STATEMENT UNDER OATH

OF

JEFFERY KRAVITZ, Ph.D.

Taken pursuant to Notice by Richard J. Lipuma, CCR, a Court Reporter and Notary Public in and for the Commonwealth of Pennsylvania, at MSHA Technical Support Office, Building 2, Industrial Park Drive, Triadelphia, West Virginia, on Wednesday, December 19, 2007 beginning at 8:06 a.m.

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I N D E X

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P R O C E E D I N G S

- -

MR. MORLEY:

My name is Thomas Morley. And I am an accident investigator with the Mine Safety and Health Administration, MSHA, an agency of the U.S. Department of Labor. With me is Derek Baxter from the Solicitor's office. And we will be conducting the questioning today. I, with other government investigators and specialists have been assigned to investigate the conditions, events, and circumstances surrounding the fatalities that occurred at the Crandall Canyon Mine in Utah in August of 2007. The investigation is being conducted by MSHA under Section 103(a) of the Federal Mine Safety and Health Act and

the Utah Commission of Labor. We appreciate your assistance in this investigation.

After the investigation is complete, MSHA will issue a public report, detailing the nature and causes of the fatalities, in the hope that greater awareness about the causes of accidents can reduce their occurrence in the future. Information obtained through witness interviews is frequently included in these reports. Your statement may also be used in other enforcement proceedings.

A court reporter will record your interview. Please speak loudly and clearly. If you do not understand the question asked, please ask me to rephrase it. Please answer each question as fully as you can, including any information

you have learned from someone else.

I'd like to thank you in advance for your appearance here. We appreciate your assistance in this investigation. Your cooperation is critical to success in making the nation's mines safer.

After we have finished asking questions, you will have an opportunity to make a statement and provide us with any other information that you believe is important. If at any time after the interview, you recall any additional information that you believe might be useful, please contact Richard Gates.

Ms. Escott, would you swear in the witness?

JEFFERY KRAVITZ, Ph.D., HAVING FIRST

BEEN DULY SWORN, TESTIFIED AS FOLLOWS:

MR. MORLEY:

Ms. Escott, are you empowered as a notary in the State of West Virginia?

MS. ESCOTT:

Yes.

MR. MORLEY:

When does your commission expire?

MS. ESCOTT:

9/23/2015.

MR. MORLEY:

And have you sworn in Doctor Kravitz?

MS. ESCOTT:

Yes.

BY MR. MORLEY:

Q. Do you have any questions about the interview process as I have described it?

A. No.

Q. Doctor Kravitz, what is your

present position?
A. I'm presently chief of scientific development. I'm formerly the chief of mine emergency operations, MSHA technical support out of the Pittsburgh Safety and Health Technology Center.
Q. How long have you been in that position?
A. Since about June --- June or July of this year.
Q. Who was your supervisor?
A. Terry Hoch.
Q. And what is your employment history?
A. I started with MSHA in October of '73. Prior to that, it was with Westinghouse Electric, from 1970 to '73. Actually, it started with the Bureau of Mines, which would have been '73. And then went through the MESA and MSHA.
Q. And what did you do throughout your --- whatever?
A. Basically it was with mine

emergency operations. It was throughout --- in the '70s, with Westinghouse, I helped develop the seismic location system and electromagnetic communication systems. We did research with Westinghouse for the Bureau of Mines on contract to develop the systems.

Q. And before your immediate --- before June, your position was head of ---?

A. I was chief of mine emergency operations.

Q. How long did you hold that position?

A. Let's see, since about '79. And prior to that, just an electrical engineer for mine emergency operations with the Bureau of Mines and MESA.

Q. What are your primary areas of responsibility in regard to responding to mine emergencies?

A. Presently or in the past or at the time ---?

Q. Well, presently, and at the time of the accident.
A. Presently, it's a support role. John Urosek has taken over for mine emergency operations. Basically, we both received promotions in that regard. Prior to that, I was doing both jobs, the Chief of Mine Emergency Operations and the research aspect. So basically, the job was split so that we could have one person devoted to deployment and the other person mainly to research and bringing in new technology into mine emergency operations.
However, during operations such as this, John and I covered for each other.
Q. At the time of the accident, had that transition been complete?
A. It was just starting.
Q. What equipment are you responsible for?
A. Right now, nothing. But

basically before that --- John is now responsible for it. But prior to that, it was --- all of the mine emergency response equipment for MSHA, basically the seismic location system, command vehicle, satellite communication systems, television probe systems, basically all of the communication systems, TV probes, communication probes, all the mine emergency equipment, the rescue capsule, things like that.

Q. How many people do you supervise?

A. Presently zero.

Q. And ---?

A. Prior to that, it was four. Gary Taylor, Virgil Brown, John Gibson, Edward Chuta.

Q. When and how were you notified of the August 6th accident?

A. I got a call from John Urosek around eight o'clock on August 6th, basically to get the seismic system ready. I usually check with my

headquarters to see if they definitely wanted the system deployed.

Q. Can you describe your role in the emergency --- kind of give me a narrative, beginning with the call, notifying you of the accident?

A. Sure. After we got the call, we immediately started getting all of the equipment ready to go. We knew that if we had to deploy the system, we'd have to do it by air, so we started basically alerting the Air Force that we needed to have airlift assistance. And that's when I discovered that the Air Force apparently forgot about us entirely. After all these years since we've used them, the last time we used them for major airlift was for Willberg in '84.

So we have, over the years, still set up. And we had discussions with the Pentagon, and set up procedures in order to deploy the

system. And over those years, we set up a group of standardized procedures, we did loading exercises with the Air Force out here at the 911th Air Base. And they had telephone numbers which we updated annually for key people within the Air Force to be notified, dispatchers, things like that.

When we requested this --- also, we have a Memorandum of Understanding with the Air Force that is still in effect. Basically it was signed by, I think, Mr. Lagather, who was Assistant Secretary at the time. When MSHA came into being, prior to that, there was another one that was signed by Jim Day, I think. But the present one is still in effect and stays in effect until it's cancelled by one of the two parties, either MSHA or the Air Force. And no one had cancelled it, so it still was in effect.

However, he just had a

Memorandum of Understanding, and it doesn't outline all of the different procedures that you need in those procedures. The people that we had contacted because of the turnover in the Pentagon, you know, those people basically forgot about us. So basically we had to start pretty much from scratch, saying who we were, provide the Memorandum of Understanding, and basically try to get the airlift assistance. And still, you know, after going through all of those gyrations, it took quite a while to get that actually deployed.

Q. How long?

A. Let's see. We were notified on the morning of the 6th. We started getting our seismic system and the supply trailer ready. We called a trucking company to get the trucker out there, on alert, just in case we had to go out, which we did eventually. And the trucker actually

picked up our supply trailer around noon time. And then I had John Gibson and Tom Barkand drive the vehicles to the 911th to start the loading procedure over there.

We had a problem at the Air Force --- meanwhile, while I'm going through making all of the contacts with the Air Force, we had a problem at the air base, because one of their major pieces of machinery for loading was actually broken. It's called a K-loader. And a K-loader basically is necessary to load seismic --- the box on a seismic trailer. The seismic system, we had to tilt that truck with the box on it, the box comes off --- the box and the truck are one load for a C-130. Well, the truck was no problem, but the box itself has to be actually entered into the C-130 on a level. And that's where the K-loader comes in, you actually load the box onto a K-loader, and the K-loader then lifts

it up vertically and then inserts it horizontally. And that machine was broken.

So they went through all sorts of gyrations to try to get that box into that truck, into the C-130. And they had some problems with that. Plus we also have a generator truck which we didn't have any problems getting onto a C-130.

So once we had made all of the arrangements with the Air Force --- let's see, I had to develop a letter --- from the Air Force they requested me to get the Assistant Secretary to send a letter to the Office of the Secretary of Defense, which I did, I drafted it up. They came back and made some minor changes to it. And then we had this actually, you know, in place. And the Air Force requested us to refund any types of expenses that they actually incurred for the airlift. And we had to agree with that in this particular letter,

and signed by the Assistant Secretary. So I'd offer that for you.

MR. MORLEY:

Let's call this Exhibit One.

(Kravitz Exhibit One marked for identification.)

A. So that took quite a while actually to get that then in place.

BY MR. MORLEY:

Q. So about how long did it take to get all of the paperwork?

A. I sent --- let's see, a signed request at six o'clock, it's about 5:50 p.m. on August 6th. And that's how long I was in the office until that particular time. Meanwhile, they're still trying to get this air equipment loaded onto the C-130 once they got approval to actually do that. So the guys went out there and then they had to wait until the Air Force actually agreed to actually

move our equipment. So in the meantime, the Air Force was looking it over down there, it's the 911th Reserve Base. So they're looking at the equipment. And then eventually, I got this letter that I just gave you over to the Air Force, signed. And then I took off from there. I went home, put some clothes in a bag and then went right out to the air base. And then we waited for another plane, because the C-130s were having difficulties loading. We decided that probably --- actually, the Air Force decided, we can't tell them what to do. But they said well, the only way we're going to get this thing out here today is either put it on a C-17 or wait until tomorrow.

They were having a problem with the time for their crew. They have certain limits of time that their crew can actually fly. So they wanted to go home and let their crew rest. I said no way, we have to get

this thing out here immediately. So I made a call back to the Pentagon, and talked to my contact there. And he made some calls and that woke up the guys at the 911th, basically, and said get back out there and you get these guys out to Utah. And they provided the C-17, like it came around 1:30, something like that, in the morning. I'd have to look at the timeline.

Q. Where did that come from?

A. That came out of Louisiana, because the governor from --- no, it actually came out of North Carolina. There was a second C-17 later on in the operation where the Governor of Utah made arrangements with the Governor of Louisiana to provide a C-17 to bring a TV truck that was on its way from Tennessee. So that was another C-17. But this one came out of North Carolina I believe. Here's a letter from --- an e-mail I sent to the Air Force with that letter

attached to it.

Q. This is part of this other letter here? These go together?

A. Yeah. There's an attachment. The letter was the attachment to that particular e-mail. So the loading on the C-17 took hardly any time, it seemed like 45 minutes once you got there. The C-17 landed some time around one o'clock or so. By two o'clock, we basically took off from Pittsburgh. We arrived about 4:00 --- actually, I think it was more like 3:30, the timeline says 4:30, but I think there's --- we had a little time difference with the way people remembered it. But we say here 4:30.

We actually got in about 3:30, it took us about an hour to get the rental car there. I had made arrangements prior to it that --- everything closes down in Grand Junction something like around midnight or something, I think 11

o'clock, and I had to make arrangements for the rental car company to leave the rental car with the fixed-space operator.

When we got there, the fixed-space operator was actually closed down, the airport was closed down. In fact, the pilot had to turn on the runway lights from his cockpit. But when we got there, it was just basically desert --- a deserted site. So I walked across the whole field, basically, and saw somebody over in the maintenance shop on the other end of the field. And he said no, the fixed-space operator was on that side. So he drove me back over to the fixed-space operator. And they were just opening up again, because they figured that we'd be in a little bit later. And actually we made a little bit better time than we thought. So he had the keys there for the rental car. And they gave us some basic directions how to get out

of the airport. All said and done about 4:30, 5:00, we were on our way to the mine site.

Q. So you flew the seismic truck?

A. Uh-huh (yes). And the generator truck.

Q. And the generator truck?

A. Right. We picked up the rental car, a four-wheel drive right there in Grand Junction. It was the last four-wheel drive that they had available in Grand Junction from the rental agency. I had made arrangements prior to that, while I was waiting for the C-17 in Pittsburgh. So we got kind of lucky getting the last one. We definitely needed it.

Q. Who traveled with you?

A. John Gibson and Tom Barkand. Okay. So basically we drove to Price. And while we were there in Price, we stopped by the motel to make sure we had a room. That's when they informed us that they had given

our rooms away because they --- just being overbooked over there. So basically we said we need a room. We're not going to stay right now, we're just going to be able to go back to the mine. We really didn't need it that particular night because we worked pretty much until the next day. But in those types of situations, you've got to have some place to come back to.

So we got to the mine site about 10:30 mountain standard.

Q. That would be a.m. on the 7th?

A. Right. And then the first thing I did was check in with Al Davis. Al was there. We had --- and on the way there, we would be talking with Bill Knepp in the office. Let's see. Basically, Al was there. And he put me in touch with the mining engineer, Dave Canning, from the mining company. And he hooked me up with Dave. And then Dave and I went over the mine map. I had gotten a

quick briefing from Al.

So we looked at the area where the last known location of the trapped miners were, or the miners were. And we decided where to put the geophone arrays --- I sketched out the pattern that I needed in order to set that up. And I told them that we had to get those things surveyed in. He had a surveyor working for drilling locations at the mine. And so we started getting that in motion. He couldn't travel with us, because he was tied up at the mine. So he gave us written directions how to get up on top of the mountain.

So we thought he would be with us, and he changed his mind at the last minute and started going with us for a little bit. And then he had to turn back and go back. So basically we were on our own to get up on top of the mountain. And we did that. And at that time, I had previously

sent Virgil Brown and the mine emergency unit ahead of us. We had guys from Pittsburgh and --- let's see, I think it was districts two, three, four, and maybe five, I think. We had the list of people --- and if you've talked to Virgil, you've got the list yet. Did you get that?

Q. We talked to Virgil. I'm not sure about the list.

A. Did he give you a list of MEU guys that we deployed from Pittsburgh? Virgil, at the time, he's based out of Beckley, but he was in Pittsburgh and doing some work there. And luckily he was there. So then when this whole thing came in out of Pittsburgh, they had Virgil call up guys that we decided --- and usually because we want to try to get guys we can get to Pittsburgh pretty quickly. And they flew out of Pittsburgh about 6:30 on the 6th. So that was way before we got deployed with the seismic, or actually got

airborne.

So they were ahead of us. And I had Virgil and some of the MEU team help set up the seismic arrays up on top of the hill. Virgil and I traveled up on top just to see what the conditions were. And it was basically extremely rugged, in fact, I'd call it treacherous terrain. It was just a dozer road and the cliff of a mountain. And that's what we had to deal with throughout most of the operation. The road had gotten approved through dozer operations.

But I had --- Virgil and I were in the lead, and had the seismic, and John Gibson was driving the seismic truck, and Tom Barkand was driving the generator truck. We headed up on top of the mountain. And I had them wait at a flat place, because it was getting really rough while Virgil and I went ahead. And basically we were following the dozer over to where the drill sites were.

So we got up there and started scouting around the site. And that's when Dave Canning met us up there and we were looking for a place where we could set up our seismic system on top of the mountain.

And we met the surveyor and we had a little powwow up there. And said well, it looks like we're not going to be able to get a good line of site from up here, because basically it was a ridge. And on this side of the ridge, you had pretty good communications with cell phones. And then as soon as you popped over the ridge, there was no communications at all. And it got very steep coming there on the other side of the ridge. And there was no place to set up the seismic equipment on top where we could actually get a truck on top, where we could actually get a line of site with the antennas down to where we wanted to be setting up the sub-arrays. And basically we

set up seven sub-arrays for the seismic system. And then all of the sub-arrays have to have a line-of-sight back up to the seismic truck. So we could probably get a line-of-sight maybe for two, very sketchy for three. But we needed seven lines of sight.

Then I started going down to where the drill site was, and then you could see because of the steepness of the terrain, you could see all the way down to the valley below. And there was a campground down there. And I said look, what is that? And he said it was Joe's Valley. And I said well, you know, rather than to try to get a line-of-sight from the top of the mountain, why don't we set the seismic truck up down below. It's just the opposite of what we normally do. But in this case, it worked out great because you had a direct line-of-sight with the radios right down into Joe's Valley.

So we could actually put our arrays pretty much where we wanted on top of the mountain and then shoot some of the signal, and it was probably over a mile down into Joe's Valley. And that's what we did.

Once we decided that, I had Virgil go back and get the --- well, from the seismic truck, he unpacked some stuff, and he got some of the MEU guys to go up with him. And he started setting up the arrays on top of the mountain. And he traveled with the surveyor. And the surveyor basically was surveying on the spot with his GPS. And he was loading up where we wanted our arrays. And I think that was pretty much most of the night. And meanwhile, I took John Gibson and Tom Barkand with me, and they followed me down into Joe's Valley. And it got rough, sketchy again, real sketchy ---.

Q. What time was that?

A. Oh, my gosh. It had to be ---

it was still --- it was getting dark out there. It may have been about seven o'clock, something like that, because we were traveling down this mountain road, and it was dark, and we had drilling coming past us here, so we had to back up several times. It was like a one-lane road. So basically you had to share it. And if someone was coming right at you, you had to back up until you get to a place where you could turn off. And it was pretty touchy, too, because the big truck --- a hoe came by, and he wanted us to back up maybe half a mile in order to get past him. It was pretty bad. He eventually went around us. And he was almost vertical on the mountain to let us pass.

So we finally got over to Joe's Valley. And it was pretty late at night. And we set up our seismic antenna. And we had the generator hooked up. And it was at a

campground, but we didn't know if that was the right campground that we had seen from up on top of the mountain. And lo and behold, the signals started coming in. So we thought we were in a pretty good location. We got signals, but there was a lot of noise from the drilling operation, because we had actually set up our seismic pretty much around where the drilling actually was taking place. So all we were getting was drill noise. And we knew that was happening, but at least we knew that we had enough coverage so if someone would stop the drill so that we could do a seismic test, that would be the way to go.

Dave Canning had set up the locations for our geophones. I also, at the time, told him that we needed to set up blast holes. And we lined up eight of them. Originally, we said --- he basically said there's the mountain here, and then basically

here's a ridge, so we wanted to get these blast holes set up so that you'd still be able to get away from the drilling operations, but each one of these blast holes would have to be loaded with about 50 pounds of explosives.

Well, he said well, this is where we originally set up, and you go up on top of the mountain, it wasn't convenient to do it there, so he moved it a couple of breaks over, and then he basically set it up here. So he had a driller actually drill these holes, and a blaster load each one of those holes with 50 pounds of explosives so that we could do our seismic signaling. According to helmet stickers we put out, we said --- we set off three charges. And then if we locate anybody, we'll set off five more charges. So that's why I did eight holes like that.

MR. MORLEY:

We'll call this Exhibit

Two.

(Kravitz Exhibit Two marked for identification.)

A. I'd like to get copies of this stuff, because I'm sure Internal Review is going to be looking at this.

BY MR. MORLEY:

Q. Sure, we can do that.

A. Okay. So anyway, we had all of the things we needed.

Q. Can you mark on here where the final blast holes ended up?

A. Yeah, right here where the arrow is.

Q. Just circle the final ones here.

A. Let me just --- is that good?

Q. That's fine.

A. Okay.

Q. That's fine.

A. Okay. So ---.

Q. What time did the system become operational?

A. About 10:30, 10:30 at night. But ---.
Q. 10:30 on the ---?
A. On the 7th. Well, let's see --- yeah, on the 7th.
Q. Okay.
A. That's mountain time. And that's when we received the first signals down in Joe's Valley. We didn't have good radio communications at that time with Virgil. So basically, we had to rely on him to basically set these things up and we'd know that they'd be live when we lit up the system and we could actually see the signals. And basically all of the channels reported back in. So he did a good job setting them up. He's had experience doing that before.
Q. So what was your role after that?
A. The major thing was for the monitoring of the drilling. You know, when the drilling would break

through, we'd pound on the drill steel several times. We'd wait to see if we heard any responses, and to operate the seismic system. I traveled back and forth mainly from up on the top where the drilling operation was down there and then the TV cameras got there, I'd sit in with the TV guys, we would be looking into the mine whenever we could do that.

After a while John Urosek got there --- and he'd do that, too, so we traded off doing that. But when we did that, my main job was basically for the seismic.

Q. And did you continue doing that through the remainder of the rescue?

A. For the remainder of the rescue, back and forth with the drilling operation. And at the end, when the team underground couldn't mine anymore, basically we reverted to requesting a robot. And I made the arrangements for setting up that

robot. And for obtaining the robot, I made arrangements with a company up in Canada to actually deliver that. And then we used that at the mine.

Q. When did you end up leaving the mine?

A. You mean going back home?

Q. Yes.

A. I think it was around the beginning of September, September 1st, or something like that. It may have been the 2nd or 3rd. Probably the 3rd, I'd say. Yeah, I'd say about the 3rd. I'd have to look at the travel. The days sort of blended together out there.

It was really the most exhausting mine rescue I've ever been on from the standpoint of the conditions. From the mine to the top of the mountain, it was a two-hour jeep ride. Basically, you had to go around the whole mountain, because there was no access.

You could actually --- once

you got up on top of the mountain, on the ridge, this is like 10,000 feet, you could see where the mine was, but basically there was no way you could go directly. So you had to go all around the mountain to get up on top of the mountain like this. And then you travel along the ridge in order to get over to the drill site, then go back over the ridge, because there was no access on the other side of the ridge, directly up.

So we scouted around for a better site, and hooked up with a guy from the BLM out there, he sort of found us, and he said he thought he had a better site, it would be more secure, because there was a lot of campers in the area. And he said on the weekends, that place gets really loaded with campers. He was right, they do. So he took us over to --- I think it was Indian Creek area. And he set up a security point there so people, they weren't allowed back

into where we were working, it was great. We really appreciated all of the help for what they did.

Q. You were already set up and then you moved?

A. Yeah, because the place we were in Joe's Valley, it was not a secure location. Basically we had campers driving right past us, and people coming in and asking us what we were doing. And then he said it's going to get worse. It's going to get a lot worse. And then I said well, show us where you're going to --- what's the better location? And he said well, it's just up the road a piece, and, in fact, you're going to be a little closer to where the arrays were. And he was right. Because then we had a better line of sight to our arrays.

But the first night, I was just going from dead reckoning. And we were pretty lucky we were still shooting right up the mountain.

There was like a little knoll in between where we were and then where the final location where we were. So we actually went on the other side of this knoll, and we got better reception. So it gave us better security and better reception.

Q. When did you move?

A. It was basically --- I think it was on the same day, on the 7th --- no, it was on the 8th, the next day.

Q. In the morning?

A. In the morning, yeah.

Q. How long did that take to move over there?

A. A couple hours.

Q. Going back over that, I have some more specific questions. When you arrived, you were briefed by Al Davis as to the ---?

A. Uh-huh (yes).

Q. Had you been in contact with him before that?

A. No, he was at the site. I

talked to Bill Knepp, basically. And Bill was giving me feedback. And then I eventually hooked up with Al.

Q. When did your men arrive at the mine?

A. Which one was that?

Q. You had some members of the MEU ---.

A. MEU?

Q. Yes.

A. They got there before us. They were probably about --- I would say about six hours ahead of us. So I'd say probably at least six hours ahead of us. I think they probably --- they left Pittsburgh by commercial. I think it was about 6:30, it's about --- well, to get to Grand Junction, they probably went to Denver and hooked up. They probably got there around midnight or so, something like that. I don't know for sure. You'd have to ask Virgil for sure exactly when he did that.

Q. So you traveled with Barkand

and Gibson?
A. Uh-huh (yes).
Q. What were their duties once they arrived on the site?
A. Mainly seismic. They helped set up the seismic and operate it.
Q. When you got there, who was the --- I'll call it the primary decision-maker for MSHA? Who was in charge of the operation for MSHA?
A. Well, when I first got there, it was Al. And then eventually Mr. Stickler and Kevin Stricklin came on site. And then basically it was Mr. Stickler.
Q. He was making the decisions?
A. Yeah.
Q. Who was the primary person there for the company?
A. Mr. Murray.
Q. Was he there from the time you arrived?
A. Yeah, pretty much.

MR. BAXTER:

What do you base that

on that Mr. Murray and Mr. Stickler were making the decisions?

A. Well, basically from my observations. When they had meetings scheduled, I sat in on a couple of those meetings where they'd have powwows and they get their staff together along with the MSHA staff. Between the two of them, they were saying this is what we want to do next, and Mr. Stickler would say well, I don't think that's a good idea, this is what I want to do, and that kind of thing. But those were in basically brown-bag meetings, whenever you could get --- I sat in, I think, on two of those. And I'm sure they had more of those meetings. But basically it was getting their staff together, like the president of the corporation, or the mining company, along with Mr. Murray. And Mr. Murray had his son there, too, sitting in on those meetings. And we

had, on our side, John Urosek, and Al Davis, and we had his staff there, too.

BY MR. MORLEY:

Q. Who directed your activities on the site?

A. My activities?

Q. Yes.

A. I did.

Q. You did?

A. Yeah.

Q. In general, who was directing surface activities for the rescue operations?

A. Surface? Basically, since the mining company was paying for all of the drilling and all of that, they're pretty much --- it's sort of a misnomer that MSHA is in charge here under 103(k). We basically signed off on what the company approved, the plans that they actually submitted to MSHA. So basically the mining company is in charge of the operation and we're just basically guaranteeing

the safety of the operation. So it's basically the mining company is telling the drillers where to drill, based upon information from the command center. And the command center gets their information from the decision-maker. So basically the head of the command center and the top people in the company, MSHA, if there's a union involved, and the state.

Q. Well, who was the person, the company person, who was in charge of the surface operations?

A. Well, Dave Canning was the major person on-site for drilling operations.

Q. Okay.

A. Along with --- there was another engineer there, but Dave was the main guy that they relied on.

Q. How was the mine communication systems on the surface protected from unofficial use?

A. Well, we used government

frequencies for our radios. We also used satellite telephones. We had special satellite systems that were developed. And actually the problem we had on the other side of the ridge where the cell phones weren't good, basically we had to use the satellite system. The hand-held satellites didn't work too well. You had to sort of get your head in the right place and over in the right direction. They were kind of sketchy.

But we had these older satellite things we bought in the end of the '90s. And we set these up in caches around the country. These are DOME. And the DOME system proved to be the best. I brought those things in. We brought one with us, but then we brought another one in. We had a stage in Denver, we had another one flown out. And those were the most reliable.

So those systems were

basically, you know, satellite systems that are pretty hard to actually tap into unless you're really sophisticated. It's not like somebody with a scanner can pick up a satellite. The signal goes up to the satellite and comes back down.

Q. Did you go underground during the operation?

A. No.

Q. Were you involved in establishing any sampling programs?

A. No. Basically, we had sampling set up at all of the bore holes. We had that set up with the ventilation group. Kim Diederich did the sampling originally. And then I think Rich Stoltz was doing some of it. But as far as getting the sampling set up and all of that, that was pretty much established. And a lot of things were divided on-site when you get to the mine emergency. Different people had different responsibilities. Basically, our

main responsibility was the seismic at the time. Then you had the ventilation group in charge of the sampling and the gas analysis. And then you have other groups in charge of like roof control and things like that.

Q. Where was the gas laboratory set up?

A. In Price, in the field office.

Q. Were you involved in developing plans or supervising any of the underground mine rescue activities after you arrived at the mine?

A. No. The only thing as far as the activities pertinent to the underground was getting the MEU guys from Pittsburgh there. We also had some MEU guys from out west. And we set up a smaller team out west. And basically that was --- Larry Ramey is in charge of that one.

Q. During the operation, were any of the team members required to go

under oxygen?
A. I think that they had gone under --- for me to go under oxygen?
Q. No, while you were on site.
A. I think when they went back to check the seals, the team members actually did use oxygen going back to check the seals. And I think that one of the seals was breached. I think one of the teams went in to set up a sample line or something like that.
Q. Were you there when they initially breached the seal?
A. No. I picked up bits and pieces. What I did was go up on top of the mountain or go into Joe's Valley. And then sometimes I'd come back into the command center to see --- to check and make sure that we were following what they wanted us to do. But basically, there was times when they wanted us to be up on top of the mountain when the drill hole came through. And basically that's

what we'd be doing. Or that's what I'd be doing. But the guys would always be manning the seismic system in one way or another.

Q. So you really didn't have any oversight or function with the underground?

A. No.

Q. If you could, could you just describe the different types of equipment --- seismic equipment that MSHA used at Crandall Canyon?

A. Yeah. It was our main seismic system, it's called a Seismic Location System. It consists of the box truck with the tilt-bed truck with the generator --- the generator truck. And basically, we have seven sub-arrays that we set out. Each sub-array has a pre-amp with a telemetry receiver built into it. And it has an antenna that gets the signals back to the seismic truck. And the seismic truck has the processing, filtering, all the

different equipment in there to try to determine, along with the survey coordinates, if anyone was pounding, that basically we'd be able to locate.

Q. What's the history of that system? When was it built or ---?

A. It started being built about 1970. The National Academy of Sciences at the time had recommended to the Bureau of Mines to actually build that system, and along with other things, including refuge chambers, the first self-rescuer, things like that. So this is part of a major contract that was left to --- Westinghouse Electric actually was the successful bidder on that contract. I had joined Westinghouse just about that time. So it was serendipity that I got involved in this stuff. But we tested that system, mostly throughout the west, originally, and then back east. Over the years, you know, even when it

came into the government, we kept developing that system, getting better and better. It's probably the only system like this in the world. We've tried several times to get people to bid on trying to replace it. There's only been one company interested in doing that, and that's out in Virginia, to actually guarantee success. But they said it's going to cost around $2 million to replace that system.

Q. How is that system different from what --- say would be used by a seismologist?

A. Well, it depends on what you're looking for. We use the same types of geophones that oilfield exploration uses, but we use them in a different way. Basically, we're turning to the system to pick up signals from somebody hammering on rock or thumping on the roof or on the floor. So that's basically how we developed that system around that

particular frequency range. So seismologists are looking --- and they have much bigger arrays. They're looking for these cavities of oil and gas. And they'll do reflective seismic, where they'll set off explosions and they'll actually have reflections from where the swell pool might be, and when they interpret those to find that.

Now, we use it in an opposite way, where we actually pick up signals from people that are generating actively. And that's what we're looking with our system. Our system picks up those signals at the sub-arrays, the signals go into our seismic truck in the process, and you'll see something that looks like a pattern that we look for in pounding ten times, waiting, pounding ten times. And then we put that into a computer algorithm that actually will come up with a projected location. But in order to operate

that system, you need all of those sub-arrays to be accurately surveyed in, you have to have some knowledge of what the ground conditions are, and we have to enter in a lot of parameters to do that.

Q. So your geophones are different --- respond to a different frequency than ---?

A. No, the system is tuned to that different frequency, but the geophones are basically, you know, the same type of frequency range of the geophone itself. But as far as the whole system, we're mainly looking for something like 20 to 200 hertz. And that's the frequency range we're looking for. And the seismologist will look for a much wider frequency band because of the reflections that they're looking for.

Q. What about the directional capabilities? Are your sensors looking for ---?

A. Pretty much vertical. Only

vertical.

Q. You're just looking at the vertical component?

A. Yeah, we're looking just vertical. And we're looking straight down with our sub-array. We can get slant ranges, but on a slant range, we're only getting the vertical component of a signal coming in on a slant. So basically, you'd have to have your array set up pretty much on top, especially in this type of cover. We're looking at about 2,000 feet of cover. And you'd have to be almost right on top of where someone would be found in order to actually pick up any type of signals.

With this system, the best we've ever done with this system was about 2,000 feet, in Alabama, in a mine that was completely shut down and you could hear a pin drop. The mine was very quiet, you could get that condition.

Q. Was that a test?

A. Yes, seismic testing, yes. So at the most, the system, we're operating at the very fringe of the operating capability. In order to pick up seismic signals from anybody pounding underground, it would have to be extremely quiet conditions. So things like drilling operations, dozers, developing drill sites, all of that stuff wipes you out completely. So you have to really look for good opportunities to be able to actually do seismic testing.

Q. Okay.

A. And we did have an opportunity to do that, I think it was on the 18th, when they actually did give us quiet time, we did set off explosions, and things like that.

Q. What about the other system, the so-called mini-seismic system?

A. The mini-seismic system was really developed for taking an underground. And basically to be able to find somebody on the other

side of a roof fall or something like that. It's very limited. It's only has about a 200-foot range. And under these conditions, it would be totally useless.

Q. Was it deployed?

A. We had it with us, but we never used it underground because of the distance that the trapped miners were from where the mining operation was. It's just not the condition that you want to use that for.

Q. You wouldn't expect it to be able to have that kind of range?

A. Now, I think that initially, I think Virgil Brown may have used it to put down a pipe, and pounding on a pipe. That was just one possibility to use it. But as far as doing it for what it was designed for, it really wasn't conditioned for that.

Q. Can you show me where the seismic arrays were placed?

A. It was on ---.

MR. MORLEY:

Let's call this Exhibit Three.

(Kravitz Exhibit Three marked for identification.)

A. Again, if you want a copy of this ---.

BY ATTORNEY MORLEY:

Q. We can scan it.

A. This is where we originally set it up, in this area. And it was over the area where we would expect someone's last known location to be. Eventually, we moved the system as a strategy change ---.

Q. The first area would be the locations marked in yellow?

A. Yeah. Right.

Q. Okay. Because we can't record it.

A. Sure. And I won't call it by chance. All I can say is I see that, Tom. Anyway, that's where we set it up. And then as the strategy changed, we moved the system and

shifted it. So we started looking more towards the end of the section, you know, basically removed the arrays so that we eventually ended up in these locations here.

Q. When did that occur?

A. Whenever we decided that we were more interested in this area over here.

Q. And also, why did it occur?

A. Well, we were doing --- well, first of all, you have a limited range here. If you're looking mostly in this area, you want to be --- you have your signalers, whoever is pounding, to be directly under the ---.

Q. You had very limited side ---?

A. Yeah, a very limited slant range. And here you'll get your algorithm, about 1,800, 1,900 feet, and 2,000 feet. And over here it was basically --- you know, you wanted to have the arrays over the area where if someone was doing pounding, that's

the best we would have wanted to be.
Q. Would you pick up the mining operations from the rescue work?
A. It's hard to say, but on a continuous miner --- we never measured continuous miners before, but it's possible that that could interfere with --- along with the drilling.
Q. Did you pick it up? Do you know?
A. Not that I know of. We picked up a lot of different signals, but we can't specifically tell you if it was drilling, dozers, miners, you know, all of that was going on at the same time.
Q. So you moved the arrays. What made you think that they needed to be over here to get them over on top of the miners?
A. We did one test here, I guess it was bore hole number three, they were pounding on a drill pipe. We thought we had seen some kind of

pattern over here, close to number four.

Q. Was this after you had moved the sensors?

A. Yeah.

Q. Okay.

A. So then we actually focused in --- we moved them like three times, because we focused in more on this area. And once we thought we had a pattern here, which I didn't really think was anything representative of a trapped miner, but we had to check it out because the signals were coming in, in a certain frequency of repetition. And I thought the signals were way too large to be anything that would be generated by a trapped miner. And they looked just too even. And the way I looked at it, there was more of an electronic oscillation more than anything else. There was something within the system. And the way I explained it was when people are pounding on the

drill pipe over here, we've got a sympathetic oscillation in this particular circuit over here. And this is still a mining operation. But you had something like 2,000 feet of drill steel hanging like this. And that drill steel is going like this. And there's enough of an energy force in a frequency to actually set up an oscillation in one of our sub-arrays. And that's basically what was set up over here, in this area. But we had to check it out, because we didn't know for sure that that's what it was.

Q. When did that occur?

A. I'm sure Tom probably mentioned it on the drill steel. It was at --- probably on the 15th, at the drill steel at the number three bore hole.

Q. And what was the response to that, and where were you at the time?

A. I was up on the site. I was helping with the pounding operation

by then at the drill site.
Q. You were up at the drill site? Okay.
A. So we would phone down to the --- radio down to the seismic truck and said just we're going to do something and listen. And they listened and they said well, we're not too sure what we're looking at, but you better come down here and take a look at it. So basically I left the drill site and went down to the seismic truck. And I started looking at it. And I said well, you know, it's definitely something that's an even pattern, but I really doubt seriously that it's something that would be generated by a trapped miner, because of the size of the signals. But at that time, you know, John Urosek was up there, and I told John that I can't tell you 100 percent, but I'm 99 percent sure we're not looking at anything that's a trapped miner. But you're getting

something from this particular sub-array up here. And, you know, this is very evenly spaced.

Q. How long does it take from when Gibson told you that you might have something until you got down to the truck?

A. It probably took me about 30 minutes, 40 minutes to get down there. And then I took a look at the signal, and then radioed back to John Urosek --- we were using satellite phones back and forth. And I said, you know, I really don't think it's something, but it's something that we can say that there's some even pattern there, but that's all we could say. But I don't think it's representative of any type of a trapped miner type of thing.

So the next thing I know, he flies in in a helicopter and he says let me have the recordings and let me have the map. And he took off and basically he went to the Governor's

command center where Richard Stickler was, and the Governor, and he was explaining to them ---.

Q. You didn't go with him?

A. No. I continued to stand there and listen, you know, to stuff.

Q. Was that information used in any future decision-making that you did?

A. I think it was, because I think Mr. Stickler wanted the next hole down in this area. And I know there was a controversy, some people wanted to drill in this area, and some people wanted to drill in this area. And this sort of supported --- it gave some support to the people who wanted to drill in this area. So ---.

Q. And by that area, you're referring to the ultimate location of bore hole four?

A. Bore hole four. So that's basically --- I made the decision of where the next bore hole was going to

be in number four. So we did do a listening at number four, after a drill hole went through. And we listened. And basically, you know, I had that particular sub-array moved over. I thought that was more sensitive to that particular frequency. And basically after we did that, we didn't see anything near what would be representative of a trapped-miner signal. So then they went out to these other drill holes.

Q. When these drill holes went through, were there quiet times established to listen for the miners?

A. No. It was kind of frustrating from the --- both Dave Canning and I were both frustrated, because he had the holes loaded, and we had everything set up, and it was mostly on --- it's typical for most rescue operations. You really don't want to stop drilling and mining operations and other types of stuff unless you really have to, unless you

think there's a really good chance of a seismic signal, the system was actually picking up anything. And sometimes seismic is used as the last resort. In this case, we had everything set up, ready to go, but we didn't get a chance to actually operate the seismic system until --- let's see, on the 18th, when they actually did set off explosive charges.

But he was calling down to his people and trying to get quiet times for us to listen. He said he's got his holes loaded. Let's stop a while and let's do a seismic test. He understood, you know --- he had never seen the system before, but after I explained what it could do, he says let's give it a shot. But he wasn't ---.

Q. When were the holes loaded?

A. The holes were loaded as soon as they got drilled up there. He actually drilled and loaded the holes

at the same time. And we were pretty much ready to go. We set up our seismic system pretty much --- I think I'd say on probably the 8th or 9th. He started probably drilling them up on the 8th. And he probably had them loaded by the 9th.

Q. So they sat loaded from the 9th to the 18th?

A. Right.

Q. And the reason they sat that long was nobody wanted to stop the --- take the time to stop the ongoing operations?

A. Not long enough to do that. Even when we banged on the pipes, we had the one drill that went through, but you had a dozer operation preparing another pad for another drill hole. So that operation was going on at the same time. Now, that operation stopped when we pounded on the pipes, but it was only a short period of time. And then everything would start back up again and they'd

move the rig.
Q. When you say short period, what are we looking at?
A. I'd say less than a half an hour, when we were pounding on the pipes.
Q. Was that each hole that was done?
A. Pretty much. The first hole, the two-and-a-half inch hole, I had been down at the command center, John and Tom were over with the seismic, and the command center, Mr. Sticker and Kevin Stricklin wanted me to go up on top of the mountain to do a couple of things. First of all, he wanted me to make sure that we didn't have a communications problem like we had at Sago, where we had knowledge of someone pounding on a pipe, if we got a response or something like that or you didn't get a response. So he had me fly up on top of the mountain with two sheriff's deputies. And I was basically told to confiscate all

cell phones up on top of the mountain.

Q. Which hole was this?

A. Number one. Hole number one. So the sheriff's deputies and I went around and basically once we figured out that they couldn't get communications on the other side of the ridge with a cell phone, all of those people were okay. So we started confiscating cell phones on the ridge facing the mine.

Q. When was this?

A. That was when we first got set up on the top. Let's see, when number one came through. So number one came through --- on the 11th there.

Q. We probably have it right here.

A. I looked on there. It's in one of these records here. This is the map from the MSHA website. It shows when these holes came in. Drilling started on number one on the

7th and breached the mine on the 9th. So it must have been the 9th.

Actually from the log, off of the MSHA website, it's got a precise time. Everything we did report back to command center should be in the command center log. So if we got any type of pounding up and down the mine, you have a code. You got some here that is representative of the code. This is the current contact plan. Basically, there is a code that we used. This is similar --- it was changed a couple of times. But basically, if we had actually found some --- people arrive and say that the parts had arrived, or there's --- we need three wrenches or things like that --- there was different types of codes that they set up and we were told to use at that time.

Q. That kept your communications from being intercepted?

A. Yeah.

MR. MORLEY:

And this would be Exhibit Four.

(Kravitz Exhibit Four marked for identification.)

A. They were very conscious of the fact of the Sago problem with the communication. Let's see ---.

BY MR. MORLEY:

Q. So when these holes went through, there was a quiet time of approximately half an hour when they pounded on the pipe and you would listen?

A. No. Sometimes I'd be up there and sometimes John Urosek would be up there. And we usually tried to have an MSHA person there when the pounding actually occurred.

Q. Were all other surface operations stopped?

A. Yeah, as best as possible. Yeah. So they shut down the dozers, they shut down --- actually all of the compressors and everything. So

it was very quiet.
Q. What about the underground operations?
A. They continued to go. We didn't interfere at all with the underground.
Q. Did the underground interfere at all with you?
A. Not to our knowledge. Now, as far as when things quieted down, they got down real quiet. So you have to correlate one thing happening underground, and when the mining machine was on and off, it's hard to say.
Q. Well, when you had your quiet times, were your signals quiet enough that you would have a good chance of picking up a signal?
A. Yeah. If we'd pick up --- we'd be looking at very low noise conditions, extremely low.
Q. Why would you not pick up the underground mining?
A. Well, it's so far away.

Q. The horizontal distance?
A. Horizontal distance. Again, we were talking about the slant range. Well, if you're 2,000 feet this way and a mile or so this way, it's pretty tough to pick up anything. It would have to be a tremendous signal. Now, we were picking up what we call events throughout the whole time we were there, and it would be things that would show up on all these sub-arrays at the same time.
Q. Okay.
A. And basically we figured there was probably movement of the earth from mountain bumps or whatever stress was being relieved in the mountain itself.
Q. What did they look like?
A. Well, you'd see signals that would be across each one of the sub-arrays. And basically they would be like something that would show up --- a fairly large signal that would

cross the entire sub-array.
Q. Before we move on from the sensor locations, these sensors --- these are the dates in blue here that were --- were those the dates that they were relocated?
A. Right.
Q. And they were relocated based on just lack of success over here or what?
A. Well, the strategy that was implied from the command center.
Q. Okay.
A. Basically if they said we want to look in this particular area, we'd move the center of the sub-arrays, and the sensors around, to get the best possible configuration over that particular area.
Q. This map that was on the MSHA website shows the geophone locations. Do you know where these came from?
A. No. I believe the mining company had put some in off of their survey coordinates. And this one

here looks like it's number seven, the geophone location here.

Q. Does your map --- are these all of the geophone locations you used that you know of?

A. Yeah, pretty much so.

Q. So was some of these red geophone locations on the website map, or ---?

A. They were trying to coordinate that with the surveyor head, but they were having some difficulties in trying to get the coordination with that. So they're there estimating off of here. I think some of this information came from the mining company as far as what the surveyor had.

Q. So these locations, like ---

A. This one?

Q. --- up in here, you think these were ---?

A. Yeah, I'd say that one is probably about right. It could be this one here. I never tried to

correlate back with what they have here. I don't know. This is where we had our sub-arrays.

Q. So then some of these red circles may not be accurate?

A. Right.

Q. Okay.

MR. MORLEY:

Let's call that Exhibit Five.

(Kravitz Exhibit Five marked for identification.)

A. I'd go with this one. This is what we were using for our locations.

BY MR. MORLEY:

Q. Exhibit Three?

A. Yeah.

Q. Do you want to take a short break?

A. I'm fine.

MR. MORLEY:

Let's take a break.

SHORT BREAK TAKEN

BY MR. MORLEY:

Q. Jeff, we were talking about the location of the sensors and the charges that were loaded to attempt to signal the miners.
A. Uh-huh (yes).
Q. Do you have any particulars on those charges? How many pounds of explosives?
A. Each hole was loaded with 50 pounds of explosives. When we did the seismic test, Dave Canning said, you know, in order to use up the explosive, and we have a bigger punch, he could do doubles. And so the first three were 100 pounds, and he actually set off two at the same time, in sequence. It went 100, 100, 100.
Q. With eight holes?
A. He had the blaster do them simultaneously. So a 50 --- like three 50s, and he did three 100s.
Q. And then the second time?
A. The second time, I thought he was going to do like 100, and then

50, 50. The 50s would be --- so for three of them, he'd use up six of them. They do like two, four, six.

Q. How many holes, total, were there?

A. There were eight. That's what he told me they were anyway.

Q. Did some of the holes have more explosive than others?

A. No, they were all supposed to be 50s. But I didn't go up to where --- he had that site pretty well closed off. So basically we knew that if we take a look at that --- and I'm sure Tom Barkand probably went over --- you can tell when the seismic signals actually came through. And when you set off the explosions, you could actually see the explosions. He set them off three times.

Q. How deep were the holes? How were they drilled; do you know?

A. Usually for those --- they put them down about two drill steels,

about 40 feet deep.
Q. What drill rig did they use?
A. It was a smaller rig that they had running, just to do that.
Q. It wasn't the main rig that was drilling?
A. No. No, it was a small rig.
Q. Who designed the shots? Like how did they know how much explosive to use?
A. I told them we usually use 50 pounds in each one.
Q. Just from experience?
A. Uh-huh (yes). Just as a rule of thumb.
Q. Does the type of the strata affect the sensitivity of the system?
A. A lot of things do. That rock, the solid rock, basically the signals will be able to travel faster through those rocks. If you got softer types of rock and soil on top of that, it goes slower through the soil than it does through the rock. So different types of rocks have

different velocities. This thing was actually --- they call it ground blast, it actually went through.

Q. Let me ask you this, was this good conditions for seismic?

A. It was mostly rock, real solid rock. But again, we were operating at the extreme limits of what the system could do, I mean at the outer edges.

Q. Do you know of any other seismic equipment deployed and used on the site by the company or the contractors?

A. No. There was some equipment for earthquake monitoring. There was --- University of Utah had some. No, I didn't see where they actually set up the arrays. I think Tom Barkand may have come across one or two. But they were used by them to do some monitoring in the area, mostly for earthquake or extremely large events, but nothing like what we're looking for. Our sensitivity is much

greater.
Q. Was there any communication between you and the University of Utah?
A. No.
Q. No coordination?
A. No, because again, they're looking for something totally different than what we're looking for.
Q. Were they notified before the shots were set off or anything?
A. No. Not by me, anyway. They could have been by the mining company. But I doubt if they did. Well, unless they had a sensor close to where we were. Those shots --- they could have been reflected on one of their arrays.
Q. Is there anybody else trained to operate the system?
A. We did original training for the mine emergency unit. So most of the people on the unit got some initial training on that, Virgil

Brown, and some of the people, and Bob Clay and some of the other people.

Q. As far as operating the truck and interpreting the results, who is qualified to do that now?

A. John Gibson can look at it and pretty much set up the system and look at the signals. But I'm probably the only one that can really do a definitive look at these things.

Q. Is it possible to expand the capabilities of the system?

A. Anything is possible if you have enough money.

Q. The locations on the Exhibit Three map that you have marked where the geophones were placed, how did that translate to --- how did they know where to set them in the field? What was that process?

A. Basically, I had set up the locations, and basically put it down on the map. And then relay that to Dave Canning. Dave Canning would

give that to the surveyor. And then the surveyor would go out and get as close as he could to each one of these arrays. And then put a stake in the ground --- like with the first day, when these were all set up, initially, Virgil Brown traveled with the surveyor. So he knew exactly where all of these things were. And then the surveyor actually assisted in the locations and helped setting up a little bit.

But I think it was Bob Clay and Virgil and one of the other MEU guys actually set up most of these arrays.

Q. So you would communicate with the company surveyor and they would go out and set a stake ---

A. Uh-huh (yes).

Q. --- and then send somebody to move to that location?

A. Right. And then there would be communication. Sometimes our guys would go up on the mountain and the

surveyor would be there. If there was any question on where the stakes were, he would point it out, because it's extremely rugged --- looking at the map, it looks like they're at that camp. But it's extremely rugged terrain.

Q. To follow up on something previous here, the noise that was detected --- and I think you said you eventually determined that you did not think it was signaling from when you were doing the test after drill hole three ---

A. Right.

Q. --- were you able to come up with a location on that noise?

A. The closest we could do was number four, somewhere around the area of number four, but only because the number four array was the one that was in oscillation. So if it --- anything was causing that, it was right at number four.

Q. So it wasn't a case where it

was being triangulated through the whole system to find the point, it was more ---?

A. No.

Q. It was only happening ---?

A. At one particular array. We did pick up on this --- probably at number three, we picked up something some other times. But as far as the one that was in oscillation, it was number four.

Q. Okay. You said that the sub-arrays were set up over where the last-known location of the miners were. How did you know that? Who told you that?

A. The mine engineer and basically in talking with Al Davis, he said this is last known --- he had been conferring with the mining company. So basically, when I went up to the mine engineering office, that's the first time Al introduced me to Dave Canning. I guess Dave Hibbs was there, too. And basically,

I explained what the seismic system could do, and they agreed to help us out.

Q. So it wasn't one person or anything in particular, it was just pretty much a consensus at that time where they thought they were?

A. Yeah, it's a guess. Well, they guessed as to the last-known location was, from where they were supposed to be working.

Q. Throughout this operation, do you keep a log of the surface activities, like when tests were done, when geophones were moved, or anything? Is there a written ---?

A. Only from the seismic printouts and when they actually moved the arrays and put them on the map. Otherwise, it's just --- it gets to be too much data with all of this coming in, unless we --- now, if we saw something that was definitive on the seismic system that we thought was a trapped miner, we definitely

would log that. That's no question about it.

Q. Do you still do tests and exercises with this equipment?

A. We have in the past. I can't remember exactly, but the last test we did was up in Pennsylvania at --- that's when we did a training operation.

Q. What's the frequency?

A. As far as the field testing goes?

Q. Yes.

A. Well, we don't do regular tests. Most of the tests are done in-house, right there at the --- we do regular testing of the complete system, to make sure that all of the sub-arrays are working and the transmitters are receiving and all of that. That's done basically on a weekly and a monthly schedule.

Q. For training, do you go out and do field tests, where they actually deploy the equipment?

A. We have in the past, and we got away from that because of other demands that were put on us. And basically, we're stretched to the limit as far as what we actually can do. So this became more of a lower priority. We had our people that knew how to do this and that's what we rely on.

Q. You had said that your seismic system had detected some signals across all of the sensors that you interpreted were probably bumps or bounces.

A. Well, we said events. We didn't really say bumps, you know, because we don't know what a bump looks like. But we say that there were several events that actually came across the arrays at particular times. They're actually --- you can see them on the printouts. And those are when we see something that will actually be cross each one of these sub-arrays. We have a signal. And

basically they pretty much max out on the peak-to-peak, the voltage on the recorder. So they're a very large signal and report in from each one of those sub-arrays. And that's something, there definitely was a movement of earth. And whether or not it's a dozer that's moving the bucket up and down or some kind of drilling operation, was moving pipes, you know, it could be something that is an extremely hard signal close to where those arrays are.

Q. Is the equipment capable of calculating the magnitude of those events?

A. When it maxes out, you can.

Q. How did you man the seismic system? Was it manned around the clock, people working shifts, or ---?

A. Well, we had John Gibson and Tom Barkand. Mostly during most of the day and most of the night. We had to send them back to sleep because the longer getting the

drilling was, we knew that the drill was a long way from penetrating the mine, we would go back to the motel and get some sleep. But at times when we knew the drill was going to break through, we'd get a little bit of quiet time, then we'd be there all the time. But other times, we'd let it run all night and then we'd go back and take a look at signals, the seismic signals we were receiving, because we knew it would be all noise anyway.

Q. So when the drill was operating, was it noisy enough? There was basically no chance you could --- is that what you're saying?

A. Yeah. There's no way in the world you could pick up sound signals from the trapped miners.

Q. So at those times, you didn't have full coverage?

A. Right.

Q. But at all the quiet times you did?

A. Uh-huh (yes).
Q. When Urosek arrived on the property, did you also remain? Did your role change at all?
A. It freed me up to do more of the seismic. And he spent more of his time at the command center with Kevin and Mr. Stickler and Al Davis. I basically stayed mostly out in the field and up on the mountain. Sometimes we got stuck up on the mountain, and I think it rained, and the soil up there got extremely slippery. And there was times when you couldn't get off of the mountain after it rained. So I slept in the car two or three nights up there. It wasn't any fun, but it's better than falling off a mountain.
Q. Switching subjects, or topics a little bit here. Did you have any role in the planning for drilling the bore holes, where they were sited?
A. No, it's all command center decisions.

Q. Do you know who made those decisions?
A. The command center. Whoever was in the command center. I can say that it was probably a joint decision between the company and MSHA.
Q. Do you know who coordinated the drilling operations for MSHA on the surface?
A. As far as?
Q. Did MSHA have a person on the surface during the drilling operations?
A. Yeah. We'd always have someone --- not coordinating, per se, but monitoring. And basically we've got an inspector there that pretty much any time the driller is drilling, to report back --- there was one thing that the command center wanted, was information on the progress of the drills.
Q. Was that through you? Were they working for you?
A. Not for me, per se. They

operated through the command center. But it was like --- we provided the communications equipment, the satellite, and stuff, unless it would be actually relied on. So basically, they report back to the command center with the progress on it. I think it was on an hourly basis I believe we were checking in.

Q. So did you schedule those people or were they basically working out of the command center?

A. Out of the command center. But I'd pass on if the command center said make sure our inspector is up there and he's reporting back. Sometimes, you know, in order to get the jeep in the right location, they would have to drive down to another drill site and then drive back up, even with the satellite system that we had there.

It was kind of a tough communications situation. So sometimes, you know, those inspectors

drove their jeeps down and then they got blocked by drilling equipment coming this way. So they did the best job they could, getting the information back to the command center as possible. Sometimes the command center got frustrated with the lack of information. That's only because of the situation at the top of the mountain. It wasn't because the inspectors weren't doing their job, they were doing a good job. I'd say they were going above and beyond what they were supposed to do.

Q. Was it always the same inspectors?

A. No, they'd switch off. That's one thing about --- with the district setup. They set up a very good shift schedule. I think they were on a 12-hour shift schedule. I couldn't tell you exactly the names of all of the inspectors.

Q. Were you at the drilling site a lot?

A. Yeah, I was there quite a bit.
Q. When they completed the hole, how long did it take them to survey and relocate? Did they already have the new location surveyed?
A. Yes. Pretty much, except for like when they completed number three, there was a decision about where we were putting the number four hole. And again, they were working on a pad for number --- what turned out to be number seven, I think. But they usually had the next hole in sight so they wouldn't waste their time. There was only one rig up there that could drill that bigger hole, that eight-and-three-quarters.
Q. When they went from three to four, was there a delay there? Did they have to develop the number four pad?
A. Yeah, they had to do that.
Q. Do you know how much time that took?
A. They were just moving the pad.

It probably took them maybe eight hours to come up with a new pad. They had already started the pad for the other ones. They started moving back over to this one over here because I think the company wanted to drill there eventually anyway. So I think they started doing some operations over there, and started cleaning --- they had several dozers operating at the same time up there.

Q. How does the surface coordinate with the underground? Did they evacuate the mine when they drilled the holes through or anything?

A. No, because it was so far away. Not that I know of, anyway. Plus you had this big blockage here. So even if something happened over here --- and this mine had very low methane. It's kind of an outby as far as the methane production.

Q. Did you have communication with any other regulatory agencies

during the operation?
A. Just the Air Force.
Q. Like BLM or ---?
A. BLM, they assisted us.
Q. The Forest Service?
A. Well, the Forest Service and BLM, I don't know if they're connected, but it could have been one or the other. Sometimes they had some overlap, but all I know is we got some good assistance from those guys.
Q. In what way? What was your dealing with them?
A. It may have been the Forest Service. Well, they provided a little four-wheeler for us, and buggies, so the guys could scoot up on top of the mountain. And after a rainstorm, even a four-wheel drive with chains couldn't make it up the mountain. Only a little four-wheeler could do it, an ATV.
Q. That's from the truck to the drill sites?

A. Yeah. In fact, one night after a rainstorm, it got so slippery you couldn't move that ATV to shuttle people down the mountain. But it was the only thing that could make it back and forth.

Q. Who was the drilling contractor? Do you know?

A. I don't know the name, per se, but I know the drill rig was made by that drilling contractor. And it was like a specially-made drill rig. And I know that Rutherford was the company that provided the guidance system, the directional drilling capability. So Rutherford was on-site with their people, monitoring, and helping to guide the drill bit. Every one of the holes ended up where they thought it would be.

Q. You said there was only one drill rig. Do you know why that was? Was there the capability for more than one?

A. That's again a command center

thing. But I know that that was brought up by the families, who wanted to have three or four drill rigs. But I know the company said that because it was such a tight site, everything had to be built on the side of the mountain and you had to build these cuts in the mountain. And it was just so tight that you couldn't actually operate more than one drill rig up there.

It would be pretty tight to have more than one drill rig with the complete water supplies and everything that had to be brought in for this kind of thing. So it was an extremely tight drill site.

Q. Do you agree with that, it would have been impractical to have more than one?

A. Well, when you had separation between --- say if you had one drill rig operating over here and another one drilling further up the mountain, you probably could have had more than

one. But again, it's a command center decision.

Q. Do you know what size the bore holes were and why that size was chosen?

A. The first thing was a helicopter rig. And that was chosen because the helicopter could bring --- the helicopter rig is a rig that breaks down in pieces that you can bring up in a helicopter. It's pretty heavy pieces, too. So we ended up down in the second location where you eventually set up the seismic. The helicopter pad was down --- not too far from where we were. And he was shuttling stuff up the mountain, as far as the drill rig itself, you know, drill steels and everything else. So that was for the two-and-a-half inch. And that had a two-inch drill steel.

The other one, I think, was eight-and-three-quarters. And basically, I don't know why that

1 particular size was chosen. Again,
2 that's a matter of the driller
3 conferring with the mining company.
4 Q. Were you up on top when they
5 broke any of the holes through?
6 A. Yes.
7 Q. Do you know what was done to
8 determine if a void existed? Was
9 there a protocol that was followed?
10 A. If a void existed, yeah.
11 Q. Do you know how to measure it?
12 Can you describe that?
13 A. Well, the driller had a real
14 good feel for when that drill bit was
15 going to break through. For the two-
16 and-a-half inch hole, I got up there
17 just about --- right after the thing
18 actually had broke through. I never
19 actually made it down to where the
20 two-and-a-half inch was, because I
21 was trying to relay information back
22 to the command center.
23 So I was stuck on top of the
24 mountain and I had other people down
25 below. But for the other holes,

basically the driller had a real good feel for when that bit broke through, because you basically lose pressure. And then you could actually see the drill pipe go down, and then when it actually hit something, like something that wasn't a void, basically he'd stop it there and then basically mark it on the drill steel what the void actually was. So he had a really good feel for what the void actually was.

Q. Were all of the bore holes sampled to determine the air quality at the bottom of the hole?

A. The ones that actually ended up into a void, I'm pretty sure they were. The ones that ended up there wasn't a void at all, I don't know if those were monitored.

Q. Was there any problems with that that you were aware of?

A. What's that?

Q. The sampling, the air sampling.

A. Problems in what way?
Q. How did they do it?
A. Basically they set up a pump and then a sample station. And then they'd pump into that and then take bottle samples out of that, or take handheld readings right through that.
Q. On the initial hole, the air samples were reported to be good, and then that changed.
A. Uh-huh (yes).
Q. Do you know what happened there?
A. Yeah. The drill bit had --- the way they sampled that one, they sampled right through the two-inch pipe. So initially, we ended up getting a reading about 20-percent oxygen. And we had --- let's see, I'll tell you what, this lists exactly what it was. Let's see, a handheld reading --- because it broke through about midnight. And they got a handheld reading of 20.5 oxygen, zero CH4, and 12 parts per million

CO. Okay?
Q. Okay.
A. At 1:15 --- you have a copy of those? Because I know there was a controversy about that. The drill bit had actually --- they were sampling right through the drill bit. And the drill bit had clogged up with mud. So when they were sampling through the two-inch pipe, the theory was the holes in the drill bit itself would let the air come through from the mine environment, and then you'd grab a sample. So basically, that's what they attempted to do.
So they got those samples, plus they took bottle samples that verified there was about --- the same thing with the handhelds with respect to the oxygen. Then they suspected that there was the possibility that the drill bit could be clogged. So then they flushed it with water --- water and air, and then after that, that's when they got the lower

reading. It was like seven percent, I think.

Q. So initial samples were taken around midnight?

A. Yeah.

Q. And then when did they get the ---?

A. The sample that was at 1:45 showed seven-percent oxygen.

Q. And the previous sample that had the 20 percent?

A. The first one was at 12:10. There was another one at 1:15, 20 percent. 1:25. And the 1:45, that's after they flushed it, had 7.2.

Q. So between 1:25 and 1:45 a.m. is when it changed? When they flushed it, I guess?

A. Yes.

Q. Were those numbers ever released?

A. Yeah.

Q. The 20 percent?

A. Yeah. In fact, I was down at the --- I was on top of the mountain,

and Kim Diederich and another person with them had been done, they did the original sample. And they set up a runner with this reading from the sample.

At the time, I didn't have any idea what their --- the process they were using, but basically this is the sample that brought up my relay back to Kevin Stricklin, who was in the command. He had called me several times, wanting a reading. And I relayed that to Kevin. Once the readings dropped to seven, I also relayed that back to Kevin. And unfortunately, he didn't get that message until the next morning, when he picked up the message on his cell phone. And I had to go down to help explain why the change in the reading had occurred.

Q. Were all of the holes sampled?

A. I don't know for sure, but the ones that ended up in solid, I don't think they were. But anything that

had a void, I think was. I can't say for sure.

Q. What were the results of the other holes?

A. I don't have them with me. Again, all of those gas samples should be in the command center logs. I know that any time that any readings were passed along, they were passed on to the command center.

Q. After a hole was completed, you stated previously that you banged on the drill steel and then you listened with the seismic system. Were there any other attempts to contact miners?

A. Well, with the drill steel and then with the quiet time that we had to listen, I think it was on the 18th.

Q. Was there any other devices, anything else put down the hole?

A. I think on the first --- in a couple of holes, there was a microphone that was put down by the

company. And they brought that in, I think --- it was a subsidiary of Draeger that was out there that supplied the microphone equipment.

Q. So that would be like a microphone speaker? Is that ---?

A. Something like what we have. We have a microphone probe. It lowered it down there with --- actually in number one hole, I think they put it down the pipe to listen. And I think they put that down number two hole, too.

Q. Are those the only two holes you know that they used that on?

A. No, I think they used that on some others, but I wasn't there when they were using the microphones.

Q. Do you know when it was decided to introduce air into the bore holes?

A. No, not precisely. I know that they were pumping with various compressors down there. But as far as all decisions to put air in came

from the command center, what they wanted to do, and ---.

Q. Do you have any specifics on the compressors?

A. No. Not my area of expertise.

Q. Do you know, did they see a change in oxygen levels once they utilized the compressors at the other holes?

A. I can't say for sure. I know that between the number one and number two, there wasn't that much of a distance. So there probably was some communication there. But I don't have the readings from there.

Q. Was a down-hole camera used?

A. Yeah. Every hole that we had a void in, we used a TV camera. There are two companies there. One was Sub-Strata. Remember I told you that the C-17 --- the other C-17 picked up the cameras and was coming out of Tennessee. And then that camera was --- other cameras were being paid for by the mining company.

So this guy from Tennessee was in Kansas, and I guess he stopped for a night to sleep, because he was exhausted, and he was traveling with a companion, and I guess there was only one guy that could actually drive the truck. So they stopped for a while and ended up in Kansas. And the mining company was a little upset that they weren't there yet.

The Governor from Utah, Mr. Huntsman, he contacted the Governor of Louisiana, and she sent a C-17 to Kansas to pick up the TV truck. And they ended up bringing that over to Salt Lake, I think, and drove it from Salt Lake.

Q. Do you know when that was?

A. Not the exact date. But I know that occurred.

Q. And then the camera arrived for use at --- was that hole number two?

A. Yeah. Hole number two.

Q. Was there a time for hole

number two that went through?
A. Whatever was on the MSHA website there. And again, it should be in the command center log.
Q. Was more than one type of camera used?
A. Yeah, there was two companies. One was a local guy that had a camera. He just had like a pickup truck with a winch on it. But he was a geophysicist. And he had a camera truck, basically, on a pickup truck. The other guy from Kansas had a gigantic truck. This thing had all sorts of cameras and gizmos on it and stuff like that.
But there was these two companies that had it. So I think that the guy with the pickup truck was there way ahead of the other guy. So he may have done number two first. But there were multiple times that the cameras went down the holes to look for anything that they could see. The lighting was pretty well

limited. You couldn't see very far, I'd say maybe 20, 30 feet with the lighting from the cameras, and the conditions in the mine.

But in the holes they were able to look at, we used that camera several times before we put the robot in at the end of the operation.

Q. Does MSHA have a camera?

A. Yeah, we've got a camera.

Q. Was it used?

A. It wasn't used. Our limit is 1,500 feet. It's well out of range for what we have.

Q. Do you know, were the camera results used to determine the location of any other holes?

A. There could have been. I wasn't on the decision-making part for that. But you could tell from probably --- I think it was number two hole, it probably produced some of the better --- two and three have the better images. Number two had belt structure you could see. Number

three you could see posts in that area from the number three hole. Number three hole, yes.

Q. Were you involved in the decision for the down-hole robot?

A. Yeah, quite a bit.

Q. Can you tell that story?

A. After the second bump occurred and the accident occurred, it was pretty evident that if anything was going to happen, we needed to send something through the mine, if possible. And this is a very low probability of success operation, but it was really a last chance to learn anything, that type of thing.

I had called around to several places around the country to see if they had any robots. And nobody had a robot for the type of hole that we were interested in looking at. First of all, there was nothing that could go down the six-inch casing from the number two hole. And the only thing we could come up with was a robot

that was going to be custom-built from Canada for us. And that was built by Inuktun. In fact, I had to make up a justification for Darryl Cooper, who was our purchasing person.

So I wrote basically an e-mail to Darryl, describing the situation. Basically, the robot was built for us. And they were going to provide a complete tether for us and everything, but it was going to take a lot longer time.

So there was a company in Denver that was finishing up an operation, it's another Canadian company, that had a pipe inspection system. It didn't have robots that we could use for this particular operation, but they had the winch truck. And the winch was a key element to this whole operation with the robot. So they agreed to come over, and for a very-low fee initially, to hook up their system to

the Inuktun system, so it would lower our cost also, but that wasn't the major concern. The major concern was time.

So they came over from Denver. And they had to do a configuration where they had a fiber-optic system, and the Inuktun system had a twisted-pair type of a system. So they had to integrate both systems. They had a canister they had to build in order to do that with all of the electronics inside of it. So this canister had a lot of heavy-duty electronics in there to do that particular operation.

So I had the Canadian company build the robot for us on the premise that if we lost it, we bought it. And I said well, we can do that, but you have to buy certain special stuff that you'd have to put into this robot on top of that. And they said okay, we'll do that. And if we lose it, we'll buy it. Which we

eventually did.

So we brought that down. We originally --- after we had a session over at the district field office, we had good integration right there at the field office, and we brought it up on top of the mountain at the number three hole.

And we had put the TV camera down in number three, took a look at that, made sure we were still clear. And then we dropped the robot down. And the robot got to within a couple feet from the roof and we couldn't make it through the hole anymore, because the mountain had shifted. And basically, what the robot had shown was that the hole wasn't a round hole anymore, it was more of an oval hole. And the robot couldn't --- the guy who was operating the winch from Pipe Eye, he actually tried to pound that robot through. It was a very sturdy robot. It just couldn't make it through number three

hole.

Q. It shifted from between the time that the TV camera went down to when the robot went down?

A. The TV camera couldn't really tell about the ovalness, but the robot actually had a better camera in it. So basically when we got real close to it, and we needed it, the size of the robot --- because you could see, if you put a TV camera down on a probe, you really can't get a feel for the dimensions. But with the robot, it had the tracks out in front of its camera. And you could tell that once you got the tracks there lined up with the hole, that the hole wasn't round anymore.

So it could have been the TV camera had actually been going through this hole and we didn't see it. But it was very clear from the fact that the hole wasn't around anymore when we put the robot down.

Q. That was hole three?

A. Hole number three, yeah. So then we waited until they had another hole drilled, I think it was --- we were going to put it down, I think, hole number five. But number four was available. But it had a lot of wire mesh that the drill had to punch through. And this wire mesh was hanging down like this. And it was almost like a minnow trap, once you get it through, you're not going to get it back.

We were very sure that the hole was very unstable. It wasn't a cased hole. The only cased hole was the number two hole. And we had requested the company to actually drill a 12-inch hole, but they didn't want to do it. Because if you did that, then you could case it down to a smaller size where you could actually put the robot --- the robot was eight inches.

Q. Why didn't they want to do it?

A. I guess they didn't have a bit

on-site like that. And I guess they were already set up with the eight-and-three-quarters. Although, I had conversations with the driller, he said, you know, if he had the bit, he could probably drill it and it wouldn't take that much longer with a 12-inch. But it's a decision that was made by the company in the command center, I think.

So we did put it down --- once they drilled number --- what was it, the number five hole, and found that that one --- they punched into the solid, I think, number five, it wasn't a useable hole for the robot.

So then we said well, we'll go back to number four. So then we used the number four hole. And we actually got it into the mine, past this wire mesh. But the water had come down the hole that actually made this situation down at the bottom where you had a mixture of the drill cuttings, and water, and the tracks

were just spinning like that. It moved ahead maybe ten feet and then it just kept going like this. And it got stuck, basically.

Q. So it actually got into the mine?

A. Yeah.

Q. And it got stuck. It wasn't effective in the mine?

A. No. You couldn't move it any further, because the tracks were just rotating like this. And actually we had it hanging in that hole overnight, and we thought that we were going to try to come up with a way to actually get it out of the mine. We tried to back it up, and we couldn't.

So in the morning, we came back and said well, we're going to just try to lower the camera down as much as possible --- we had two cameras on it, and one camera came up like this. We lowered the back camera, and then we gave it a good

yank and maneuvered it so it actually came out of the mesh and into the hole. Then we was coming up the hole fine, and we thought we were free and clear. And we got to within 50 feet of the surface and the hole caved in on top of it. We had a rock fall inside.

So we were pretty well frustrated with that. We said well, in order to retrieve the robot, we're going to have to break that rock. So I brought in a company with a big rod, the company had actually used this --- they were going to try to punch the drill bit out from the number one hole, so that they could actually put a TV camera down there. But they ended up breaking the pipe in the number one hole, and I guess the hole caved in somewhat in number one. This is later on in the operation.

So we brought in this company. And they couldn't break through this

rock. And then we brought in another company after that that had a vacuum truck, because the hole was collapsing even more. We had something like 20 feet of muck on top of this rock.

So this vacuum truck came in, I brought it in, requested it. And at that time, pretty much everybody else had left the site on top. At the last minute, the contractor who we had formed a relationship with on the dozers and the backhoes and all of that, he said I'm not going to leave you guys up here hanging like this, I'm going to help you, so he did.

So he helped us get done --- get down the mountain with their equipment, using the dozer, and then he had a --- the track hoe, he used it as a lift for us. And he helped us out considerably. So we actually set that --- oh, it took us a good portion of the day to do that. We

got down to the rock, I think we had punched the rock a bit. And then we said move the robot up some more, and the hole collapsed more on top of it. At that point, we said it's a lost cause. So then we gave it a good yank, and the cable broke for the robot, and that was the end of that operation.

Before we did that, we actually had the contractor use the backhoe. And he was going to dig down 50 feet, but then he hit rock. He said in order to excavate that, you'd have to tear up the whole drill pad in order to do that, which was like 200 feet by 200 feet. He said he can't do it.

So we tried every which way but loose to get that robot out of there, and we lost it eventually.

Q. You had two different companies that built this robot. Where was the whole system put together at?

A. It was built in Canada. And this other company, the Canadian company was --- with the winch truck in order to lower it, that was an operation in Denver. They had just finished up --- he was out of Canada, too. But we put all of this together at the field office. We basically integrated the two systems at the field office.

Q. Was there any discussion given to like enlarging any of the holes for the use for a robot or anything?

A. No, not that I know of, no. Once you punch through, you lose all circulation in the hole. So the only way you could do is build a new one. You couldn't actually drill it unless you put a plug in the hole and then ---.

Q. A plug on the bottom?

A. Yeah. And they didn’t want to do that.

Q. Okay.

A. Because we requested --- in

fact, I think Dave Canning and I both pretty much were in agreement that we needed a larger hole. But he called back and the company wouldn't do it.

Q. Was there any discussion to drilling a large enough hole to put a capsule down?

A. The families had requested that. We had brought in a rescue capsule from Beckley. We had it driven by one of the mine emergency unit guys that was going to trade off with another member. And at the point --- the families were requesting that, but given the situation with the mountain moving like that, I, for one, thought that was a horrible idea.

It's enough to lose a robot, but if you lose a person in the hole like that, they'd go down 2,000 feet in a rescue capsule, it would be awful. And it was the sentiment for the command center people, too, that they really didn't want to see that

happen.
Q. When did the capsule arrive on the site?
A. Let's see, I think we have it in a timeline at the beginning. The timeline should be the same one that Tom Barkand and John Gibson gave you. We worked on that together.
Let's see, it said the 11th of August, took the capsule from FedEx, 8:00 a.m., to the hotel, 10:00 a.m., put the capsule in the supply trailer.
Q. Was any geophysical logging done on the holes?
A. Geophysical from the standpoint of the strata?
Q. Yes.
A. No, not that I know of.
Q. So when was the last day that you were on the mine property? When the robot failed, was that pretty much it?
A. Yeah. After we got the robot out --- we attempted on the 2nd, I

think, after we got everybody off the mine. It must have been the 2nd. And maybe the 3rd or 4th, I flew back to Pittsburgh. It was probably the 4th. I took a day to clean things up a bit down there.

Q. And in the weeks following, have you returned to Price?

A. No. I haven't been back there.

MR. MORLEY:

Let's take a short break and see if there's any follow ups.

SHORT BREAK TAKEN

BY MR. MORLEY:

Q. The bore hole robot, do you have any pictures of it?

A. Yeah.

Q. Can we get some copies?

A. Yeah, we'll get them to you. I don't have them with me, but I'll get them to you.

Q. I don't know if we have a copy of the --- did it take any video?

A. Yeah, actually that did.
Q. You said the bore hole was --- after it went down hole number --- or it didn't go all the way down hole number three, you were planning to put it on in a different hole. Was that hole five or hole seven?
A. It could have been one or the other. I'm not sure.
Q. You're not real clear?
A. Yeah, it could have been seven. I know we waited for a while for the other holes to be dug. It could have been seven, because I know that we wanted to get into a hole where we had a good chance of seeing something and having the robot move through the mine. We knew that from what we saw over here, three was not useable, two wasn't usable because of the casing in there was too small. One was out of the question. Four was the only option if we could get past that mesh. And then the other holes didn't go through and ended up

being not useable. It could have been seven. It's possible.

Q. Do you have anything else you'd like to add that may be relevant to the accident investigation?

A. Nope, I can't think of anything offhand. Everybody tried the best as possible to do something under really adverse conditions on top of the mine. Again, if the seismic had a chance, it was at the extreme edge of probability. There was a very low probability for that to actually work. But we gave it a shot anyway, just in case.

MR. MORLEY:

On behalf of MSHA, I want to thank you for appearing and answering questions today. Your cooperation is very important to the investigation as we work to determine the cause of the accident. We ask that you

not discuss your testimony with any person who may have already been interviewed or who may be interviewed in the future. This will ensure that we obtain everyone's independent recollection of events surrounding the accident.

After questioning other witnesses, we may call you if we have any follow-up questions that we feel we need to ask you. If at any time you have additional information regarding the accident that you would like to provide to us, please contact Richard Gates.

A. Okay.

MR. MORLEY:

If you wish, you may now go back over any answer you've given and you may also make any statement at this

time.

A. No. That's just to the best of my recollection. And that's probably not the --- I probably messed up on some of these holes, but it could have been --- like the last question you asked, was it at five or seven, it could have been seven.

I know we waited until when one of the holes came in that we decided to go in number four.

MR. MORLEY:

Okay. Again, I want to thank you for your cooperation.

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STATEMENT CONCLUDED AT 10:28 A.M.

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