a minute, Exhibit 39, which is also your exhibit, that is a copy of your resume, is it not?

A. Yes, it is.

Q. All right. And your next exhibit would be Exhibit 40, and that is a --

A. It's kind of a sketch section showing log correlations, and these are three gamma ray neutron logs. And north is on the left. South, I've labeled as A-A prime. It starts out in the Union Federal No. 1 in the northwest of 35, goes to the south to the Yates AIS No. 5 in the southwest-southwest of Section 36. And it goes down through Section 2 to the AC No. 8 corehole.

Now, on the No. 8 corehole, it is a corehole, and we also have a gamma ray log. What this section is on -- its datum is the Vaca Triste, which is the top of the McNutt. And I have just put a few of the marker beds on there, Marker Bed 119. And I've also showed the tenth mineralization zone, the eighth and the fourth, Union Anhydride in Marker Bed 123 and 124 and 129.

What I would like to do is take the

tenth ore zone, which is the productive zone in the New Mexico mine and kind of go from north to south. If you will see a large radioactive kick there, this to me would be an indication of mineralization. When you correlate it to the Yates AIS No. 5, you can see that we could classify this well barren.

And when you carry it over to the AC No. 8, you can see again it's very radioactive, and that well we know has 6.4 feet of 12 percent sylvite. You can do similar with -- the eighth zone is barren. And the fourth zone is mineralized in the AC No. 8.

Q. Then with respect to the, I guess, purpose of this exhibit then, what conclusion can you draw or have you drawn?

A. My conclusion is that you can use oil and gas logs to predict barren and to some degree mineralized zones in the potash zones.

Q. Is it also possible using these logs to correlate the relationship of these beds?

A. Definitely on most of the marker beds are probably polyhalite. And, as you can see, you go from 116 to 129 here. And if I drew all the marker beds in, you can see I would have a

lot of lines on there.

But if you would take a look below the fourth zone and above the 126, this is the stratigraphic position where the producing zones 1, 2, and 3 are. And you can see there's no gamma ray response, and these zones are all barren in this part of the district.

Q. All right. You have prepared an additional exhibit using then the information that you've gained through the logs; is that correct?

A. Yes.

MR. CARROLL: Exhibit 41. Mr. High, Commissioner LeMay, this exhibit also contains lines of the LMR, and it's necessary that we have some discussion with them. I propose to go along unless -- and if Mr. High thinks I've asked a question that may be too revealing of the confidential information, I would just ask him to stand up or let me know, and we'll handle it. We may or may not do anything. I just don't know.

MR. HIGH: That's fine with me. Sure.

CHAIRMAN LeMAY: We'll continue under that format.

MR. CARROLL: We would, with our

agreement, we have no problem with designating Exhibit No. 41 as a confidential exhibit.

Q. Now, would you explain basically what is being depicted here, Mr. Lammers, what you're attempting to do?

A. Well, first, I'd like to point out where my section runs, which I think was the previous exhibit.

Q. Certainly. Exhibit 40?

A. 40. If you'll look in the northwest quarter of Section 35, that's the northernmost well on my section. Then I come down to YPC, which is Yates, AIS No. 5 in the southwest-southwest of 36. Then I go across Section 2 and pick up AC-8, which was the corehole which I have a log on.

Now, if you would, what you should do with this block diagram is pretend you're standing to the south and looking at New Mexico mines, their area, and looking at Section 2, 34, 35, and 36. Then if you could imagine that we strip everything off down to the tenth ore zone, then you could walk around on top of the tenth ore zone, the tenth zone. The depths are given to the tenth zone, and the dashed contours are

the structural configuration on that zone.

Now, if we could start out in the north at the Union Federal No. 1, which I showed you the gamma ray log -- let me just point out one other thing. The scale is 1 inch equals 1,000 horizontal. And the slice of the block is 2-1/2 inches to 100 feet, which is the same scale as the logs on a reduced scale.

In other words, you can take these logs and put them by Yates No. 5, and the tenth ore zone will line up with the tenth ore zone, and the eighth, and so forth. If you could fold it up, and if you will put -- in other words, on the Yates well, take 1444 feet and put it approximately where that little dot is, and you will see that the marker beds and so forth line up.

So starting at the Union well, which I only -- this is from log data -- in my opinion the tenth zone is mineralized on the log. The eighth and the fourth appear barren. Then I come down to what we call ERDA 6, which is in the southeast corner of 35. The tenth ore zone is barren there. The eighth zone is barren. And the eleventh ore zone -- or the fourth ore zone

is barren. Those three ore zones are barren.

Q. Now, Mr. Lammers, you actually have core data from that ERDA 6, do you not?

A. Yes, I do. Right. That's core data, public data.

Q. All right. This particular hole was drilled by a federal agency; is that correct?

A. That's correct. I believe that ERDA stands -- I believe that it was the predecessor to the Department of Energy. It became -- it is what today is the Department of Energy. I believe that's correct. It is a federal -- an analysis. It is all covered in open file report 8146-A, which I inspected at the BLM office in Roswell.

Q. All right. Would you continue on. I'm sorry for interrupting you.

A. Okay. Let's for the moment go to the YPC AIS No. 5. This one is on my cross-section, this well. And the tenth, the eighth, and the fourth zones all are barren. The next corehole on the cross-section, this one is -- which I will not give any -- this one is the one that's --

Q. K-162?

A. K-162.

Q. That is a confidential --

A. Confidential hole. To me it appears mineralized in the tenth, barren in the eighth, and mineralized in the fourth.

Q. Now, is there a differentiation between the two kinds of mineralizations that you see?

A. Whether -- what? What kind of mineral?

Q. Whether sylvite or langbeinite?

A. Yes, there is. The tenth is sylvite, and the fourth is langbeinite.

Q. All right. If you'll continue.

A. Now, we come to AC No. 8, which is down in Section 11. And we have both core data and log data on this well. To me the tenth is mineralized, the eighth is barren, and the fourth is mineralized, same basis again, sylvite in the tenth and langbeinite in the fourth.

Now, this data all came out of open file report 7882-A, which is the WIPP report, which contains all the WIPP holes. Then let's move onto the west to FC-81. This is also published in the same report. Plus it is on open file at the BLM. And I got my information from the BLM. This core test is barren in all zones.

The tenth -- you can see all four zones are barren.

Q. The amount of mineralization there is so small --

A. Right. You have 5.6 feet of 2.7 percent. And you have 12 percent in the AC-8. So you could extrapolate where you put this red line here from that.

Q. Now, Mr. Lammers, there are oil and gas wells in Section 2; is that correct?

A. Yes, there's -- I believe I have them spotted on my map here. I have -- I believe, I think the two wells to the south are Pogo wells, and the other ones are the Yates-Graham wells.

Q. You're talking about the four dots that appear along --

A. If you took the west half of the -- or no, excuse me. You take the east half-east half of 2, that's where the four wells are located.

Q. That's the line of four dots that --

A. Right.

Q. -- appear that up and down the easternmost edge of Section 2?

A. Uh-huh.

Q. Now, you have examined those logs, have

you not?

A. Correct.

Q. With respect to the northernmost of these four wells, what conclusions did you reach with respect to your examination of the logs on that well?

A. The well, which would be the Commission's A location, to me appears mineralized.

Q. All right. What about the next well down?

A. That would be in -- let's see, well it would be -- the next would be the southeast of the northeast. That one appears barren.

Q. Appears barren?

A. Yeah.

Q. No mineralization; is that correct?

A. No. It's barren to me.

Q. All right. Now, the next location down?

A. Is barren.

Q. That would be the northernmost Pogo well --

A. That's correct.

Q. -- in the southeast quarter. What

about the farthest south well?

A. "P" location, that would be barren.

Q. So with respect to the three southern wells upon this eastern edge, they all in your opinion appear barren of mineralization?

A. Yes.

Q. And that would be in all of the zones?

A. That would be in the tenth zone definitely.

Q. Okay. Now, the tenth zone is the one you're looking at because that's the zone being mined by New Mexico Potash?

A. Right.

Q. Now, one of the other things that is drawn on this map in the red is the outline at least for this particular area of the LMR; is that correct?

A. That is correct. The red area represents the LMR.

Q. And, as you understand it, this was the LMR that was created after 1/7 of 92?

A. Correct.

Q. Now, Mr. Lammers, I've noticed that there is a dashed line that starts up in the northern part of Section 36 and extends westward

around ERDA 6, and it tracks to the west of the red line; is that correct?

A. That's correct. Probably half a mile.

Q. All right. Can you explain what that line is and the significance of it?

A. That is where I would draw my barren line or the -- on this color scheme purple or lavender. In the ERDA 6, you have core data that the tenth is barren. And, as I asked you to do in the start, if you were walking on the tenth zone and walked over ERDA 6, there it would be barren. And that's core data, public data.

Q. All right. Is it a fair statement then that you disagree with how this LMR was drawn?

A. That is a fair statement.

Q. All right. Can you, in your own words, explain why you differ?

A. Well, with ERDA 6, or E-R-D-A 6, you have core data that is given to us by the USGS open file 8146-A, and they list the tenth zone at 1386 feet as barren. And that's -- I mean, we have to accept the BLM's information.

Q. Is that why you have -- this white area that surrounds ERDA 6, why is it white?

A. That is white because of ERDA 6.

Q. Okay. You do not feel that there is any ore in the tenth zone there; is that correct?

A. That is correct.

Q. Like mineralization anyway?

A. Yes. I would say they do not even list any mineralization there.

Q. Now, your line, your dashed line stays within to the west of the red line. In your opinion, is this typical or atypical of how you find the laying down of the potash mineralization?

A. In an evaporite environment it's very typical. It's very erratic. Especially right in this particular area of the tenth zone, it can become barren with, you know, within one hole and mineralized in the next. It's very -- in the tenth zone, right in here, I would classify it as very erratic.

Q. All right. Now, Mr. Lammers, in your experience do you think it's fair for us to use the core data from K-162 and extrapolate from it even to the west of your line that you have drawn that we can say conclusively that there's mineralization there to the west of your line?

A. You must honor the data in ERDA 6 if

you are going to make a mineralized zone of the tenth zone, mineralized map.

Q. All right.

A. And I think ERDA 6 is probably right at a mile north-northeast of K-162; therefore, between these two wells, or core tests, there has to be a barren area.

Q. All right. And you feel -- what opinion do you have with respect to the way the LMR line was drawn by New Mexico Potash? Do you feel it honored ERDA-6?

A. If their LMR represents the tenth ore zone, they did not honor this core test, which is public information.

Q. Mr. Lammers, you said you drilled some 33 holes for Arco; is that correct?

A. Yes. I think we started in either late 66 -- or probably early 66, and we completed them late 68.

Q. This was an exploration type project; is that correct?

A. Definitely.

Q. What happened with respect to that project?

A. Well, the project got abandoned and

basically for two reasons. Our our sylvite zone, we did not have enough reserves to justify doing it any further. If you remember, I said I worked with the mining engineer and a mineral economist. Our mineral economist predicted that there would be a tremendous oversupply of potash when the Canadian mines came on.

And some of them came right around the mid-60s; some of them made it plus or minus in there. And we had to have such a high grade -- we had a minimum cutoff grade, and that was so high that it just, in sylvite, it never occurred. I mean, we didn't find it.

Q. How high was that?

A. Nineteen percent.

Q. Nineteen percent. And why was it set at that level?

A. That's what we were given by -- we were given that by the -- you understand what a mineral economist -- the one we worked with had a degree in mining geology and an MBA from Stanford. He's the one that worked that up and coordinated with me and the mining engineer. And he gave us that number.

MR. HIGH: Excuse me, Mr. LeMay. I'm

going to object on the ground of relevancy. I don't know what this has to do with Section 2.

CHAIRMAN LeMAY: It may have something to do with why they abandoned the project. If that's the reason you can just state it.

THE WITNESS: Can I finish, please?

MR. CARROLL: Yes, please.

THE WITNESS: The second project, which was a langbeinite project, we found some encouragement in this grade thickness, and we drilled a little bit. In other words, in these 30-some holes, you kind of -- when you get your first encouragement, you drill closer to it.

And we drilled several close coreholes around our most promising deposit. And the thickness and the grade could not justify the cost of a mine, mill, or refinery. And, in other words, it wasn't a big enough deposit to justify a mine and a mill, and we abandoned that.

Q. With respect to drilling the number of holes drilled, was there a rule that Arco followed as to how many holes were necessary to be drilled, distances for them? Could you discuss that for us?

A. I believe we had a rule of thumb four

per section when you wanted to develop -- four to five per section. If you thought you had a deposit, you wanted to drill that many per section.

Q. All right. Would that be for both kinds of ore or just one kind?

A. I would say it would be for both kinds of ore. The ones we drilled that many on, I believe, or close to that anywhere, are langbeinite. I think it would apply equally well to both zones.

Q. Do you know why you settled on the four to five per section?

A. Well, I think ore can change or, you know, so that the mineralization can change so fast from one hole to the next that you would need that many before you want to sink -- I don't know how much a mine did -- I did at that time, but I'm sure it's inflated. If you wanted to put a large sum of money into a shaft and a mill, you would want to make sure you had enough reserves to pay for it.

Q. And I believe it's your testimony that a number of these coreholes, the four or five per section, were necessitated because of the erratic

nature of these deposits; is that correct?

A. That is correct.

Q. With respect to Section 2 and the one corehole that we have, 162, do you think that that one corehole is sufficient to be able to define Section 2 as having commercial ore in it?

A. No.

Q. What opinion do you have with respect to the way this LMR is drawn? Do you feel it was fairly drawn?

A. I'd sure disagree with it around ERDA-6. If you're going to draw a tenth ore zone, I think you have to honor that well. That's where my white area is up there.

Q. Certainly. With respect to Section 2, do you have an opinion there?

A. I would disagree with it on the east half and quite possibly on the west half too.

Q. Why would you disagree with it on the west half?

A. Well, you have a barren hole in 81, in FC-81. I wouldn't want to -- I would want another corehole in 2, probably 2 -- or that would be my opinion. So I would disagree with it over there.

MR. CARROLL: Chairman LeMay, I would move admission of Exhibits 38-- oh, excuse me, 39, 40, and 41 at this time.

CHAIRMAN LeMAY: Without objections, those exhibits, 38 through 41, will be admitted into the record.

Mr. High?

MR. HIGH: Yes, I do have some questions, Mr. LeMay.

EXAMINATION

BY MR. HIGH:

Q. Mr. Lammers, what are the three things you said could cause radioactivity?

A. Thorium, uranium, and potassium.

Q. Have you generally found any of those elements in the potash basin other than potassium?

A. No. Generally potassium is the only one found.

Q. And what do they cause your gamma log to do when you find them?

A. They cause it to read a lot higher radioactivity.

Q. So you get a big spike on your gamma log?

A. Yes.

Q. You've been reading these gamma logs, I guess, for a long time?

A. Oh, since 1956.

Q. That's a long time. You're fairly comfortable with what you see on one of them, I take it?

A. Yes.

Q. Is this an art or science that requires judgment? Can reasonable people disagree over what a gamma log does?

A. A gamma ray log is the simplest of all logs. These logs are run in suites. As I pointed out, these are gamma ray neutron density logs on there.

Q. When I say gamma ray logs, I'm referring to the whole universe of whatever they are. Maybe a neutron.

A. The gamma ray is the simplest to read.

Q. And my question is can competent people reasonably disagree over what they show, or is it so black and white that anyone who knew anything about it would know what was there?

A. I guess you could reasonably disagree on most anything.

Q. So -- well, let me ask it differently. Would it surprise you if I put a witness on the stand and he looked at the same logs as you did and came up with a different conclusion? Would that be unusual? I'm just trying to get how fine an art this is.

A. It would be in the case of the YPC-AIS No. 5.

Q. And why is that?

A. There's no radioactive response at all.

Q. Just nothing there?

A. No. You've got 20 units.

Q. So when there's nothing showing up on the log, it's easier to know what's not there than if you do have some spikes?

A. Yes.

Q. In at least in terms of potassium?

A. Would you repeat that?

Q. Yes. At least in terms of potassium, if there's no spikes on the log, you know there's no potassium because if it was there, they'd have spikes?

A. That is correct.

Q. Okay. And you believe you can tell from these logs whether or not it's sylvite or

langbeinite?

A. I think whether -- if you had a complete sweep of logs, it's documented that you can tell.

Q. Can you do that?

A. I could if I had a gamma ray neutron, a sonic, and a density log.

Q. What is it about the logs that separates langbeinite from sylvite?

A. The density and the travel time on the sonic.

Q. The size of the spike?

A. No.

Q. Anything else that you can name that separates or would make a langbeinite and sylvite show up differently on these logs?

A. Those would be all of it. The biggest difference between langbeinite and sylvite is its density.

Q. How about the height of the ore?

A. You can get some indication, but you could not say. In other words, if it were in AC-8, you know it's thicker -- it's fairly thick there because -- if you -- it also depends. If you logged the well and you drilled it yourself,

you would have a different set of logs sometimes than if you have to get them from a commercial source.

Q. How do you know how you have more potassium there as opposed to lesser potassium? Would it be the size of the spike?

A. It would be the size of the spike and the thickness.

Q. I'm sorry. Go ahead.

A. No. That would be all.

Q. And the frequency of its occurrence in a continuing pattern could have some indication of depth of the potassium?

A. The frequency?

Q. Yes. If you had a spike that occurred more than once, could that indicate a greater thickness of potassium than a single spike?

A. Probably not.

Q. So just one spike, and that's enough to show mineralization?

A. Well, you could get two spikes if you had a 10-foot zone with sylvite in the top of 2-foot, 3-foot barren zone in the middle, and another mineralized sylvite zone in the bottom, then you would end up with two spikes.

Q. Now, what depth do you have for the tenth ore zone in these areas, Mr. Lammers?

A. Well, at AC-8 I have it from core at 1589. And on the log I think it comes in at 1590. On the FC-81 I have it at 1526. I will not give K-162. On the Yates I have it at 1440 feet. And in the Union well I have it right around 1400 feet.

Q. Is the potash deposit dipping any particular direction?

A. If you will note, there is a little ridge right going through the center of 35. This is also documented, I believe, in the ERDA-6 publication.

Q. Which way is the dip in Section 2?

A. If there's a ridge -- restate that again, please.

Q. Is there a ridge in Section 2?

A. No.

Q. Is there a dip in Section 2?

A. Yes.

Q. What direction is the dip?

A. Dip is to the south.

Q. Directly south?

A. Maybe -- yes, almost directly south.

Q. And from corehole 162 down to AEC-8, at least that area, would be a dip of how many feet?

A. You will have to give me the dip on K-162.

Q. 1523.

A. Okay.

Q. And AEC-8 is 1589.

A. You have a dip of 1589 -- you have a dip of just right at 50 feet, plus 2002 and you're at 1953. If my quick arithmetic is right, I believe that's 49 feet. So you have 49 feet of south dip.

Q. All right. Look over to the right of Section 2 along the edge on the line that you've dawn. I assume you've drawn down from Yates No. 5. Do you see that line that goes about two-thirds of the way down Section 1?

A. Yes. That straight line?

Q. Yes, sir.

A. Yes.

Q. What is that line?

A. That's the depths of zones in the Yates well. The top of the tenth zone there is at 1440, and then you see my little 1500.

Q. I'm sorry. That's the side of your

cross-section?

A. If you will, take this and look at it as a block, and those are a slice taken out of the earth.

Q. I understood that when you said it a minute ago. But when I was looking at it here --

A. All four coreholes are the same vertical scale.

Q. Now, up on Yates No. 5, on your dashed line, how did you decide to draw it out the location you drew that out?

A. Well, that well is barren.

Q. I know it's barren. I don't dispute that. My question is, how did you decide to get the distance you got from the Yates No. 5 out to that dashed line?

A. To the east?

Q. Yes, sir -- no. No. To the west. Look at Yates No. 5.

A. Okay. To the west?

Q. Look to the west where the dashed line is you told us about. Do you see that?

A. Yes.

Q. You put that line on this piece of paper?

A. Right.
Q. My question is, how did you decide to put it at that particular position?
A. Well, I have it west of the ERDA-6.
Q. I know you do, but you've also got it coming down below Yates No. 5.
A. Oh, you're talking to the southwest?
Q. Yes.
A. The Graham -- I believe that's the Graham No. 1 at the A location, that has mineralization.
Q. Well, let me ask you a different way. Why didn't you come in closer to Yates No. 5 with your dashed line? You stayed away a distance there, didn't you? Do you understand the distance there I'm talking about? May I approach the witness?
CHAIRMAN LeMAY: Sure.
Q. Let me just point out something.
A. You're asking why I didn't draw this line?
Q. Yes. Southwest of Yates No. 5, there's a dashed line. Do you see that dashed line?
A. Yes.
Q. And my question is, after you came

around ERDA-6, why did you keep that distance away from Yates No. 5?

A. I believe I may have other well control in here.

Q. Well, that's my question. Do you have other well control?

A. Yes.

Q. Why isn't it on the map?

A. That data might be proprietary.

Q. Do you know if it showed mineralization or not?

A. These -- I'll have to get -- I won't answer that.

Q. Well, you told us a minute ago that the northernmost Graham No. 1 is mineralized?

A. Yes.

Q. Okay. And you've got this line that you call barren. How close to Graham No. 1?

A. Probably 4-, 500 feet.

Q. Okay. Yet you've got the barren line away from Yates No. 5 how far?

A. One thousand feet.

Q. Are you giving a greater distance of influence on the barren one than you are on the mineralized one? Do you see what I'm getting at?

A. I do not think I am. This is a matter of interpretation.

Q. Okay.

A. And this is the way I interpret it.

Q. Different people could put this line on the map at a different location; correct?

A. Correct.

Q. Competent people could have made a difference in judgment as to where that line ought to go; right?

A. You could get two geologists to contour most any map, and I doubt whether they would be similar.

Q. Okay. But would it stand to reason, Mr. Lammers, that the distance you stay away from, or the influence you give on a log that you conclude is barren, you ought to give an equidistance on interpretation on a log that shows mineralization; would you agree with that?

A. That would be a --

Q. Would you agree with me that you have not done that in drawing this dashed line on Exhibit No. 41?

A. If you only honor the Yates AIS-5 and Graham 1.

Q. If you gave -- let me ask it a different way. If you gave the same interpretation to Graham No. 1, which you said showed mineralization, as you did to the log on Yates No. 5, that dashed line that you drew should be equidistance between the two; right?

A. Unless you had an unmineralized well in the northwest-northwest of 1.

Q. And we don't know that just looking at this exhibit, do we?

A. No.

Q. Do you know whether or not the BLM uses gamma or neutron logs for purposes of showing mineralization or the absence of it?

A. I do not.

Q. Have you ever inquired?

A. I have inquired.

Q. And what response did you get back?

A. The response is they can only make their triangles with core tests.

Q. In other words, they don't use them; right?

A. That's correct.

Q. Now, when you were reading the log of this Graham No. 2, I guess that would be the

second one down in the top of Section 2, wouldn't it?

A. Uh-huh.

Q. When you were looking at the log, you concluded that was barren on the tenth ore zone?

A. Yes.

Q. And there were no kicks on it; is that what --

A. The kick on it is considerably less than the polyhalite.

Q. Was there any mineralization shown by the log on Graham No. 2?

A. I would not put any mineralization on it.

Q. Even though it had some kick on it?

A. Correct.

Q. And why is that?

A. Sylvite reads 500 into infinity API units. Polyhalite reads about 270. If it's reading less than polyhalite, therefore it has a lot less radioactivity. And with the sylvite zone you can do that.

Q. Is there anything else in Section 2 that you know of that would cause a kick other than potassium?

A. No.

Q. And the Pogo well, the second one from the bottom in Section 2, does that corehole show any mineralization at all?

A. They'd be -- both of those are in the same category. The spike on them is considerably less than the polyhalite spike.

Q. And how about the Pogo well down at the end? Did you say that one showed mineralization?

A. No. The southeast-southeast?

Q. Yes, sir. The southernmost one?

A. Uh-huh.

Q. Did it show --

A. Same category as the other two.

Q. Did you use any set standard in what influence you would give to these various holes? Do you understand my question, Mr. Lammers?

A. No.

Q. Okay. Then let's go directly up to ERDA-6. Your dashed line comes out around ERDA-6 at a specified distance, does it not? I don't mean specified. At a measurable distance?

A. Yes. Approximately 1,000 feet.

Q. All right. How did you arrive at that distance?

A. That was arbitrary because I had no control to the north of there, to the northeast. If I -- the Union well gives me control, but I don't know whether the Union well has, say, 10 percent, 8 percent, or 16 percent.

Q. Do you know whether or not there's any standards that are followed in the basin with respect to the distances that you'll give on the corehole results?

A. I think the BLM standard.

Q. And what is that?

A. I think they use a mile-and-a-half, three holes.

Q. And how much influence would they then give the core results in a single hole?

A. That I don't know for sure.

Q. But you didn't follow those BLM standards in deciding whether to put your little dashed line on here, did you?

A. No. But I probably was more than generous keeping it that close to ERDA-6. If you gave ERDA-6 zero, which it has and, you know, I don't have any control to -- but my dashed line is probably at 2 percent.

Q. Well, did you look at any of the logs

up in Section 16 above Yates No. 5?

A. I have no Section 16 on the map.

Q. I said Section 36.

A. Yes.

Q. In fact, in looking at another exhibit, Mr. Lammers -- this is Yates Exhibit 38 -- it shows in Section 36, in addition to Yates No. 5, there are two, four, six, eight, nine more wells. Did you look at any of those logs?

A. Yes, I did.

Q. And did they show any mineralization?

THE WITNESS: I'd have to ask counsel if I could answer that.

MR. CARROLL: There is no problem with it, Mr. Lammers.

THE WITNESS: We're giving out data that we got ourselves.

Q. (BY MR. HIGH) Whatever that data was, it's not shown on Exhibit 41; is that right?

A. No. Some of these wells in 36 do not -- they didn't log the salt section. The other one is predominantly barren.

Q. Is your only disagreement, Mr. Lammers, with -- let me come back to that in a minute. The blue you show on Exhibit No. 41, you painted

that blue?

A. Correct.

Q. And you don't have any problem with that being -- I assume that blue means mineralized; right?

A. That means mineralized.

Q. And you don't have any argument over that area shown as being mineralized except those areas that you've talked about here with the dashed line?

A. I would have a problem between AEC-8 and FC-81. I think if you extrapolate 2.7 and 12.3, that red line comes approximately 1/8 plus or minus percent.

Q. An extrapolation is a mathematical tool, is it not?

A. That's what the BLM uses.

Q. And would you agree that wherever that extrapolation line fell on a certain cutoff, that's where that red line ought to be? Assuming the extrapolation is correctly done, would you then have a problem with where the line was?

A. Right. I wouldn't have a problem. I don't think -- if it checks out, I just did this in my head.

Q. Okay.

A. If it checks out at 8 percent, I'd have a problem with it.

Q. I would too. Okay. But if that red line falls at a location where through extrapolation it's supposed to be, you wouldn't have any problem with it then, would you?

A. No. But I'd want to check.

Q. Sure. Assuming the map is correct?

A. I think it's too far to the east.

Q. Okay. But you don't have any dashed lines drawn over there like you do on the east side, do you?

A. The reason I don't is I put -- the last thing I did with this on Labor Day was put the New Mexico -- that's your LMR.

Q. I accept that. And my question is that the only place you put a dashed line showing where the LMR should be, as opposed to where it is, is along the east side; right?

A. That is correct. However, I'm not privy to the data on the other, so we have no way of checking.

Q. And did you arrive at the distance from the Pogo well in Graham No. 2 where the line is,

the little dashed line, the distance from that just by using what you thought you were comfortable with in interpreting the data?

A. Yes.

Q. Now, on this project I'm talking about for Arco --

A. Yes.

Q. -- Arco did not own a mine at the time you were working on that project, did it?

A. No.

Q. So Arco was looking to make a rather large investment in not only a mine, but a milling facility?

A. That's correct.

Q. You can't have a mine without the mill, can you?

A. Not unless you can sell the ores.

Q. And that would involve a very large expenditure to get in the mining business?

A. Along with a conveyer belt.

Q. Okay. Do you think there's a difference, Mr. Lammers, in the number of coreholes you would drill if you were considering making an investment like that, as opposed to already having a mine and mill in place, and

looking for other ore where you've already made the investment?

A. There would be a difference.

Q. And if you've already made the investment and you have the mine and mill in place, you want to save and cut down on expenses as much as you can; right?

A. I would assume so.

Q. And drilling too many coreholes would be an expense, wouldn't it?

A. I think we had a saying, "It's difficult to drill too many coreholes."

Q. Well, from a geological or geologist's standpoint, you may be entirely correct because you're looking for certainty where none may exist; right?

A. You bet.

Q. In a mine you're not necessarily looking for that, are you?

A. Yes, that's true.

MR. HIGH: We have nothing else.

CHAIRMAN LeMAY: Additional questions of the witness?

MR. CARROLL: Just a couple.

FURTHER EXAMINATION

BY MR. CARROLL:

Q. Mr. Lammers, if you'd look at your Exhibit No. 41, and let's talk about ERDA-6 in Section 35 and also coreholes K-157 and K-158 just to the north in Section 26.

A. Yes, I see that.

Q. Are you located?

A. I'm located.

Q. All right. Now, as this map is drawn, K-157 and K-158 are drawn in a barren zone; is that correct?

A. Yes.

Q. All right. And if we used the method of extrapolation that Mr. High and you were discussing a moment ago, if we drew a line from ERDA-6 to K-158, and if both of them are barren, couldn't it also be just as reasonable to say there's no ore at all between ERDA-6 and K-158?

A. Certainly. What you could do is take the southernmost barren line and connect it up with the -- or that would be the westernmost barren line and connect it up with my westernmost dashed line, and that would be a very logical conclusion. And you could do the same with the northern line.

We're assuming K-157 and 158 are both barren, because it's in their barren zone, and ERDA-6 is barren. There's no reason at all to put the blue in between, like I show it, which is their LMR.

Q. So really your dashed line is being very generous?

A. Very generous.

Q. All right. And in fact, Mr. Lammers, you could also connect up ERDA-6 with FC-81, couldn't you?

A. Yes. There's no coreholes to keep you from doing that.

Q. And in fact you could then, if you connected it up and perform the same analysis, that would say all of Section 2 is barren except for the area around the one little corehole?

A. That's correct. And I think, if I remember right, I may have the geologist from the State Land Commission, Mr. Szabo, is it?

Q. Yes.

A. I think he pointed that out.

Q. In his testimony?

A. In his testimony.

MR. CARROLL: That's all I have -- oh,

excuse me. Was there something else you'd like to add?

THE WITNESS: No.

CHAIRMAN LeMAY: Additional questions? Commissioner Carlson?

EXAMINATION

BY COMMISSIONER CARLSON:

Q. If I'm eyeballing the four locations that Yates wants to drill on, they'd be in your blue area that shows mineralization; is that correct?

A. More correctly they would be within their LMR, blue area.

COMMISSIONER CARLSON: That's all I have.

CHAIRMAN LeMAY: Commissioner Weiss?

COMMISSIONER WEISS: Yes.

EXAMINATION

BY COMMISSIONER WEISS:

Q. Leo, did I hear you say that Arco was going to mine langbeinite?

A. Within the basin, we had it fairly -- we had a langbeinite deposit.

Q. I thought I had heard that nobody knew how to do that or process it except IMC.

A. In 1966 they didn't tell us that.

COMMISSIONER WEISS: Thank you.

CHAIRMAN LeMAY: Couple questions, Mr. Lammers.

EXAMINATION

BY CHAIRMAN LeMAY:

Q. On your gamma ray curve, what was your baseline for polyhalite? Seventy-five units anything --

A. Well, let me, if I could, read -- you can get this information on page 143 of Schlumberger's logging book. And the polyhalite has a response of 180, now, and sylvite is 500. And when you -- that's pure. If you mix them with salt, the polyhalite is always going -- the sylvite is always going to be greatest. And whether you want to put it at -- it would probably be 50 API units.

It also depends -- in other words, if you would want to do a scale, you find a good polyhalite bed and then go from there.

Q. So the ratio is really what you scale?

A. Right.

Q. Is that affected by casing in a hole versus openhole logging on the gamma ray?

A. The gamma ray is the least affected. There again it affects all zones equally. And do you see what I mean? The casing and the cement depress the effect, but it does the same to each one.

Q. And is the assumption that we had mineralization progressively from zero to commercial grade, or do we have, like, faults or abrupt terminations of mineralization? Or is it more uniform than maybe some of our oil fields?

A. Within the tenth zone?

Q. Within the tenth zone you can really pretty well contour from zero -- I mean, percentage-wise from zero to maybe 10 percent mineralization, between a zero point and a 10 percent point? What I'm getting at is when you're looking at -- you all work with shows. You have noncommercial mineralization that might indicate proximity to commercial mineralization?

A. Okay. In the tenth zone, in any evaporite, I would say it's much more erratic than take the Yates sand. What you have going for you in the Yates or the Queen or any of those Permians is you drill a dry hole, you've got the Yates or the Queen or whatever. You drill a

producer, you've still got the Yates.

When you drill a dry hole or a dry core test or a producer, you don't -- the mineralized zones are not continuous and they're not like, say, coal where you can trace the seam, you know, all the way around the mountains.

CHAIRMAN LeMAY: I have no further questions.

Anything additional of the witness?

MR. HIGH: I'd just like to follow up.

FURTHER EXAMINATION

BY MR. HIGH:

Q. Mr. Lammers, do you have any mining experience in the potash basin?

A. What do you mean by that?

Q. Well, you're talking about what happened in the tenth ore zone. Have you done any mining in the tenth ore zone?

A. No, I haven't.

Q. Have you ever worked for a potash mine in the Carlsbad Basin?

A. I worked for one of the largest mining companies.

Q. Which one is that?

A. Atlantic Richfield.

Q. Have you ever worked for a company that has an operating mine in the potash basin?

A. No.

Q. So you don't have any idea of what's going on down in the mining horizons when a mine is mining on the tenth ore zone, do you?

A. Just from when I've been in the mines.

Q. But you've never been there in a working capacity or a supervisory capacity over the mining operation, have you?

A. No I've never been in a potash mine in a working capacity.

MR. HIGH: Thank you.

CHAIRMAN LeMAY: Any questions of the witness?

If not, he may be excused. Let's recess until 2:15. Thank you very much for your timing in this, gentlemen. I appreciate it.

[A recess was taken.]

CHAIRMAN LeMAY: We'll continue. Mr. Carroll.

MR. CARROLL: Thank you.

MR. CARROLL: Our next witness will be Gary Hutchinson.

GARY L. HUTCHINSON

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

EXAMINATION

BY MR. CARROLL:

Q. Would you, please, state your name, place of residence, and occupation?

A. Gary L. Hutchinson. I live at 956 South Elizabeth, Denver, Colorado. I have a minerals management consulting business.

Q. Mr. Hutchinson, would you first start with -- let's start with your educational background.

A. I have an engineer of mines degree from the Colorado School of Mines. I have a master's degree from the same institution in mineral economics.

Q. Did you write a thesis with respect to your master's degree, Mr. Hutchinson?

A. My degree was through an executive program. We had to write many papers. We did not have to write a thesis.

Q. But that master's degree was in mine economics?

A. Mineral economics.

Q. Mineral economics. Are you a member of

any professional societies or organizations?

A. Oh, many. Among them AIME, International Association of Energy Economists. There is a new organization that I'm a founding member of concerning mineral economics, principally in the United States. I've forgotten the name of it.

Q. Mr. Hutchinson, how long have you been involved or has your work experience period been?

A. I began working in the heavy construction industry when I was 16 years old. I worked my way through college. And upon graduating from the Colorado School of Mines in 1962, I pursued a career in the heavy construction industry, principally in major underground structures, powerhouses, subways, shafts.

In the early 70s, mid-70s I was working for S. J. Groves & Sons Company. I had started a tunnel division for them. The president of the company asked me to do some development, business development work, and that took me to Saudi Arabia, Brazil, Central America, but mainly to the west, western states, to look into the mining industry. We started a mining company there. A

few years later we started an oil and gas company.

In the beginning of 1981, I started my own consulting business. And since then I've had many projects principally in the management and evaluation of all minerals properties including oil and gas.

During that period of time, I founded a small oil and gas exploration company, which was quite successful, and sold my share of that in 1985.

I managed the entire mineral estate of the Rock Island Railroad while it was in trusteeship through liquidation. I continued to manage it as a reorganized company and then a large financier in Los Angeles bought those minerals and much real estate from the railroad, and I continued to manage those minerals plus his for several years.

Q. Mr. Hutchinson, with respect to the kind of problem we have or are experiencing with this particular case, we have two competing type interests applying to develop the minerals that they're interested in.

Have you had any direct experience in

handling situations like that or mediating a situation where you have two competing forces trying to mine minerals and to develop where one may in some way interfere or make inconvenient the development of the other?

A. Yes. Many times when I was managing the Rock Island Railroad minerals, I'll call them, we had 15,000 parcels in 12 states, and I think we had 600 wells in total, 60,000 acres of coal reserves, and some other minable minerals. Most of the revenue was from royalties. That was my mandate: Maximize our long-term royalty.

And as a matter of course, I did resolve many conflicts between the petroleum companies that we had granted leases to and the coal companies. Primarily those were in Oklahoma and Texas.

Q. Basically then your work experience has covered three areas: mining engineering, mine economics, and minerals management?

A. Yes, with a considerable amount of time in the very competitive heavy construction industry.

Q. Now, Mr. Hutchinson, have you had occasion to testify before regulatory agencies

within the United States?

A. Yes, I have.

Q. What states have you testified before?

A. In Oklahoma, Texas, and in Kansas.

Q. Have you had your credentials as an expert in these fields that you have just talked about accepted before those agencies or within those states?

A. They were primarily in oil and gas and mining.

Q. All right. You have not testified before the Oil Conservation Commission or regulatory agency within the state of New Mexico, have you?

A. No, I have not.

Q. Have you managed properties in and around the state of New Mexico?

A. Yes, in a couple of instances. I evaluated a very large company for purchase or -- it wasn't actually for purchase. It was for really a breaking up of the company with considerable property in the San Juan Basin and just across the Colorado line in an industry that is probably more prevalent in New Mexico than in Colorado. I was the Court-appointed receiver of

some coalbed methane gas wells.

Q. So your experience does cross over both the mining and petroleum industries?

A. Yes, it does.

MR. CARROLL: Mr. LeMay, I would tender Mr. Hutchinson as an expert in the fields of mine engineering, mine economics, and minerals management.

CHAIRMAN LeMAY: He is so qualified.

Q. (BY MR. CARROLL) Now, Mr. Hutchinson, as a consultant there has to be a beginning point for your involvement in any case. Could you explain to the Commission just exactly how your involvement in this case began and how your research and study began?

A. Well, all of my consulting business comes from law firms or predominantly from law firms, mainly law firms involved in mineral law. And from other, you know, large consulting companies that know of me and my special expertise.

A consulting firm representative called me early this year, probably in early April, and asked if I was available to work on a problem that involved both oil and gas and mining, and I

was the only one that he knew of that could do that. And he put me in touch with the Yates Corporation, and I talked with their representatives and traveled to Artesia to see what was on their mind and whether or not I could help.

Q. What did you conclude after your contact with Yates Petroleum?

A. Well, we had a short meeting one afternoon and -- not really a short meeting, but they identified the problem, as they saw it, that they were being kept out of what we know now as the -- or I know now as the New Mexico Potash area, and that they knew mining was important to that area. I mean, after all, they're headquartered in Artesia, just a few miles from this area.

But they were troubled that they weren't getting a fair shake on whether or not they could get in and drill some wells. They gave me about 8 inches of documents to read that night, and the next day I went back and told them that they had some -- they did have some major problems; that there were a lot of safety issues that I had read about; and that they might have a

real difficult time.

They asked me if I felt that I could try to help them in interpreting for them what really goes on in the mining industry to see if we could work together and solve their problems without compromising my situation, being a mining engineer and deriving some of my revenue from that industry.

I told them that I would be happy to do that; that I had done it in the past. I thought I could help them at least understand the problems of the mining industry. And I extracted from them a commitment that, if I were to see a situation in this project where I thought they were out of line or wanted to do something in the potash mining area that I felt would hurt a mining company, I would tell them and they would respect my judgment, and they agreed to that. And they have lived up to that agreement to this day.

Q. I take it that an agreement was reached, and you performed some kind of initial review of that; is that correct?

A. Yes. I told them I needed, I think, three weeks to digest the information that they

had given me and to do my own research. After that period of time, I went back with what I thought to be an identification of the problems and a plan to attack those problems in a constructive way.

Q. What were those problems that you identified?

A. Well, there are really maybe as many as half a dozen problems, four really predominate. The potash mines are fighting for their economic lives. They've got a tough uphill battle to fight. They're price takers in an economic sense. The Yates people understood that because that's what they are too.

I discovered that there had been considerable misinformation being projected by the potash industry representatives towards the regulatory agencies. That was certainly my opinion.

The oil and gas companies were frustrated, very frustrated, by the unilateral abilities of the mine companies to arbitrarily keep them from drilling. And the frustration was founded in the fact that they were just unable to get any information to confirm or deny whether or

not they were encroaching upon mining rights.

Even through the BLM or the state, specific information was totally withheld and in confidence. And you fellows know a lot more about the history of that than I do. I'm just talking about the problems that I identified early this year.

Yates, to reiterate, Yates did not want to interfere with the legitimate mining plan or place any mining operations in jeopardy as a result of its operation. So that was my starting point.

Q. Mr. Hutchinson, you have mentioned the problem of this confidentiality of material. Was there sufficient material in your opinion, available to you in the realm of public information, to be able to perform the tasks that were placed on you by Yates Petroleum and would enable you to render some expert opinions with respect to the main question that we have before us, and that's whether or not the drilling of these four wells will create an undue waste of commercial potash?

A. All of the information that I had gained at that point was public information. It

was information that I dug out of the libraries and out of my own files and my economic evaluation.

So understanding the limitations and the background and workings of your regulation, R-111-P, I told the Yates people that probably the best thing I could do for them would be to analyze the situation based on only public information; that I did have an appreciation at that point for the competitive industry in New Mexico that the New Mexico Potash operators are in. They're fighting tooth and nail to dispose of their product in a very tough market where they can't set their own price. And that I could appreciate within certain limits that they needed to have that confidence -- some of the information kept confidential.

So with that presentation to Yates they said, "Have at it," and I then put together the information that I have for this hearing on what I believe to be 100 percent public information.

Q. Well, Mr. Hutchinson, have you formed an opinion as of today's date, with respect to whether or not the drilling of the four subject wells would create an undue waste of commercial

potash?

A. Yes, I have. It's my opinion that there are no economically minable reserves in Section 2 today. And without economical reserves to exploit, no mining of potash will take place, and therefore the drilling of an oil or gas well will not result in the waste of economic potash.

Q. Would you explain for the Commission how you reached that opinion?

A. Again discovering that the potash production and marketing information was being held confidential by the companies and the regulatory bodies, I started digging up public information on the industry and how it's regulated in New Mexico.

Looking for a starting point, I did concentrate on R-111-P and therein really found the reason for the petroleum industry's frustration. As you're aware, no drilling is allowed within the LMRs without the permission of the mining company. The mining companies may unilaterally determine the extent of their LMRs.

The state regulatory agencies apparently have no right to question the validity of the LMRs. And if they do have the right,

which it doesn't appear that way to me, they do not have the technical expertise or information to make a judgment as to the validity of the LMR as it is defined in R-111-P.

In my opinion the R-111-P was not written with an eye towards practicality of allowing the industries to work out compromises through regulation, but very craftily drafted to hold oil and gas development at bay unilaterally.

It's my understanding, however, that R-111-P should not be the subject of these proceedings and that the Commission has the right to grant exceptions to the rule, which disallows drilling within the LMR, which brings us to this point.

Q. All right. So on that basis you have, I guess, planned or organized your testimony then?

A. Yes. Being an engineer, really growing up with an engineer, I'm accustomed to working with natural laws. I researched the economic laws of supply and demand, laws bendable by regulation in the short-run, but not breakable in the long-run.

The economic research enabled me to put the conflict into perspective and to better understand the position of the potash industry in New Mexico and to project that understanding to my client and now this Commission.

In fact, the questions before us will ultimately be determined by economic forces. For one, the question of how long and at what rate the existing mines can produce muriate of potash into the marketplace and then the pressure of the loss of oil and gas revenues to the state.

Correspondingly, without access to the specific information now held confidential, the best source of information for analysis is supply and demand characteristics of the industry to which all mines must comply sooner or later in our capitalistic society.

MR. HIGH: Excuse me, Mr. Lemay. Could I get a copy of what Mr. Hutchinson is reading? I don't have a copy in the exhibits.

MR. CARROLL: It is not an exhibit. It is something that I prepared for the use of Mr. Hutchinson and myself. And there really aren't any copies without my notes and thoughts in it. I'm not sure that he's entitled to it. We don't

propose to introduce it as an exhibit. He's testifying to it, and it's really just an aid for us because this is lengthy testimony to keep track of where we're going.

MR. HIGH: I'm entitled to it in preparation for cross-examination. I mean, the witness can't read something that I can't cross-examine from.

THE WITNESS: I prepared these notes. I have a lot of things to talk about. This is a very complex problem. And I'd have to be about 300 years old to get up here and repeat this from my brain only. I am unable to write longhand due to an accident, so I am able to type, and that's where this comes from predominantly.

CHAIRMAN LeMAY: Let me ask Bob Stovall to give us his opinion of whether that constitutes.

MR. STOVALL: You guys are really doing a job of testing my rules of evidence. At least I brought the book this time.

Mr. Chairman, what I'm going to suggest is, while I look this up, I think you can proceed with the question.

MR. HIGH: 26. Look at Rule 26.

MR. STOVALL: Thank you, Mr. High.

And then I'll get you an answer.

CHAIRMAN LeMAY: Can we proceed with the testimony and then when Stovall has an answer he'll break in and give us a legal opinion?

MR. HIGH: That's fine.

Q. (BY MR. CARROLL) Would you continue? I'm not sure exactly. I guess right now you have testified that you did perform some economic research and you have prepared certain exhibits, have you not, to aid in presenting the results of this research to the Commission?

A. I have. And I've blown up, so that I can talk from that, and you all have 8-1/2-by-11 copies of these. But it might be --

MR. STOVALL: I need to go off the record for a second.

[A discussion was held off the record.]

THE WITNESS: This shows US potash consumption thousands of metric tons of K_2O, years from 1981 to 1991. This black vertical column is consumption in any given year. The red line is the price in 1991 dollars. You would think that as price drops, demand would go up. That isn't the case in potash.

This aberration here in 1984 shows up that demand is really not purely a function of price. Other considerations where the demand in the last four years has been relatively constant, the price has, in constant dollars, been relatively constant also.

Trying to figure out why potash doesn't respond to what we think would be normal supply and demand curves --

Q. (BY MR. CARROLL) This is Exhibit 43, is it not?

A. This is Exhibit 43. I apologize. This shows agricultural demand, this line with the open squares, again for a ten-, eleven-year period, shows the crop income -- or excuse me, the consumption. The crop income to the farmers is shown in the line that has the solid black points along it. You can see that crop income generally declined from 1981 to a low in 1987. Then it's climbed back up to where it is in 1991.

Thinking about what causes a big fluctuation in crop income, as you all may know, we're a big exporter of food in this country. We supply the world with a lot of food. But if our

dollar is strong, we don't sell much food to other countries.

And when I plotted and lagged by year the dollar strength, I found a pretty good indication that when the dollar is strong, crop income is going to be low. When crop income -- or when the dollar drops, crop income increases.

Q. Now, when you speak on this exhibit, US consumption, you are talking about the consumption of potash; is that correct?

A. Yes, muriate of potash in terms of metric tons of K_2O or prices per metric ton of K_2O.

Q. And the conclusion to be drawn from this exhibit is that basically consumption of potash follows the rises and falls of farm income?

A. Rather than the price, it's more of a function of what the farmers want. And I don't think I have to tell this group that potash, the potassium in potash is a necessary ingredient for crops, along with phosphorous and nitrogen.

Q. This next exhibit is 44?

A. Yes, Exhibit 44. I took all the information I could find across the X axis.

Horizontally we have thousands of metric tons consumed. And on the abscissa, we have the price in 91 dollars per metric ton of K_2O.

In 81 we had a very high consumption and a very high price. That was great for everybody. In 82 it dropped down to here. 83 is here. 84 it went back up. I mean, consumption went from 5.2 million tons way up here to almost 6 million tons. Then in 85 it dropped down here. 87 and 86 was a terribly bad year. And, lo and behold, here we are with the highest strength of dollar we've had in the last ten years. 87 started moving back. Then we hit 88, 89, 90, and 91.

What I was looking for here is getting the other problems, or the other influences on the price of potash out of the picture. I'm looking for a demand curve so that we can anticipate, since we did find a trend -- I was happy to find that -- that at a given within this range at a given demand, we can anticipate a price.

The next I did was try to figure out where the potash supply to US came from.

Q. That would be Exhibit 45; is that

correct?

A. Exhibit 45, correct.

A. Again these tall solid black lines, in terms of metric tons of K_2O, represent the US demand. That's how much we consumed each year. The gray crosshatched indicates the same tons imported from Canada. The red on mine -- and yours may not be colored red; it may just be the short line here that has dots on it -- that indicates the amount of potash that went into the US -- or that was produced in New Mexico.

So you can see this gave me a good idea of what the relative importance of potash from New Mexico was to the US demand. I had read in some of the publications information that led us to believe that this is much stronger than it actually is.

Q. It would appear from this exhibit that the US demand is somewhat less than 50 percent supplied by New Mexico; is that correct?

A. Oh, it's far less than 50 percent. It's -- well, last year it was 1.5 million tons of K_2O, and the demand was over 5 million tons of K_2O, so less than 30 percent.

There are some considerations that we

need to take into account here that I'd like to mention that came across. The Canadian production does come from Saskatchewan, just north of our border.

New Mexico does have a unique industry in the potash basin, and that's the production of sulfates of potash here from the mineral langbeinite. And it's in -- it demands a very high price. The quantity demand is quite low because of the high price, I assume. But there are certain crops that just need to be treated with sulfates of potash because the soils are chlorine sensitive, and normally potash is shipped as potassium chloride.

So grapes, tobacco, many fruit crops in areas that just, you know, have a chlorine-sensitive soil have to use this stuff to be their source of potash for their plants. I haven't really dealt with that too much. I can answer questions about it. But New Mexico Potash doesn't produce any sulfates of potash. And so, you know, it may be of academic interest to us, and I'll be happy to answer any questions, if you would like.

A couple of other things came out of

this study. I found that there have been some trade constraints. If you'll look at the Canadian input here, it's declined a little bit from its high in 1984, but it's remained somewhat steady through here. I found, because I knew they had lots of unused capacity up there, I discovered that there is an anti-dumping agreement that expires at the end of this year.

Also, looking through the literature, the Bureau of Mines does a study of critical minerals to the US economy. And they don't find potash to be critical at all because our biggest trading partner in the world is right across the border. And in fact any day now, I think, if it hasn't already come out, we'll have a North America Free Trade Act, and it will be interesting to see what's in that as far as potash goes.

The other thing that is going on is that the European economic community is gradually coming together, and it will be coming together more so over the next few years. They will surpass the US and Canada as the biggest market in the world when that happens.

Getting back to what goes on with --

I'll give you a picture of where New Mexico fits in this potash picture. Here's approximately where -- a focal point of where most of the potash is produced in Saskatchewan.

Q. This is Exhibit 46, is it not, Mr. Hutchinson?

A. Correct. Just keep kicking me in the shins.

This is the New Mexico area. This shows the sylvite designation as having dots on it. And you can see how small this is compared to how large this is. Take note of this. Up here in the Michigan basin, which they have their own evaporites up there and also produce some oil -- some into my pocket, I hope -- they have some large sylvite deposits up here.

Earlier today someone spoke of the Kane Creek area, or the Kane Creek mine in Utah, it's located here, close to the Utah-Colorado border, towards the southern part of it. So those are really the principal things. Texas Gulf Coast, but that's underwater.

This is one that we need to watch for in the future. They currently have a pilot plant up here trying to solution mine sylvite. It's

still in the pilot plant stage.

On this map this brown area -- there's one state here of Missouri that is both brown and blue. But the brown reflects from year to year 55 to 70 percent of the US demand from both the US and Canada.

The blue areas, Florida, Louisiana, Arkansas, part of Missouri, Kansas, Texas, of course, and California represent 70 to 75 percent of the potash that's produced in the US. And since approximately 85 to 87 percent of the potash that's produced in the US is produced right here in New Mexico, most of it comes from New Mexico.

The relative volumes here are reflected in the greater command -- excuse me, greater demand for potash by corn crops. Corn requires a lot more potash than wheat. You notice some red lines on here. This is 500 miles from Saskatchewan as the crow flies. This is 500 miles from Carlsbad. This is 1,000 from Carlsbad. 1,000 from Saskatchewan. Out here this little "x" shows where the 1,500 mile circles would intersect.

You would think then that it's natural

being in close proximity that most of the potash from Canada would go to where the demand is greatest or the market here would derive its supply from Canada. But these -- connecting these you would see where they were approximately equidistant. You'll find Ohio, Indiana, and Illinois are kind of on the fence.

Now, Missouri gets approximately 60 to 70 percent of its potash from New Mexico, but it's the largest. It provides the largest demand for New Mexico potash, and it's purely a subject of transportation advantage.

All potash is provided at a minimum grade, at least by the North American producers. The Russians are also big potash producers. Their grade isn't quite as good as ours. So these are all based on the same minimum grades.

What happens in these states that are kind of on the fence is that Ohio only derives 3 to 4 percent from New Mexico; Indiana, 5 to 15 percent, and Illinois, 2 to 12 percent. That's over a period of time. That's why there's a fluctuation there. But some of this, particularly in Ohio, is sulfate of potash, so it colors a little bit. New Mexico is the only

place they can get it.

I would draw your attention to this red dot up here. That's in New Brunswick. There are two mines being developed, a third mine contemplated. I think all three of them, if my information is correct, will be mined by US-backed companies.

They have found a deposit of sylvite, which develops into muriate of potash, the big demand here, that are 12 to 25 feet thick with a 30 percent grade. That means they only have to mine 2 tons at that rate to make a ton of product. That by water is going to hurt some of the other muriate producers, including these in Saskatchewan.

Q. Now, Mr. Hutchinson, a minute ago you were talking about the percentages of New Mexico potash going to some of these states, Ohio Indiana, Illinois. I note on your exhibit there are written in percentage points. And it appeared that you were reading that those are the numbers, and that's the purpose on these exhibits?

A. Yes. That's to give you some idea of the total consumption of that state, how much

comes from New Mexico.

Q. So in Wisconsin, 2 percent or a fluctuation between 1 and 2 percent; is that correct?

A. That's right.

Q. And Minnesota would be the same amount?

A. That's correct.

Q. And then Iowa was between 8 and 11 percent?

A. That's right. Missouri is where it really jumps up, and Kansas is much closer, but there's a transportation advantage there.

I mentioned the development of the in situ mining technology will further compromise the New Mexico share of the market. It will also hurt the Canadians because they're sitting right here by Wisconsin and Minnesota, which are very large consumers because of the demand for their wheat.

Just as a matter of interest, I'll stick a small map up here for a second.

Q. This is Exhibit 47, is it not?

A. Yes. This is sulfates of potash. And the major consumers, as we would guess, California, with all of its agricultural industry

is great. Georgia. Florida. North and South Carolina are fairly strong. Texas needs a lot of it. As I mentioned before, Ohio. But it just gives you -- you can bet that the Serals Lake evaporites out here, all of that goes to California. Some of it is exported.

Also much of the sulfate -- many of the tons of sulfate of potash from New Mexico are exported. There's quite a demand in South America particularly for that product.

Q. Is it a fair statement then, Mr. Hutchinson, that based on this analysis of US demand and the effect that supply location has on it -- have you reached any conclusion with respect to that?

A. Would you --

Q. As I understand then, what you've been telling us, is that there are severe limitations being placed on the growth of this industry because of these considerations that you're talking about; is that a fair interpretation?

A. No question about it. I mean, there are huge supplies of muriate of potash out here, which is New Mexico's biggest product. And they just have -- not only have a production

advantage, they have a big transportation advantage.

Certainly New Mexico will maintain its shipments to Texas. Arkansas most likely. Missouri is on the cusp, and some years it fluctuates. I found one year where only less than 5 percent of the potash that went -- that was used in Missouri came from New Mexico. But that's -- maybe there was a railroad strike or something that year that would have caused it.

So getting back to the langbeinite, to give you some picture of what that means in the overall scope of things, I calculated that only 3-1/2 percent of potash demand in the United States is for sulfates of potash. And 14 percent of the total produced in New Mexico is that, and most of that is exported.

Q. In talking about the grade of potash, how do the New Mexico mines compare to the Canadian mines?

A. The Canadian mines that I've researched have in-place-grades -- all are in excess of 25 percent. The average is maybe 28 -- 27 to 29 percent K_2O in the ground drill-indicated grades.

In New Mexico, not considering langbeinite because it's a whole different ball game, but grades that I'm aware of that are being mined right now will vary anywhere from a low of 11-1/2 percent up to 18 percent. The average is probably in the neighborhood of 13-1/2 percent. It will be a little bit higher on a comparative basis to drill indicated reserves, maybe in the neighborhood of 15 percent as an overall average.

So we're a little less than half -- we're a little more than half the grade on an apples-to-apples basis that the Canadians have in place.

Q. What about the thickness of the deposit? Is there a difference there?

A. Oh, quite a difference. In Canada the thicknesses go from maybe 9 feet to 20, 21 feet. Here the thicknesses are mined, and I might add very efficiently mined, at 4 feet. Average probably being in the neighborhood of 6-1/2 feet, including the langbeinite mines. But in the neighborhood of 6 feet.

Q. What are these differences in percentage of K_2O and the thicknesses of the ore

body play with respect to the competitive advantages that one -- that Canada may or may not have over the United States?

A. Well, certainly the cost of production when you have such a high grade and the cost of producing a milled product is going to be much help. For example, I had worked out some numbers here that -- digging deeply for information. Some costs per metric ton of ore mined, hoisted, and milled measured as that amount mined and hoisted and sent to the mill, but including the cost of milling per metric ton are approximately $15.18 at Horizon; $27.67 at Western Ag; and $25.35 from the studies made by the US Bureau of Mines, which fall in line.

Now, there's quite a disparity between the Western Ag prices and Horizon because Horizon is mining in a much softer bed with continuous miners that were especially made for that mine and that the Western Ag mine, which mines langbeinite exclusively, has to drill and chute their ore. Mr. Lammers testified that there's a much higher density. And that causes the requirement for them to drill and chute their ore. That's going to add considerably to the

cost of producing that ore. I don't know what it does in the milling process because that information is just not available to the public.

Compared to that, just on a cost per ton, 2204 pounds coming out of a mine in Canada, based on information I was able to get from public companies there, they're mining at the rate of $10.84 a metric ton. Well, without anything to do with grade so far, I think one of the most efficient mines here is their cost per ton is about 50 percent over the Saskatchewan costs.

So with a higher cost in New Mexico -- or let's back up a minute and let's just say that -- okay. Let's say that any given mine in New Mexico can be so efficient that it can compete with the $10 to $12 that they're able to mine and hoist a ton out of the mine in Canada. We look at the difference in grade. And using a raw product of 12 to 18 percent and after accounting for clay seams, as Mexico Potash has to do, Horizon doesn't have to do, trying to give you some idea of what the range might be, I hit upon what I think to be a generous grade delivered to the mill of 14 percent K_2O on average.

That means to ship 60 percent K_2O, you divide 60 by 14, you get about 4.25 tons of ore -- must be mined, hoisted, and milled to make a ton of product; whereas, in Canada, if their production grade to a mill is 25 percent, including dilution and the same factors that we have here, they only have to mine 2.4 tons.

So you can take any number per ton you want. If your mine has to hoist 4-1/4 tons and somebody else's mine only has to mine and hoist 2.4 tons, you're in trouble, if everybody is operating from the same basis.

Q. So basically what you've described, there is a natural competitive advantage that the Canadians have over the United States?

A. It's tremendous. And there's absolutely nothing that anybody can do about it. It's there and exists, and it shall continue to exist because their deposits are so huge.

Q. What then is your conclusion about the future of the New Mexico potash industry?

A. Well, the Canadians must have hired a mineral economist or something. And when they got into trouble with our US Department of Labor and Commerce -- or I guess it was the Commerce

Department that brought the anti-dumping suit or threatened it. And their economist told them that, hey fellows, look at what's going on in Saudi Arabia. Those guys over there can produce a barrel of oil for two bucks, but they're producing now after 1985 -- 86, I guess, when our price of oil got so low and the Saudis showed us who was boss -- they will produce up to what we call their marginal revenue.

Now, in a competitive industry all of the producers produce up to their individual marginal cost. So that when that next item of production, that next ton in this case, goes out of their mill and they have lost money on it, they're not going to ship that ton.

But the Canadians are sitting up there saying we don't have to do it that way, fellows. We'll just mine up to the point where the next ton is going to reduce our profit margin, and that's where they stop. Through that they can set the price. They'll go to a demand curve that they generate, like I showed you, and they'll say, okay, here's what -- if we go over this production rate per year, we'll lose money; we won't make as much profit. They won't lose money

at all. We won't make as much profit. So let's stop here. They go up to the command curve, and they find out what that price is and they set the price there.

Now, the marginal operators, which we clearly have here in New Mexico, have to take that price. They have no choice. And so they are marginal producers. Individually they can just produce up to a point where they actually lose money. But with the age of the industry here in New Mexico, they actually produce up to where they have a negative cash flow.

Q. Mr. Hutchinson, what you've just described is very similar with respect to the experience the United States petroleum industry has had in the petroleum market in the Arab countries?

A. That's correct. And I think Randy Patterson said he thought $20 was great. Well, Yates, believe me, doesn't have any control over that price. That price is set by the OPEC countries, and I think he alluded to that.

Q. And the major mechanism is the amount of supply. And if that increases, the price goes down; as that decreases, the price will go up?

A. Yeah. The Canadians could bury us any time they want, but it's a politically very unwise thing for them to do, wanting to negotiate this North America Free Trade Agreement.

Q. If you'd continue on. I apologize for the interruption.

A. I've hit upon supply here in New Mexico. Let's just take all these down.

Q. Your next exhibit will be Exhibit 48; is that correct?

A. Right. I want to give credit where credit is due. This chart came out of the "Miner's Bible" that we spoke of earlier. Not all of that information in there is bad. This is particularly good. The shows, going back to 1931, the mines as they came on stream and what year they came on stream and what cumulative production was sold.

So you would think that this is probably the most efficient mine with the best reserves, next and next, on up here. This tells who the players are. You would think that the last mine to come on-line would be the most marginal mine. That's the way it works in the manufacturing industry, and that's really what

we're doing here, is manufacturing a product for sale.

By the same token in a declining economy, which, you know, this one started to decline as early, as far as this chart goes, as early as, oh, 1966 or so. I don't know, I didn't plot what happened to it here, but the essence of my comment is to say that if mines were going to shut down, they would shut down in the reverse order unless they ran out of reserves.

And, sure enough, that's what happened. In 1985 the Kerr-McGee mine sold for $3 million. Clearly and purely an abandonment price. Kerr-McGee wanted to get out of business. Their mine was not economic. It did not meet their big company plans. And you can see $3 million worth of salvage value out there in the equipment.

Logically the next mine to close would then be the AMAX mine, which is No. 6 here. No. Excuse me. The next one to close would be the National Potash Company. And it got itself out of sync. It was really the first one to close in 1982. Of course, Kerr-McGee has not closed. It just changed ownership at a very nice price to

the current operators.

Q. Now, the current operator is New Mexico Potash Company; is that correct?

A. Yeah. New Mexico Potash is owned, as I understand it, is owned by another company called Trans-Resources, but I'm not privy to that information. That's just what I read.

Q. But the Kerr-McGee mine is the New Mexico Potash mine?

A. It's the same property, yeah. Excuse me.

Q. That's the mine that we are concerned with today?

A. Right.

Q. And the AMAX mine that you're -- the National Potash mine is a Mississippi Chemical mine, which is closed and has been since 1982, just to the north?

A. Immediately north of New Mexico Potash.

Q. And then the AMAX mine is the mine we've been referring to throughout the last two days as the Horizon mine?

A. Horizon mine, correct. I might add that, since you bring that up, that both the Mississippi Chemical, National Potash mine, and

the New Mexico Potash mine, mine from the tenth ore zone exclusively. That's by its permission.

Going back down the line, you would think that No. 5 would be the next to go. And I got ahead of myself. AMAX Chemical -- AMAX Potash, I should say, in 1988 announced that the mine would close. They brought one of their people in, a man steeped in environmental expertise to close the mine.

Some of the mine people there convinced management to open up a zone above the first ore zone, I think it's the third ore zone, and they've been after them for years to open that up. Finally they said okay, have at it, we'll see if we can develop some more reserves up there.

They're very efficient people at that mine. And they went up there and built some 4-foot vertically mounted continuous miners and a slick conveyor system, and they started making a little money with that. Proved that they could mine it economically. And AMAX then put it on the market and sold it for three million bucks, plus some cash consideration for product inventory and some spare parts and things like

that they had.

It's hard to tell what the total purchase price was, but the initial cash payment by Horizon for the stock was three million bucks.

Q. Well, Mr. Hutchinson, is that $3 million representative of what it would take to go out and start a new mine?

A. Oh, not at all. In fact, there's probably in excess of $5 million of hoists, electrical gear, buildings, structures, and equipment in the mine. So it turned out to be, in my view, in both the situation of Kerr-McGee and AMAX, they did a lot of people, including themselves, a big favor.

A smaller company who can operate more efficiently came in. The big companies got the environmental liability off their books. I'm sure they had built up a reserve for that. They all have such deep pockets that somebody is going to go after them. And it keeps the mines operating. The workers, the miners are still out there collecting a salary. They're able to survive. It was a terrific deal for everybody.

But the fact of my presentation is that those mines essentially sold for salvage value.

Hopefully they'll be able to stay open for a considerable amount of time.

Tax revenue, as a result of that, to the state and feds is good, and I'm sure that there's some considerable royalty that comes out of that that isn't coming out of the Mississippi Chemical-National Potash mine.

The large companies got the -- they were able to reduce their equity, so they automatically got a higher return on equity. They have their stockholders to satisfy, and they're interested in that.

The demise of the muriate producers, I think, to answer your question specifically in New Mexico is inevitable. They're going to slowly fall by the wayside once they get to the point where they can't meet a positive cash flow, unless they have langbeinite. Then they've got a whole different product and have a pretty good situation.

In our case, for New Mexico Potash to ramp down to some of the langbeinite that they have found, it's going to take tremendous capital expense, and I'll get into some more of that later.

Continuing on with the economic evaluation I did, having figured out what the demand situation was in the United States, I did some research on the supply.

Q. This is Exhibit 49?

A. Correct. The way we put these supply charts together is that we'll take a cost -- in this case it's a cost per metric ton in 1991 dollars. We'll take -- and I don't know what these mines are. I just get this information that has been held confidential except in unidentified operations. I don't know what mine this is. But it's capable on an annual basis of recovering, what, about one-and-a-half million tons a year.

This is the next least expensive mine to operate, and the next, and the next, and the next. These, on this lower level here, are Canadian mines. These that start out up here in the cost per metric ton of in excess of 80 bucks are shown on the same basis.

Now, you can see that on a supply basis per ton of product, we just can't compete with the Canadians. And since 85 to 87 percent of the US potash is produced from New Mexico, the New

Mexico mines must be very well represented in this group of operations.

Q. Well, then the potash supply, your potash supply exhibit actually shows a source of the supply used to meet most of the United States demand; is that correct?

A. Yeah, I think we import -- other than from Canada -- I think Canada supplies 90-plus, 91, 93 percent of the potash that's imported in the United States. So we do get some from I think the Red Sea, perhaps some from Europe. Eastern Europe has quite a good supply of potash also.

Well, the next logical step is to match up the supply and demand.

Q. This is Exhibit 50?

A. Right. So if you recall back to the demand curve, these are a little different scale so I can get them on this chart. Here are the Canadian operating costs. By the way, these supply costs are operating costs. They have no capital recovery in them. And they also include, because it's a serious consideration, they include some transportation costs to the nearest market.

So here we have the supply curve. The demand curve that I talked about earlier, where from 82 to 91 with an aberration in 84, 85, 86, and 87 down here. A pretty good demand curve. The Canadian supply curve is very flat along the bottom. The red line here is the US supply operating cost including transportation allowances.

Now, last year Canadian imports were about 3.2 million tons of K_2O, metric tons of K_2O. If we move this across as economics works, and we start and we say that, okay, transportation included, after the Canadians have sold all they want to sell, we'll start picking up with US producers. And we see that -- I'm a little bit off here.

Q. What you're actually doing here, Mr. Hutchinson, because our exhibits differ, you have superimposed the US supply operating cost curve onto the right hand of your diagram?

A. Yeah. So we have a combined Canadian supply, and then it jumps up and we have the US supply. And here, underneath here -- it's the only way I could think of to do this -- I think on your copies there's this one and then there's

this one. There's two separate curves. So you understand where they come from.

Q. The dashed line is that curve over there on that exhibit?

A. I think that's the way I did it, correct. Anyway I just, you know, with an overlay like this, you could pick any amount of tonnage out of Canada that you wanted and you could say, okay, we'll pick up what's over. And you can see that up here, one mine that can't produce up to its capacity because it would lose money over the demand, and another mine just can't do it at all. Perhaps that's the Mississippi Chemical mine. I really have no idea.

But that's the idea behind why I can say that the days of muriate production in New Mexico are numbered and what control the Canadians have.

That was Exhibit 50; right?

Q. Yes. Well, then in summation of the presentation that you've made thus far on the economics, what are your conclusions then?

A. Muriate of potash production from New Mexico is and will remain marginal at best. Only

the most efficient mines will be able to survive and shall only survive as long as the Canadians find it in their best interest to do so.

If the production from New Brunswick starts eating into the other Canadian production out of Saskatchewan too much, which might be five years from now, that will put the Saskatchewan production into a more competitive situation. They're going to lower their prices because they have huge mines. They're operating anywhere from 45 to 60 percent of their already built and paid for capacity.

So the days are numbered here, but it's been a really terrific history. I mean, starting in 1930, I mean we have 60 years of a terrific industry here. Canadians are going to enjoy it for a while until the Russians perhaps come up with a more efficient system and then cut the Canadians out. That's just the way the shark business works.

AMAX discovered this. They've got some very bright people. Kerr-McGee discovered this. Ray Rock-Yellow Knife, Western Ag parent, knows it. That's why they're restricted to the specialty product of langbeinite. That's mainly

where the only big mining company left is concentrating its efforts, and that's IMC in sulfates of potash. And they're doing some very ingenious things about combining their production to maximize their income in the sulfates of potash markets.

They do also produce muriate. But in Canada they produce easily three to four times as much potash per year as they do from New Mexico. They know -- they're one of the pioneers up there. In fact, they took a lot of technology developed here in New Mexico to Canada and made it work even better.

Narranda, a company in total twice the size of AMAX and twice the size of Kerr-McGee, has had a large lease position here in New Mexico. And the laws of economics did a couple of things. They recently dropped a big block of leases, federal leases. And they would like to sell their remaining leases. But, as the thing flowed along and they got into this thing a little bit late, in the early 70s, their deposit never was -- the next marginal deposit, and it was so marginal that it has never been economic. It might be economic for a smaller company or in

association with one of the companies here now. But Narranda knows, as a large company, that they have no business here in developing their property.

I think I covered most of those points, Ernie. There's a lot of things here.

Q. I understand. But basically what you're saying is that New Mexico potash industry is a cash flow industry; that if it were required to influx any appreciable amount of capital expenditure, it just couldn't do it?

A. It's totally out of the question. Anyone, any bank, anybody that would hire somebody like me or people to do what I do to evaluate an investment in a capital expansion of a New Mexico potash mine, sylvite potash mine, knowing that huge companies in Canada have 200 years of reserves and they're only operating at half of their already paid for plant capacity, they're going to say, hey, the cost of entry into that business is just not a good thing to do.

Alternative uses of their capital are far and many compared to investing in New Mexico potash -- or not the New Mexico potash, the company, but the industry.

Q. All right. Mr. Hutchinson, let's turn our focus more closely to the case at hand. And, having learned this about the industry in general, what have you been able to determine about New Mexico Potash Corporation itself?

A. I was -- I'll get into this. But I was a little shocked this morning, and I want to explain to the Commission where I'm coming from on this. When I got my mandate from Yates to go ahead and do this thing my way on public information, it was, I think May 5, I came to this building for the first time in my life, and I went to the OCD.

I had read R-111-P, and I knew that the mines had to submit their mine plans -- not their mine plans but their mined-out areas. And I also know, having operated some mines myself, that they're required to submit mined areas, I think, every six months to MSHA.

Well, I thought I don't want to go to Dallas and deal with that, so I came here. I went to the OCD, and I very carefully asked if I could see the information that was available to the public on what had been mined out. And I was brought files and I was given a room and a desk,

and I sat down with those maps and I looked at them.

I was primarily interested as my main objective in New Mexico Potash, and so I picked theirs out first. And I didn't really notice or really understand what life of mine reserves meant. In the mining industry outside southeastern New Mexico it doesn't mean a thing. They change constantly with the price of the product and whether it's open pit or underground.

And I saw one map that showed a cutoff grade, and I thought, well, that's what they're using as their cutoff grade. That's fine with me. And I built up a series of maps, which I'll show you soon, that showed where they were in October of 88, which was the first requirement by R-111-P. And I think the next one I found was January 1, 1990. They're required to submit these annually. And the next one I found was for January 7, 1992, which came up as a subject of comments this morning.

I did not find a map, and I asked the OCD person if there was a map for January 1991. He was unable to find it, so I didn't use it.

But what you're about to see I consider public information. I asked for that specifically; that's what I was given; and that's what I used.

And I don't think under those circumstances that I have -- and my interpretation of those maps, which frankly show quite a good mining operation; they seem to do things right. And I will show you where I noticed that they change their economic and uneconomic grade barriers.

But as to be a political life of mine reserve thing, I want to stay out of it. And so you understand that's what I did, and that's what I got. And that was May 5.

Q. All right. Then turning to your first exhibit, Exhibit 51.

A. This is a base map in the area, Lea County, Eddy County line, the New Mexico Potash shaft location.

Q. Just a moment, Gary.

A. It is what you're calling the LMR, but that's not what I saw.

Q. I understand, but I needed to allow --

A. Whatever I have to do.

MR. HIGH: Let's deal with it again,

Mr. LeMay. We're going to object.

CHAIRMAN LeMAY: Sure.

MR. HIGH: The LMR map that was filed with the OCD should not have been released to Mr. Hutchinson. The information that they have in error, that they have now, they received in error by release of that from the OCD.

At the very minimum, I would like that marked "confidential" and treated confidential. But more important than that, I want to move at this time to preclude Yates from using any confidential information they received from the OCD in violation of R-111-P.

The OCD should not have released the LMR map to Yates as they did. That is in violation of R-111-P, and I would move at this time to preclude the use of that information.

CHAIRMAN LeMAY: I think some clarification. Go ahead, Bob.

MR. STOVALL: Let me clarify the record. I think it's more appropriate to say the LMR map should not have been filed with the OCD. My understanding of the situation that's being referred to is that the New Mexico Potash was filing their mined-out area maps, and they

included an LMR on those maps.

The LMRs were intended under the rule to be filed with the State Land Office, and they were to keep those confidential. It was never the intent that they be filed with the OCD.

So New Mexico Potash has created this situation by filing those maps with the OCD as part of their mine workings maps, which were required to be filed. So they have created that situation and placed those in the public domain. And I don't think the OCD were ever made aware that those were LMRs on that map until actually today, I don't believe.

MR. HIGH: Let me also add to the record that the letter that came out insisting that the LMRs be filed came from Mr. LeMay from the OCD.

CHAIRMAN LeMAY: That's true.

MR. HIGH: The letter that came in that included the map that was released to Mr. Hutchinson that had the LMR attached to it said in response to Mr. LeMay's letter, here's the information you requested. And it was thereafter it was released to the public.

The letter specifically says that that

document is being sent to Mr. LeMay in accordance with R-111-P. It even referred to the paragraph number, which includes the confidentiality and the no public disclosure.

CHAIRMAN LeMAY: I'm not sure I understand you, counsel me. You mean the letter that accompanied the map --

MR. HIGH: Yes, sir.

CHAIRMAN LeMAY: -- to be filed indicated there was an LMR on that?

MR. HIGH: Yes, sir. It is entitled "LMR." Yes, sir, it is.

CHAIRMAN LeMAY: Is that in your list? Do you have a copy of that letter?

MR. HIGH: We have it here from the purged file. We understand that counsel purged the public file this morning and gave us back what should not have been in the public file. We have those documents here.

CHAIRMAN LeMAY: Generally our policy when those are filed, because they are filed, I don't see them. They go in file. And it's not our intent to analyze that.

MR. HIGH: But, Mr. LeMay, just for the record again, before we ever filed anything with

the state, you may recall there was some concern on behalf of the potash industry that if we started filing these confidential documents with the state, in addition to the BLM, which we had done for years, that they would be inadvertently released.

We discussed that with the State Land Office in your office. The person retired. I forget his name now.

CHAIRMAN LeMAY: Dick Lyon?

MR. HIGH: Dick Lyon. And we got a letter back assuring the potash industry that procedures were in place where this information would not be inadvertently disclosed. And we already have an instance here where it has been.

CHAIRMAN LeMAY: I'm still confused. If it shouldn't have been filed with us, how could it be inadvertently disclosed?

MR. HIGH: Here's in the letter that's in response to your letter asking for it.

CHAIRMAN LeMAY: Asking for the LMRs or asking that the LMRs be filed with the appropriate agency?

MR. HIGH: I don't have a copy of your letter up here. I just have a copy of the

response to it.

CHAIRMAN LeMAY: Thank you.

MR. HIGH: I'd have to look at your letter. I really don't know.

CHAIRMAN LeMAY: Well, that indicates that they have -- it was an LMR. I'm not sure I even saw that letter, but I see what you're referring to.

MR. CARROLL: Chairman LeMay, if I might also state for the record, is that Order R-111-P required New Mexico Potash to file on an annual basis their open mine workings.

CHAIRMAN LeMAY: Right.

MR. CARROLL: There was no requirement that they place that LMR on the open mine workings. I think that was a decision that was made by New Mexico Potash. And when they made that decision and then sent that to the OCD, knowing full well the wording of R-111-P, which states, "which plat shall be available for public inspection and on a scale acceptable to the Division," they should have known that if they put confidential material on something that was required to be released and be available for public inspection, I think they took care of the

problem.

I don't see any fault falling on the part of the OCD or any laxity of procedures. I think the OCD did what they represented by Mr. Lyon. It was the fact that New Mexico Potash did something which they should not have done, at least under their interpretation and my interpretation.

I don't know why they did it unless maybe they were hoping that even the open mine workings would be become confidential by putting confidential material on it. And that would be a subversion of the statute or the order.

And again I think the position is this material was put into the public domain by New Mexico Potash. It was not something that was required of them. They did it of their own free volition. I think the law is very clear on these subjects, that if they have put something into the public domain, then they have waived all rights of confidentiality.

And, furthermore, I think -- of course Mr. High's objection was twofold: He wanted to strike it, but he wanted to also prevent us from using it. I think that's improper. It was there

in the public domain. This is critical to the issue.

The LMR is in existence not only in their own exhibits, but we have talked about it all throughout this hearing. And I think that motion is just way too late, and I would ask that -- I think the motions of Mr. High were to strike this evidence and prevent us from using it, and on both counts this Commission should overrule it.

CHAIRMAN LeMAY: I'm not sure, what is your motion at this time, Mr. High?

MR. HIGH: I just don't want to be disadvantaged by the erroneous release of the information by the OCD. We will be introducing ourselves a portion of the LMR. It's central to the case, and I agree with counsel, that a portion of the LMR is central to the Commission's resolution of this case.

And we have some documents in the exhibits that we have provided to the Commission already that have a portion of our LMR, but we don't have the full thing. We only have that portion of the LMR that's relevant to this proceeding in our judgment, namely, that down

around Section 2.

What has happened here, Yates has gained access to our entire LMR. And I can't tell you how sensitive that is, Mr. LeMay. You recall those discussions earlier on.

CHAIRMAN LeMAY: Well, I do. And let's just recess for about five minutes. What you're saying is you want to go ahead with the testimony based on this exhibit?

MR. CARROLL: That's correct.

CHAIRMAN LeMAY: And whether the hearing room here is clear or not, it's not what you're worried about; it's the fact that it's being used, period, in the evidence?

MR. HIGH: I don't want it used, period, in the evidence. Secondarily, if the Commission doesn't grant that, clearly we want it treated confidential.

MR. CARROLL: We have no objection to it being treated confidential. We've stated that all through this proceeding.

CHAIRMAN LeMAY: Let's take five minutes.

COMMISSIONER CARLSON: Before we recess, does anybody have a copy of the letter

that Mr. LeMay wrote asking for the LMRs? Nobody knows whether it was asking that it be filed immediately with the State Land Office and the BLM or that it be filed with the OCD?

MR. HIGH: I'm sorry, Mr. Carlson. We don't have one with us. We just found out this morning that the OCD had inadvertently released this.

MR. STOVALL: Commissioner Carlson, I think if we take a recess, I think that we can obtain a copy from our files hopefully.

COMMISSIONER CARLSON: That may be very critical to this determination.

MR. STOVALL: My recollection is that at the time that the LMRs had not been filed with the State Land Office so we could not determine -- couldn't even find out from the State Land Office or the BLM whether there was an LMR. And I believe the memo was intended to have those filed with the State Land Office. But I think if we take the recess, we can find that memo and see.

I will enter an objection on behalf of the Division as to the characterization as it being an improper release by the Division because

I don't think the Division was on notice that it had confidential information there.

MR. HIGH: Could I get back, though, the letter?

MR. STOVALL: That's disappeared, I'm sorry.

MR. HIGH: I'm sure it will be released sometime in the future.

[A recess was taken.]

CHAIRMAN LeMAY: Let the record show we're back on the record.

MR. STOVALL: Mr. Chairman, at the time before we took a break, there was some discussion about how Yates Petroleum and its witness got ahold of an LMR map, which apparently New Mexico Potash had filed with the Oil Conservation Division, and there was reference to some correspondence back in 1989.

During the break we went to the official files of the OCD and have recovered three letters: One dated January 3, 1989, from William J. LeMay, Director of the Division, to Charlie High -- pardon me, Charles C. High, Jr., just to make the record correct; a return letter from Mr. High to Mr. LeMay; and a third letter

from Mr. LeMay to Mr. High, dated February 20, 1989. The second letter was dated January 30, 1989.

The essence, having reviewed these letters -- and I would invite counsel to comment on additions -- is that the Oil Conservation Division had written the letter to Mr. High stating that LMR maps had so far not been filed with the State Land Office in accordance with provisions of R-111-P.

Mr. High wrote back essentially saying that they had not been filed because the BLM had not signed off on the agreement, which was an exhibit to R-111-P between the two industries. The Division then wrote back and essentially said that the implementation of R-111-P was not contingent upon BLM agreement; that neither the OCD, nor the BLM, nor the State Land Office would actually become parties to that agreement; and that the filing of the LMRs was not contingent upon any action by the BLM but was due.

All of the letters refer to filing of the LMR with the State Land Office. There was never any request that they be filed with the Oil Conservation Division.

For whatever reason, and I wouldn't delve into the history at this point, apparently the referenced material was sent to the Oil Conservation Division. There are no specific confidentiality statutes that specifically protect this type of information, which is one of the reasons that the SLO was the repository for the information.

Therefore, I think it is incorrect to characterize any failure on the part of the OCD, as far as protecting the confidential information -- it was filed with the wrong agency is what the problem was. And in accordance with Division policy, my understanding is that the specific information or map or exhibit filed was not allowed to be copied or removed from the office, but it was allowed to be examined by anybody and specifically Yates. And that is how they came by the information.

And it is my advice and recommendation that neither the Division nor Yates Petroleum acted improperly or illegally in obtaining the information. And I would therefore say it's admissible but certainly could be subject to confidentiality to prevent any other persons from

gaining access to the information thereon and could be covered by that.

And let me, just for the sake of record keeping and for the record, the three exhibits I've marked, I am going to suggest that they be incorporated or taken notice of by the Commission as official records of the Division. And simply for the purpose of identification we can call them Commission Exhibit A just to -- the Division, of course, is not a party and not a proponent. But it's simply to have a designation so they can be referred to in the record in the simplest fashion.

MR. CARROLL: I would concur with Mr. Stovall's request and ask that it be so designated and included as part of the record.

CHAIRMAN LeMAY: Mr. High.

MR. HIGH: We have no comment, Mr. LeMay. R-111-P is an order of the OCD. And regardless of how it got into your office, R-111-P says it will remain confidential, not subject to disclosure. So notwithstanding Mr. Stovall's ruling, we still believe it should not have been disclosed.

As far as the exhibit is concerned, if

you want to mark it as Exhibit A, I have no objection.

CHAIRMAN LeMAY: Fine. I think we concur with Bob's recommendation. We'll put it in the record.

When we come back tomorrow -- it is your recommendation, isn't it, Mr. High, that we treat this as confidential as far as clearing the hearing room, like we did in other -- and keep it confidential from this point on, I guess?

MR. HIGH: Yes, sir. If the reference is the testimony will cover the LMR, we would ask that be confidential.

CHAIRMAN LeMAY: I think we can accommodate that.

MR. HIGH: If we can ask questions or get answers around it like we've been doing so far, I have no problem with that.

MR. CARROLL: I think we will attempt to do that. We will refrain from identifying where it lies by giving --

CHAIRMAN LeMAY: Well, then you're agreeable to treating it like we did before, leave it there, leave everyone here, but if it does get into specific references beyond where

you think we should be, then you'll raise an objection?

MR. HIGH: That's correct. And the less we clear the room the happier I am also because that takes time away from the hearing.

CHAIRMAN LeMAY: Sure. It's your call too on that part of it.

MR. STOVALL: The record should also reflect that when the Division became aware this morning that this actually was an LMR which should not have been filed, the Division did purge its files, and I believe the document was either turned over to the New Mexico Potash or the State Land Office. So it is no longer in the Division records.

The second issue is --

CHAIRMAN LeMAY: Go ahead, please.

MR. STOVALL: The second issue is at the beginning of Mr. Hutchinson's testimony, Mr. High had requested that the document which he was using -- that a copy be made available to Mr. High. I believe the Commission operates under relaxed rules of evidence. And I refer to the Rules of Evidence of the Civil Procedure for the courts of New Mexico.

The applicable rule appears to be 11-612, Writing Used to Refresh Memory. In summary, I would say that the language basically says that the court, in this case the Commission, at its discretion, if it determines that it's necessary in the interest of justice, may give the adverse party the writing and have the opportunity to inspect it, cross-examine the witness thereon, and introduce in evidence those portions which relate to the testimony of the witness.

My advice would be that it is in the discretion of the Commission that the Commission can at this point allow Mr. Hutchinson to testify. I understand that the objection to making it a record is that it contains some communication with the attorney and notes of the attorneys as well as the witness.

If, at the conclusion of the testimony, Mr. High feels the need to look at those notes, then the Commission would have its discretion, if in the interest of justice it believes he needs to -- he should have the opportunity or if it would be useful for cross-examination or otherwise.

My recommendation is that you may withhold ruling until the end of the testimony, at which time Mr. High can renew his request and you can make a decision, if you determine it's necessary in the interest of justice.

CHAIRMAN LeMAY: Mr. High, is it necessary in the interest of justice so far, you think?

MR. HIGH: Mr. LeMay, I'd like to add that the cases Mr. Stovall also cites, that we are entitled to attorney's notes if they are shown to a witness. And the case law would bear that out. If a lawyer shows a testifying witness his notes, we are entitled to those notes because he has waived the attorney-client privilege, if one ever existed, and one does not exist here between Mr. Hutchinson and Mr. Carroll.

And I remind you also that this is an expert witness. And under the rule we are entitled to get every document given to this expert witness. That's a special rule applicable only to experts.

MR. STOVALL: Could you point me in the direction?

MR. HIGH: I'm not going to guess

again. I tried twice a while ago. But the rule on expert witnesses, under the discovery we are entitled to every document that this witness received from Yates Corporation, Mr. Carroll.

Aside from that, let me just say one other thing on the map, we also ask that the Commission enter an order directing Yates not to divulge the contents of this confidential information. I don't know if that may be implicit in what you said earlier, but I'd just ask that the Commission make it clear that it not be divulged or used in any other way.

MR. STOVALL: If I may respond to Mr. High's comments as far as the privilege issue. I would be inclined to agree that it may not be privileged under those circumstances. I think the point is that even, I think, Rule 705, 11-705, Disclosure of Facts or Data Underlying Expert Opinion, I believe that may be what you're relying on, Mr. High?

MR. HIGH: Yes, sir, it is.

MR. STOVALL: Again the expert may in any event be required to disclose the underlying facts or data on cross-examination. So I believe that would be the appropriate time to make these

available, if the Commission wishes to do so. I think it has some discretion, and I think Mr. High makes a valid point for requesting them. But I think that should be done at the time of cross-examination.

MR. CARROLL: I think one of the points I'd like to point out, first of all, I totally disagree with Mr. High's representation that if I make a note and give it to Mr. Hutchinson that that automatically waives any privilege. Well, there's also the attorney work product rule.

I am entitled to communicate with my witness, and if I am supplying him data on which to testify, that's one thing. If he is using that to form an expert opinion, I agree, he should have access to it.

But in no way does the document that we've been talking about, which is an outline for our own purposes to be able to keep track of the numerous exhibits that Mr. Hutchinson was doing, should be used by Mr. Hutchinson in any of the personal notes that I have, which were notes to -- because there's only two copies of this thing, the one Mr. Hutchinson has and the one I have. They've been made of each other, and I'm really

not sure until I look at his to know what's on his and whether they even comply or are consistent.

But again I object to any disclosure of this because this is not document used in the true sense to refresh Mr. Hutchinson's testimony. Now, if we were going to some document, because he did not and was not aware of something and it would be some resource material or something like that, again Mr. Hutchinson [sic] would have full access to it.

But these were our notes and outline of the testimony, to be used to be able to communicate between ourselves and to keep at least some continuity in the presentation of exhibits and was not used for the purposes of actually generating or data to be used in his testimony.

CHAIRMAN LeMAY: I think what we'll do is, when we hear the testimony, think again whether you think these notes, or whatever they are, are critical to your cross-examination, renew the motion, and maybe we can reach an agreement there. If not, I guess we'll have to rule on whether we feel it's in the interest of

justice to release his notes to you.

MR. HIGH: Could I ask that the witness be directed not to alter in any way the document he has in front of him over the course of the adjournment?

MR. STOVALL: I would think that's --

CHAIRMAN LeMAY: I think that's a valid request. Don't alter your record between now and tomorrow.

But recognize, Mr. High, in the interest of what we have done in administrative hearings, we don't adhere to the strict rules of discovery, nor are we required to adhere to the strict rules that are present in courts.

MR. HIGH: Mr. LeMay, I know that. And, as you know, I've been here before. And I know people get up there and read documents in almost every instance. In fact, the geology stuff is always read. I always get a copy of it. This is the first time I've been denied a copy of what a witness is reading from that witness stand. I don't have any objection to the procedure, it's just not getting a copy where I can follow along.

CHAIRMAN LeMAY: There's reading

something and this are notes to refresh memories, and that can be a fine line, as you well know.

Okay. We are going to break and come back here tomorrow at 8:30 to finish up Yates' presentation.

I think you have one more witness; is that correct?

MR. CARROLL: That's correct.

CHAIRMAN LeMAY: Will that be a long one or short one?

MR. CARROLL: It will be much, much shorter than Mr. Hutchinson. I think we will be able to complete tomorrow.

CHAIRMAN LeMAY: By noon?

MR. CARROLL: Again the cross-examination -- I could put all the direct on by noon, I'm sure.

CHAIRMAN LeMAY: The direct by noon?

MR. CARROLL: The direct.

CHAIRMAN LeMAY: We'll still break now. I don't think 15 minutes is going to help us. But we will keep going until we get through tomorrow on Yates' presentation. Check your calendar, Mr. High.

MR. HIGH: I will.

MR. STOVALL: I'll keep the Rules of Evidence handy.

CHAIRMAN LeMAY: Adjourned until tomorrow.

[And the proceedings were adjourned at the approximate hour of 5:30 p.m.]

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 20, 1992.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3