Certification Form

I certify that I have read the transcript for the June 20, 2007, meeting of the Panel, and that, to the best of my knowledge, this transcript is accurate and complete.

Linda Zeiler, Designated Federal Officer

Dr. Jan M. Mutmansky, Chair

TECHNICAL STUDY PANEL ON THE UTILIZATION OF BELT AIR AND THE COMPOSITION OF FIRE RETARDANT PROPERTIES OF BELT MINING MATERIAL IN UNDERGROUND COAL MINING

CAPTION

The Technical Study Panel on the Utilization of Belt Air and the Composition of Fire Retardant Properties of Belt Materials in Underground Coal Mining met on June 20, 2007 and June 21, 2007 at the Best Western Airport Hotel, 5216 Messer Airport Highway in Birmingham, Alabama. The minutes of this Hearing were taken by Susan Bell, CSR, Notary Public in and for the State of Alabama.

AGENDA

Wednesday, June 20, 2007

9:00 to 7:00 p.m.

Panel of AMS Manufacturers; presentations and Q & A from:

American Mine Research.........Bob Saxton

Conspec Controls.............Rob Albinger

Jim Walter Resources...........Randy Watts

Jim Walter Resources.........Tommy McNider

Pyott-Boone......................Doug Coon

Rel-Tek Corporation..............Al Ketler

LUNCH RECESS

Jim Walter Resources Mine Tour Presentation

No. 4 Mine Belt Air Issues

National Mining Association/Alabama Coal Association Panel presentations, Q & A

Public Input Hour

Goodyear........................Dave Maguire

Adjournment, Day 1

NMA/ALABAMA COAL ASSOCIATION PANEL

Bruce Watzman

Dr. Pramod Thakur

David Decker

Patrick Leedy

Greg Dotson

Bill Olsen

Jim Poulsen

Gary Hartsog

TECHNICAL STUDY PANEL

Dr. Jerry Tien

Mr. Thomas Mucho

Dr. Jan Mutmansky

Dr. Jurgen Brune

Dr. Felipe Calizaya

Dr. James Weeks

ALSO IN ATTENDANCE

Linda Zeiler, Designated Federal Official

Kevin Hedrick, Electrical Engineer, MSHA

Debra James, Standards Office, MSHA

Hazel Haycraft, MSHA

Bob Timko, NIOSH

PROCEEDING

MS. ZEILER: Good morning. I would like to welcome everybody to this Technical Study Panel meeting on the Utilization of Belt Air and the Composition and Fire retardant Properties of Belt Materials in Underground Coal Mining.

This morning we will have a panel of AMS manufacturers here to speak to us about the current state of technology.

I have Kevin Hedrick here on my left, who is a Mining Engineer with Technical Support who has put this panel together and will make the introductions.

Kevin.

MR. HEDRICK: As Linda said, my name is Kevin Hedrick, and I'm an electrical engineer at the Approval and Certification Center.

One of my duties at the

Approval and Certification Center has been testing AMS components and evaluating them for safety for facilities.

This morning we're here to have four companies give presentations about their Atmospheric Monitoring Systems. We're going to go in alphabetical order by company name.

After the individual presentations, we're going to have each party sit in on a Panel discussion along with a representative from Jim Walter Resources, since they've assembled their own infrastructure for their Atmospheric Monitoring Systems.

The first presentation will be by a representative from American Mine Research from Rocky Gap, Virginia. Their representative giving the presentation today will be David Graf. That's G-r-a-f. He's the Manager of Business Development, and he has a Bachelor of Science and Commerce from the University of Virginia.

He's been with AMR for five years.

Helping him with the presentation is Bob Saxton. That's S-a-x-t-o-n. He's the general manager there. He's got a Bachelor of Science and Education from West Virginia Tech. He's been in the mining industry for 33 years and has been with AMR for 20 years.

Sitting in on the panel discussion for AMR will be Jim Gunnoe. He's their Engineering Manager. He's been with AMR for 29 years, and he's developed hardware and software for their AMS.

David, are you ready?

MR. GRAF: Thank you for having us. My name is David Graf, as Kevin said. It's a pleasure to be here.

I'm going to quickly give a history of AMR; where we've been, where we are now, and a brief description of our overall product line. Then Bob's going to describe in detail our Alarm Monitoring System.

AMR was founded in 1975 by Bob Graf, my dad, with his invention of the pilotless or cone-type ground monitor for the underground and surface mining industries.

The company has since grown into a monitoring control and automation specialist, serving the mining aggregates and water and waste water industries.

So there are two sides to our business. We manufacture our own mining equipment product line; and then we're also system integrators of hardware and software, off-the-shelf hardware and software.

We're located in the bustling metropolis of Rocky Gap, Virginia, up here in Bluefield.

We also have two sister companies who provide us turn-key manufacturing. They do our sheet metal fabrication, electronics, electromechanical assembly for all of our electronics. They provide us service mounting approval, PPD assembly, cable and harness assembly, electromechanical assembly, custom sheet metal fab, and finishing and silkscreening.

Also, we have three facilities, 140,000 square feet of manufacturing space, and 200-plus employees. We're also ISO 9001.

As I said, AMR was started with its introduction of the pilotless ground monitor. Ground monitors ensure the integrity of the ground wire and the trailing cable for underground and above ground electrically powered mining equipment. So it basically sends a signal through the three phases and back to ground and ensures that the ground is intact at all times.

Otherwise, if it's severed, the equipment will become electrically charged, and someone could possibly jump on the equipment and get electrocuted.

These are our three primary ground monitors. The low-voltage pilot and pilotless version GM200; and the two high-voltage versions, the GM250 and the GM300.

We also offer a wide array of monitoring controlled equipment. Our belt monitoring equipment includes a "Little Speedy" speed sensor, our Tip Switches, and our Belt Master 400.

We also offer battery indicators and cable fault detectors for detecting an opening in shorts and trailing cables.

Our circuit breaker series replaces traditional molded case breakers you find in power centers underground, and it's comprised of one control unit, vacuum contractors, fuses, and CTs. It drastically improves the reliability intake of all the case breakers. Monitors can't close into faults, and they last much longer with the vacuum contractors.

We also remotely open and close the circuit breakers from the surface using our MC4000 system or any kind of DTS system.

Now, I will hand it off to Bob.

MR. SAXTON: Thank you, David.

As David mentioned, we're today -- my name is Bob Saxton -- to talk about the Atmospheric Monitoring Systems.

The MC2000 system was the first system that we designed and manufactured back in the early-mid 1980s. At that time, there was a lot of questions about how can you put something underground that could communicate to the surface via using twisted cable for communication. Because of the hash environment and rockfalls and things similar to that, how can you get that information back.

Well, we designed the MC2000 system with a technology that was available at that time. All the sensors were 4020 milliamp current type sensors.

So they were not addressable. Everything that you ran, when you hung any sensor, you had to bring it back to a power source; hang another sensor, bring the wires back to the power source.

It had a slow baud rate of 4,800 baud. So communications was always a question about how fast this was communicating. You used multiple pairs of wires to communicate from that distance and from the sensors back to the remotes.

We had a proprietary master station, which shows right here in the right-hand corner and MC2010, which was a video monitor with our software that we wrote to gather the information coming back from the sensors. That's what was available back in the 1980s.

From that, five years later, we developed the MC4000 system, which we have today, with a lot of changes. Naturally, as technology improved, we incorporated that into our new systems.

We use a Windows operating environment; meaning, we use a computer that is updated almost weekly now. Every time we sell a system, it's a new type of computer coming out from Dell or whoever that you get a computer from.

All the sensors now are addressable. So we use a twisted pair of cables and communicate to those sensors because each one has its own address.

We're running at a fast baud rate, so we can communicate faster, at 38.4 kilobauds.

Some of the advantages that this system had over the original system was when you're calibrating the sensors to keep from getting an alarm of some type on the surface that's nondistinguishable from an actual alarm, any time that we're doing a calibration or a test on the sensors, or as they calibrate those and test them, that does not give an alarm to the surface. It just shows on the screen that it is being monitored or is being calibrated or is being tested. Those go into a log, are recorded and kept for information purposes down the road.

The sensors also have auto zero and span calibration, where you can just go put the gas on it and calibrate it up to 50 and then zero it back down, and then it settles in. It also flashes at set points, whether it's 5 to 10 PPM or whether it's addressed; and shows that it is calibrated on the screen on the surface. So all that's done automatically.

The software that we provide on our systems, we wrote. Jim Gunnoe wrote the software for that and developed the software. We use a Windows-type version of software where we can show different remotes, different sensors, and also do graphical representations on those particular items.

We buy HMI packages, either

from Wonder Wear, GE, or Simplicity. We're in the process of developing our own at this particular time.

Some of the advantages to these systems, as I mentioned earlier about the technology changing and us being able to improve the systems and making these enhancements, has been the availability to troubleshoot these systems. As with anything, it does take some maintenance and it does take some time. They don't self-heal themselves. They've got to have some work done to them.

One of the things that we've done is incorporate some smart repeaters and splitters into our remotes or outstations so if there is a problem in a leg or in an area of the mine that you can detect from the surface and say you're getting bad communications from this spot, you can go to this smart repeater and isolate the rest of the mine and troubleshoot that one leg. So it allows you to remove your 28 volts of DC power and disable communication throughout the ports that are available on that smart repeater.

It also gives you your line measurements for voltage and current draw. That's another big thing. You've got to run on a certain amount of voltage of 24 volts, your whole system. So, if you get a low current draw and your communication goes down, then this enables you to say "Yeah, I need to put another booster in here to boost my communication and boost my power."

A lot of this can be done from the master station. Not only underground where you can go and look into the remote and look and see what's blinking and where your ports are and disable the ports underground, but you can do this from the surface at the master station.

You can enable and disable communication with three output ports, and you can reset the communication port arrow count from the master station with the kill remotes, as we're required by MSHA to be able to kill these during a problem underground.

The other thing that we've done recently with the CO sensor is improve its -- I guess its capabilities. A lot of sensors that are out there or a lot that we've had in the past weren't, I guess, almost failsafe to some extent.

What we've done now is taken our sensor with a new board, which we call a flash upgradable board, whereby in the past, we've had to -- any time we made enhancements to our software, we had to go change a processor on the board. That was time consuming and costly, not only to us but also to the users.

So what we're able to do now is just go in there and flash the new software with a little item that we have where the operator can go in there and flash each sensor, and everything's done. Any changes that we make have to be incorporated into the sensor.

Also, some of the things that we've done to this when we came out with this new board is we're detecting an open and shorted cell. Thereby showing it to the surface "Hey, I've got a bad cell, take me out." It displays this on that particular address of sensor.

If there's an electronics fault on that sensor itself, it displays that on the surface. If it loses its memory or says "I've lost my span, where am I supposed to be, I've lost my address, I've gone dumb," it shows that on the surface.

We have this watchdog circuitry that continuously monitors this particular board and cell and all these functions to keep it in tune with what it's supposed to be and where it's supposed to be. All these malfunctions are reported to the surface.

Just recently, because of new technology -- we were talking back in the 1980s, we had a twisted pair of cables. The MC4000 system was using a twisted pair cable, and everybody talked about when are you ever going to use fiber? Nobody ever wanted to use fiber underground because of the capabilities of it. How can you splice it? How can you get fiber underground with roof falls and the conditions it's got under there?

Well, a lot of mines are going to fiber. They've started using fiber on some of the longwalls, and now they're using fiber on their Mine Monitoring Systems, and that's what we've come out with.

AMR has its own fiber-based MC4000 ET system, which is an Ethernet-based system. Basically, it's the same type of system whereby you use an HMI package on the surface; run your fiber through the mine as a backbone; and anywhere you hang sensors, you go through a gateway; and, from that gateway, connect up each of your sensors on copper.

Once you've run that full length of copper and you have all your sensors, then you can put another gateway in and hang it right off your fiber and go from there.

All our products that we manufacture, like David was saying earlier, with a CB, are able to communicate with our system and also with the Ethernet system; and the sensors are basically the same.

That's one of the advantages and that's one of the reasons why we went to this flash sensor. So anybody that has the flash boards on their system and upgrades to an Ethernet-type system, it's just a matter of flashing those systems and making them modified from our regular MC4000 system.

Some of the hardware that we

have for the gateway are the 4020, which also is a battery backup, battery supply, and power supply. We have three Modbus data ports to drive four conductor copper trunk cables. It's also a battery backup and available diagnostic information from each port because it has a smart repeater built into those Gateways, as well.

This is a picture of basically the gateway with the battery backup, the board, an Ethernet switch, and our gateway board.

The next step that we've taken here recently is integrating in, because of some the laws going into West Virginia and also the laws that are mandated in 2009 of tagging and tracking, AMR is developing it's tagging and tracking system that will go right on to the copper system that our users have right now.

We're in the process of testing this out or in the process of finishing up some design and going into test with that.

Not only will it go on to copper, but it will also go on to fiber. So it can be a stand-alone system on somebody else's fiber, or can be integrated into AMR's Monitoring System, as well.

We'll have a smart reader where we can feature up to four antennae inputs to cover multiple zones and ranges, and it provides the system with tag message and receiver information allowing tracking and triangulation. All this is battery backed up, as well.

This is basically some of the units that we have here. Our smart readers and our small little tags that we have down there, that go onto the operator or the miners' helmets, and then this is a display of how this would show on the screen. It would show them where they were and what time they reported in and the picture of that particular guy that was wearing the tag.

Atmospheric monitoring safety

aspects. There's a lot of things that go into conjunction when you're thinking about these systems. Where the technology was years ago and where it is today, there's a big difference. We are able to detect a fire before it begins versus a heat detection system, which was way back when.

Also, there is automatic alarm activation for working sections. So, if you have a fire in this one area, it can detect that particular leg or all the sections that you have, depending on how you set it up.

We have real-time measurements of other gases; CO, methane, oxygen, and nitrogen. Also, we've developed a hydrogen nullifying sensor. So a lot of people that use battery stations, we can put this hydrogen nullifying CO sensor into that particular area to monitor their charging station, but it won't nuisance alarm because it's getting hydrogen bleed off from the battery charging station itself. That's why we put the hydrogen nullifying in there.

We're also finalizing our next step in going to diesel discriminating. For a long time, that was not available; but it is available now. We can go in and detect so you don't get a nuisance -- well, that's just a tracker going by, and it's got diesel in it because you see that rise in CO. So we're developing that particular item right now.

Recently, we've had a lot of requests for cell and return monitoring requirements with oxygen, CO, and methane as well, going through a blue barrier in intrinsically safe areas.

One of the things that we worked on back in the mid '90s was a smoke detector. We used an ionization-type design at that particular time and worked with it probably for six months, and we didn't have much success. I think mainly because of the design, mainly because of maintenance issues, and mainly because of several different other items.

One of them was market drives, what we manufacture, as well. The market conditions at that time were conducive for us to spend a lot of time and money on an item, and we might sell one or two items.

Now, with new regs coming out and concerns about fire retardant belts, that might put this back on the front burner where we can get more interest. With new technology as it is today, there's a big difference.

Where are we going for the future? The main thing is that these systems, as I mentioned earlier, are not self-healing. It does take maintenance. You go to some mines sometimes, and they say "Well, the system is down, we don't know what's wrong, we don't have anyone here to fix it." Well, it's just like if your miner was going down and your miner needed oil in it or if your miner needed a new motor, I guarantee you, you're going to take care of that miner.

Well, it's the same way with the system. If it's protecting the people that are underground, it should be maintained in that same manner.

It does require specialized installation and maintenance personnel to maintain these systems. It's not just another job, and you say "You go take care of the system or put in a CO." It does take someone to take care of it that will take responsibility for that system.

One of the things that Kevin mentioned earlier about his job of taking care and looking at what we as manufacturers present to him to put underground, he's got to make sure that they work. We've got to make sure that MSHA understands that what we try to do is build a good product and a safe product that will work and protect the people underground.

That's it. Thank you.

DR. MUTMANSKY: Linda, can we take some questions right now?

MS. ZEILER: Sure.

DR. MUTMANSKY: Bob or David, would you comment a little bit more about what you had mentioned about smoke detectors? You basically said that in the past, you've looked at these; but you also said that perhaps today we could do a better job.

Would you try to assess whether or not it would be possible to implement smoke detectors using your system today and whether or not you could be successful today where you weren't so successful in the past.

MR. GUNNOE: My name is Jim Gunnoe. I'll take that question.

As Bob said, in the past, we looked at the ionization-type smoke detector and did not have very much success with that type of technology. The next step beyond that would probably be to do it optically. I know there's a couple of them on the market now to do it with obscurity techniques, and that's probably what we would look at next.

Now, there are also problems with that. There's -- naturally, you have other particulates in the atmosphere in the ground; such as, the rock dust, the coal dust. So those dusts, those contaminants affect even that type of technology, the obscurity technology.

DR. BRUNE: My question relates to your comment when you said you can detect the fire before the fire begins. What is the definition? Are you talking about detecting a fire or something heating before there's open flame, or what's the definition there? I mean, if I can detect something, obviously, there's something there that indicates something is smoldering or something is already smoking. Is that also not a fire?

MR. GUNNOE: The carbon monoxide sensors, when we say they'll detect a fire before there's a flame, is the fact that when a fire starts, before a flame, you have carbon monoxide elements off of that flame. So these sensors are sensitive enough to pick that carbon monoxide up before there's an actual flame.

DR. BRUNE: Okay. So what you said by detecting fire before the fire begins is before there's a flame, you can detect a fire?

MR. GUNNOE: That's correct.

DR. BRUNE: Okay. Thank you.

DR. TIEN: In the last slide, you were talking about using -- you have to have a specialized installation; and then there's personnel. What are some situations you have had in the field? Where do those people come from? Do you folks provide it, or does it come from the mine? What kind of background are these people? Are you happy with the type of people you're dealing with?

MR. GUNNOE: In some cases, in some of the larger mines, there are more qualified personnel to take care of these systems. In some of your smaller mines, they'll use the same guy that may patch a trailing cable to install some of these sensors, and they're not -- they have no electronics background.

We certainly try to train these people when we put a system in, but there's a lot of turnover. That's another one of the problems. You will train somebody on the system, and six months down the road, they've signed off of that job and gone somewhere else. So I think that is a big problem, the type of personnel that are available to work on these systems.

The same thing goes with the surface computer. We have people that may not even know what a mouse is. You get them on the phone and try to help them, and you have to tell them which button to push on the mouse. That's the kind of people we deal with sometimes.

MR. SAXTON: The other aspect of it is AMR has on staff six or seven engineers with BS Degrees in Electronic Engineering. So, when we do send someone out to install the system and to train these people on it, they are qualified to do that and service them.

DR. TIEN: That's great. Now, what do you see or how do you want this problem to be addressed, the lack of competent personnel in your field?

MR. GUNNOE: We'd like to see the companies provide more trained personnel; somebody that knows something about the computer, somebody that can use a multimeter, somebody that can troubleshoot the system and take care of it that knows a little more than turning a wrench on a miner.

MR. SAXTON: Some of the better systems that we have in place today are the ones where the end user takes ownership of the system. When they call in and say "The AMR system is down," we know that they have not taken ownership. If they call in and say "Our system is down," then we know that there is ownership and they have tried to take care of some things.

DR. TIEN: I just want to have a feel of the scope of the challenges we face as an industry. For customers you see, clients, how many of them roughly are you putting in that are competent, less than desirable, or whatever?

MR. SAXTON: Probably 10 to 20 percent are probably in that range of having difficulty with maintaining the system as we would like to see it maintained.

DR. TIEN: Thank you.

DR. WEEKS: I have a related question, and it's sort of the same question about qualified people to operate and maintain the system. Actually, I'm more concerned with the operational aspects.

Do you do the training of operators, or do you leave that up to the mine operator? How does that work? In the end, there's a person there looking at the screen that's got to make the decisions about what to do given certain circumstances. How does that person acquire those skills? Do you provide the training, or do you provide the people, or how does that work?

MR. GUNNOE: Originally, we provide the training to the operators. Again, you see a lot of turnover, personnel turnover. Once you train the original operators and the company owners, a lot of times, we'll depend on them to task train as they trade that job off.

Many times, we've been called back to do additional training, when the staff does change.

DR. CALIZAYA: My question deals with accuracy of the instruments. Several of the instruments are affected by local conditions. Specifically, I'm talking about oxygen and carbon monoxide. Depending on where you are located and where you calibrate these instruments, you may have some variation. How do you take care of that?

MR. GUNNOE: In the carbon monoxide sensors, and the oxygen, there's a temperature compensation that's taken into consideration. As far as accuracy, I would say plus or minus two parts on the carbon monoxide, and within half a percent on oxygen.

We're somewhat limited to the cell technology that we use. It's fairly common among all the manufacturers. A company called City Technology primarily provides the cell technology that most of us use.

MR. HEDRICK: Our next presentation was scheduled to be by Conspec Controls. Their representative had travel difficulties and has been delayed. So he will be here a little bit later in the morning.

So that brings us to our next presentation from Pyott Boone Electronics. They are from Caswell, Virginia. Pyott Boone Electronics was established in 1971, and supplied the coal ministry with communications and monitoring systems.

With us today is Doug Coon, who is the Sales and Engineering Director. He has 24-plus years at Pyott Boone, first starting in February of '79, and he has been there continuously since March of 1985.

He's held various positions, starting in repair and service. He has been a Sales Territorial Manager. He has made marketing the Mine Monitoring System a personal goal.

The Company Sales Manager's job was his next responsibility, starting in 1990. His next opportunity came along with the international business, traveling to other countries in pursuit of business opportunities.

Through all of this, he has been the main liaison with the folks at Triadelphia in getting products approved and/or accepted as was necessary.

So Doug has got a presentation,

MR. COON: We appreciate the opportunity to be present today and give you an insight into our history and involvement in Atmospheric Monitoring Systems.

We started serving the mining industry 36 years ago, and we presented solutions for safety and production. Of course, we had standard page phones that have been with us for a number of years.

We have sold over 250 of the Atmospheric Monitoring Systems in the last 22 years, and we have sales of over 7,000 gas monitors all over the United States. Some of these are obviously used in other manufacturing systems, such as integration, by those people that integrate the items.

I want to show you a few slides as I go along with my presentation.

Pyott Boone, as far as history of the business, started in the late '70s, early '80s. Pyott Boone's first Monitoring System was the Model 950. The model 950 used a CPU off the shelf and other hardware that was available at the time to engineer a master station which utilized an LED display as part of the HMI.

With a 12-key numeric key pad, retrieving information and decoding the messages was accomplished with charts attached to the 950. It was very simple.

There was no PC computer or monitor as such associated with the 950.

Pyott Boone arrived late on the scene with the system and targeted the small to medium mine operators since the research indicated the larger operators were going with Transmitton, Conspec, MSA, Rel-Tek, and others.

Since Pyott Boone was performing basic CO monitoring and belt-control monitoring for small operators, we did not opt for high speed data rates. Monitoring distance was somewhat of a concern, but did not become an immediate issue.

As time moved on and more operators learned of the Pyott Boone System and what Pyott Boone had to offer in service of reliability, expansion of the PC-based system and requests for additional monitoring capability plus speed came about.

This continues today as we meet

here. The next generation of the AMS is being engineered, and we expect this system to far exceed anything on the market today.

This system has been under design for the last nine months to a year, and we expect to have it available to the market sometime late next year.

What the system does. The AMS monitors the environment for numerous items; including, oxygen, methane, carbon monoxide, and air flow. Components which, make up the Atmospheric Monitoring System are the cabling, the computer, uninterruptible power supplies, gas monitors, and other remotes. Audible/visual alarms are part of the system.

You can see there we have our mine monitor station in the dust enclosure to protect the computer. Of course, we have multigas monitors. We have the single gas monitors. Primarily, the single gas monitors all look the same. Obviously, they do different jobs, depending on the sensor cells and what their intended purpose is meant to be.

40 and 20 milliamp is available, although we've never utilized a system at Pyott Boone that used 40 or 20 milliamp monitors. We've always talked directly to the remotes.

The gas monitors warn and alarm on gas concentrations of the targeted gas that exceed the predetermined levels. These warnings and alarms are displayed at the Monitoring Station on the surface with the appropriate signals for monitoring system personnel to act on.

The computer can be configured to activate alarms at locations underground where personnel are stationed, and this can be automatic operation of those alarms by the computer. It doesn't require human intervention.

The most widely monitored

target gas is the carbon monoxide, CO. CO is odorless, colorless, and toxic. It results from incomplete oxidation of carbon and combustion. It can auto ignite at about 1,130 degrees Fahrenheit.

What are the AMS benefits? The AMS benefits for the coal mine operator are the best safety for personnel and their assets. Most CO units are placed along the belt haulage entry to warn of a fire potential.

When installed and maintained, to manufacturers requirements, the system will report all concentrations considered to be out of the window of normal operation.

Reports of belt alignment problems, along with hot rollers and bearings, are not uncommon for operators utilizing the AMS. With fewer personnel to monitor and maintain the conveyor belt infrastructure, monitoring for a safe environment is of the utmost importance.

Even though the Pyott Boone Belt Boss belt controller is not a gas monitor -- you will see the Belt Boss controller at the bottom right -- it incorporates one of the most advanced digital speed monitoring services in the coal industry today.

This technology monitors for belt speed slow down, thereby turning off power to the conveyor motors long before slippage becomes a fire hazard. Conveyor belt fires from slippage should be a thing of the past for operators using this controller.

Since the events of 2006, we have seen an effort by operators to better train personnel in understanding the AMS and the calibration of the monitors. We have conducted training for years for the mine operators using the Pyott Boone system. We typically give them one free annual retrain, and they take advantage of this. Sometimes they ask me for more, and they have to pay for those.

During this training -- as a matter of fact just this past Monday night, we had one of the operators request that our personnel be there for the Hoot Owl shift to do training. Again, on Tuesday night, last night, there was an AMS operator doing training on the Hoot Owl shift.

So we go, at their pleasure, any time they ask; and we also have a 24/7 Service Department at our facility.

Pyott Boone, along with distributor/service centers, conduct training. We do have distributors -- one in Pennsylvania, one in West Virginia, one in Kentucky -- that also perform training of installation of systems, et cetera.

Pyott Boone always conducts training for the MSHA inspectors at the Beckley Academy. We are requested, from time to time, to come to Beckley to help train the mine inspectors there in the operation of our system and try to point out the things that would be of importance to them, as far as inspecting the system.

We have also digital calibrations, key-pad programming, configurable set points, alarms, and warning contacts. Obviously, we have a nonmetallic impact molding, display LCD on the system; and we have MSHA approval on certain monitors; the 1700 and the others employed with the latest technology.

We are in the process of considering a new replacement unit, which will be the third generation of our CO monitors taking advantage of all the improvements in the electronic components and available electronics to us today from the industry.

Our system has proven over and over it works and alerts mine personnel of pending problems. Obviously, as the folks at AMR said, the best system in the world will not work unless it is properly installed and maintained.

We sell a system. We go to help with the installation, especially at the surface with the equipment. We train them on the installation of the underground monitors, the proper procedures for installation; and we also assist there, if they request us to.

I won't read that since you folks can look at it.

Thank you. Are there any questions?

DR. MUTMANSKY: Doug, I'd like to ask a basic question, and this is a question not directed necessarily just toward you all, but to the AMS people.

Is there any attempt today to not only integrate the sensors into a computerized system, but also to provide software which suggests the correct decision to be made when any particular event occurs within the Monitoring System? For example, CO is picked up in certain locations or something else is out of the ordinary, do any of the manufacturers provide software which helps the operator make a decision?

MR. GUNNOE: Well, the working sections are typically automatically alerted, if there's a sensor that's gone into alarm where air is traveling toward their sections, but not so much to tell the operator "Okay, get on the phone, call this guy." I don't know that there's anybody doing that at this point.

DR. MUTMANSKY: Can it be done?

MR. GUNNOE: Oh, yes. That's not a bad idea. I'll take note of that.

MR. COON: Typically, an operator has instructions for all their people who are trained by us. As a matter of fact, we had an operator bring about 20 of his people who actually bought the mine operation. He brought about 20 of his people to our facility for two-day training, and it was primarily the operators that would be monitoring this computer outside.

They have their own instructions, which is I think mostly driven by what's in CFR(30) Regulations. That says when certain conditions occur, you have to do this, this, and this.

So it's probably not something that we've considered, but I'm not saying we wouldn't, as far as the software package.

DR. TIEN: Why don't you consider that? Is it because of a legal concern or because you haven't done that before?

MR. COON: The instructions, is that your question?

DR. TIEN: Yes.

MR. COON: It's not that -- I don't think it's that, as much we've just never had a request from the operators that they would like for us to integrate that into a software package.

DR. TIEN: Don't you think that's a good idea?

MR. COON: Yes, sir.

DR. BRUNE: I have a question that I would like to know. Do you provide facilities for your sensing systems to say -- let's say 10 percent methane behind a seal could be a concern. However, if at the same time the oxygen is less than 10 percent, that 10 percent methane is no longer explosive.

So, if you have a second sensor that says "We don't have enough oxygen to make an explosion possible, we are not in the explosive range," do you have a small sensing system that could validate the results from multiple sensors and therefore make a smarter decision than just say 10 percent methane and 10 percent in the explosive range?

MR. COON: I think what you're asking is: Do we have a monitor that would have the ability to detect certain levels of presence of gas, in the presence, obviously, of oxygen or methane or whatever; and then it would make that decision whether that's a safe or unsafe level?

DR. BRUNE: Yeah.

MR. COON: I don't know. I would have to toss that over to the -- my first thought is: Do we want that liability? Okay. I think our approach would be that we will provide them with the actual sensor readings, which we can do now; and it's up to them to make that decision of whether that's an unsafe condition or a safe condition.

They can set these alarm set points wherever they want. They are fully adjustable either at the computer or at the actual monitor itself.

DR. BRUNE: Thank you.

MR. MUCHO: Just a comment a little bit on that, Doug. Basically, what you're looking at is probably not a monitor making that decision. It's really the software would make that decision.

There's, of course, ways to do that with software to make decisions from sensors.

MR. COON: Oh, absolutely.

MR. MUCHO: Some of these decisions could be -- are pretty straight-forward. For example, the one that he talked about is pretty scientifically considered valid in understanding as to what's in the explosive range and what isn't in the explosion range. There probably wouldn't be a lot of argument about that.

So, in terms of liability, there are certain aspects that are pretty straightforward that wouldn't be much in terms of liability and generally accepted.

There are some others we're going to hear tomorrow about some work that was done at NIOSH with multiple sensors and making a determination on fire.

You're right. There is some liability there; but, for example, that research considered a lot of variables and so forth and came up with a neural network to make that decision for diesel operating hydrogen from a battery charging station or whatever.

Again, while some of that stuff may not be set in stone and you're getting a probability of fire -- for example, that worked within 90-something percentiles -- that would be correct.

If we're going to move forward in terms of some of these detections and in some of these instances, that's kind of what we have to be dealing with, is some high probability, some assessment of risk, and move forward. Otherwise, we'll be stuck at this decision-making process beyond what we want to do.

That's just a comment for the manufacturers to think about. We're probably going to see that come from, like you said, operator requests or maybe a regulation or maybe other actions; such as, from this panel.

Thank you.

MR. COON: Thank you.

MR. HEDRICK: Our next presentation is Rel-Tek Corporation from Monroe, Pennsylvania. With us today is Albert Ketler, who is President and CEO.

He is a Registered Professional Engineer in Pennsylvania and Texas. He graduated from Bucknell University with a Bachelor of Science in Mechanical Engineering in 1956.

He joined General Electric in management assignments across the country. He took graduate studies in Electrical Engineering and Business at Penn State and Xavier University while undertaking advanced studies at General Electric's three-year Advanced Engineering Program, followed by their five-year Systems

Engineering Development Program.

His last assignment with GE was Systems Engineer on SNAP-27, the nuclear power system used on Apollo lunar landings and present interplanetary probes.

He founded Ocenco in 1970 and then founded Rel-Tek in 1979. He has pioneered in the development of Atmosphere Monitoring Systems since their inception and has numerous papers and patents to his credit.

He holds an aircraft pilot's license, raises bees at home, and spends weekends gardening and keeping up with his four grandchildren.

MR. KETLER: I guess I can just -- while Kevin is doing the high-tech stuff here --

MS. ZEILER: You need to get the microphone on.

MR. KETLER: Can you hear me okay?

Okay. What to do when you have

an alarm? That's always a crisis. You've got an alarm there and an inexperienced person sitting in front of the monitor or called in from an adjacent office and the alarm is going off. What do you do when you have an alarm?

We've given the resources -- given the client the resources to do whatever he needs to do; page out messages, announce over a loud speaker, have pop-up verbiage of what the characteristics of this is and choices and priorities and what to do.

All if this has to be conceived by the operators in conjunction with the known sections, the definitions, the terminology, the nomenclature of where things are, escapeways and whatever. We can't impose that on them and do it for them because we're not experts on their particular set up.

So, if they give us the information on what they want to have done on these instances, then we can implement it for them or we can put in voice messages and have them brought up and paged out and that kind of thing. It's not something that they would look to us to do for them, as far as coming up with a concept of how to react to a particular alarm or combination of alarms.

DR. MUTMANSKY: Al, would you answer the question: In an ordinary AMS system, what percent of the alarms are false alarms? In other words, your system or somebody else's. Roughly. Just give us a rough idea of what percent are false alarms.

MR. KETLER: Well, you're going to have false alarms but, hopefully, not very many. When you have an alarm, you have to trust it. It's like I'm an aircraft pilot. You always trust the instruments first, even if you think you're flying upside down. It's probable -- the instruments are probably right. So you have to react to them, but you have to do it intelligently with history in mind.

I've always had trouble with that. You've got to send somebody over to look at a sensor and do something to it. That would qualify your reaction to it, but there shouldn't be very many false alarms.

DR. MUTMANSKY: What would be the source of the false alarm? Are most of them sensor problems, or are they other types of problems?

MR. KETLER: When you set up a sensor, you don't just set the maximum -- a low alarm threshold and a maximum alarm threshold. You also set in there offset alarms. If it falls below a certain level indicating that there's a failure on the instrument, you want an alarm on that; but it's a different kind of alarm. It's not what we call a critical alarm. It's a maintenance alarm.

It will come up on the screen.

Instead of being red or flashing yellow or something, it will be a different color, a blue, which will indicate that you've got to go take care of that sensor there. That's sort of the qualifications to it.

The alarms are all logged with the time and the date and the place to put in a message by whoever acknowledges it. You can have them type in their initials and some statement, and that goes along with that particular alarm, whether you notice it or whether there's -- it's guessed to be a false alarm, that sort of qualification.

You can go back and then review these alarms and sort them by categories. There's carbon monoxide alarms, methane alarms, offset alarms, critical alarms, noncritical alarms. So you can get a report on your plant's performance, your mine's performance over time.

This is where that data mining comes in. You can review what happened.

If you had a shutdown or a fire or whatever, you can see the conditions leading up to it. So it was an historical trend. If you had an early alarm, you'd go in, look at the logs, the graphs, and see if the CO started building up slowly or whether it went abruptly.

Maybe you had a roller lock up and you had some heating. That always generates carbon monoxide. You might have some slow build up. So that's small forensic-type information that you can get off the system.

We use 12-bit resolution in all of our end-log input so we can see very carefully. It's like this, it's a nice smooth curve. We get 4,096 steps between zero and full scale. We have a lot of room there to -- you can see small differences and small changes.

You can print out these graphs and grids and amplifications for particular dates and times and periods.

DR. WEEKS: While that's being set, I have a similar question. When you do this kind of data mining for, as you put it, forensic purposes -- well, first of all, I assume you do that on a regular basis?

MR. KETLER: It's automatic. It comes with our software package.

DR. WEEKS: So what do you get when you do that? What do you get in the way of false alarms? If you find trends, are you looking at spikes? What exactly does that tell you, either about the mine or about the system? When you get that kind of information, what do you do with it?

If you could provide some examples or just discuss some examples of how that develops, it would be helpful to get a better understanding of how to use the system.

MR. KETLER: One forensic application was a capital metro transit facility down in Austin, Texas. They have one of our systems for monitoring for compressed natural gas emissions off of CNG powered buses. They have a system that's a block-sized building, a huge facility, with hundreds of sensors.

There was an instance where they had a hose -- a fueling hose came off a bus while they were fueling it, and the gas level went up, and the alarms went off, and the police weren't notified.

So the Union sued the Company because the system wasn't maintained properly or whatever it was, that it was -- they didn't have the right reaction to the alarm.

We looked into our log of the data, and it showed that the maximum level where you -- you sound the alarm, the audible alarm, and then -- the visual alarm first and then the audible alarm, but it never went up to the level of notification of the fire department. So, if there's a prima facia thing throughout the case, that kind of evidence is useful.

I can't think of a mining application of that right now, but there probably has been. I'm sure maybe some of these folks have.

We've all been around this industry for a long time and seen it grow and seen the technology advance, and it's just remarkable the things that you can do in the system now; with the archiving, with the logging, with the printing, with the automatic printout of reports. So every morning you walk in there, and you have a report of your last week's CO levels and that kind of thing.

DR. WEEKS: Is that something that when you go out and sell a system and you train operators on how to use it and so on and so forth, is that the kind of thing that's regularly included in when you sell a system? Do you talk to them about data mining and how to get a better

handle of what's going on in their mine?
MR. KETLER: Well, any viable mining entity that's interested in doing business on a long-term basis has to be concerned with safety. So they're looking for anything that sheds some light on an unsafe condition or information on their mining; their down time, their conveyor shut-down events and how many there were and how long the durations were and that kind of stuff.
So there's a payback from a safety standpoint and also a productivity standpoint. I think they combine those benefits.
DR. WEEKS: Well, it's the ones that don't that are the problem. The question is how do get them to do what's needed to explore the capabilities of them.
MR. KETLER: Well, you can lead a horse to water, you know, and all that. You can't make them do something --

sometimes they don't want the logging. Sometimes they don't want meters on the sensors. They don't want the CO levels to be visible. They want to keep that in the archives and stuff.

Yeah, you run into those situations. You kind of walk around it because it's nothing but trouble.

DR. WEEKS: It's trouble that can cause some serious problems.

MR. KETLER: Yeah, you're right.

Okay. What's new at Rel-Tek? That's what I was invited here to talk about. Let me very quickly go through these slides. I have too many slides so I will kind of brush through them.

If anybody wants a copy of them, you're welcome to -- I can E-mail them to you. No, it's too big to E-mail. I can send it to you some way or another. We do have a record copy here.

Conveyor belt controls, MSHA

approval, these are new categories of things we want to talk about; longer distance, higher security communications.

Communications is the backbone of your system. If you don't have good communication, no matter how many bells and whistles of things you have on your computer, it's not going to be meaningful. So you have to have solid communications, that's kind of a given here. Really long-life sensors are not questionable after six months or a year, but they'll last for five years and ten years.

Some of the carbon monoxide sensors we get back for repair when they're ten years old. They've never had a cell change on them. It's kind of amazing. Some of the old equipment comes back that the technical people forgot existed.

Automatic gas sensor calibration. We're talking about reliability of sensing, where you get a sensor that drifts a little bit with temperature, with age, with conditions. Do you wait for the 31 days to come up to do the manual calibration, or do you push that CAL NOW button and get all your sensors calibrated while you're having coffee? That's all possible and doable now.

DR. BRUNE: Are you talking about actual calibration remotely, or are you talking about zeroing in and out?

MR. KETLER: Automatically. Totally within the computers.

DR. BRUNE: Without putting a test gas on it, is that what you're saying?

MR. KETLER: No. We put test gas on it. It's done automatically.

DR. BRUNE: I'm not sure I understand this calibration.

MR. KETLER: I will get into it. I hope to cover that here.

Okay. Personnel location and

tracking. This is a new area. You folks are all involved in coming after the products.

What we're doing is the backbone for it. Our part is the communication and reliability, the long-distance communication. We're doing the long-haul backbone for the manufacture of the personnel tracking equipment. Emergency and post-disaster monitoring. Monitoring of the conditions so that people leaving the working place and leaving the mine know in advance what's happening outby, what they're getting into, if they're getting into a CO level or some methane or whatever it is. Temperature. That's in our sights now of doing that.

Seal pressure. Seal pressure is a big item now. We're selling quite a lot of pressure sensors, deferential pressure sensor that measure inches of water gauges to know what's behind the seal, whether there's positive pressure or whether the barometric pressure changed and all of that, and what's behind it in the way of methane and carbon monoxide and smoke. There's temperature and air velocity, vibration of fans, and that kind of thing.

Okay. Our Windows operating system. We have our own software. We've been developing it for about 12 years or more. It's quite a piece of work. It's just all our own code; but, by doing the telemetry components in conjunction with the software, we can optimize the two and come up with enormously improved communication and reliability and high speed.

The computer speed and the software speed contributes to the overall monitoring speed. You have to keep that software running really lickety-split because you don't want slogging through a lot of overhead code that's just slowing implementation.

We have ours running all in hard code. We have hundreds of thousands of lines of code that do this.

We include all the setup tools. All the setup tools are sometimes expensive add-ons to other systems, whereas we supply that with it.

So the client can do their own customizing. If they put in a new section, they don't have to call us in to reprogram it for them. They can do it very intuitively and very logically, and it's very simple for them to add onto the system.

Large hard drive capability gives us archiving capability that was unheard of. We have 50 gigabytes of hard drive that you can save things on, and we have automatic file management so that the files never get too big to offload and that kind of thing. It does all that.

We solved these problems over

the years, and now it's kind of a standard for our Millennia system.

That's a wall mount PC. This is for mine offices where you don't want a cabinet occupying floor space. This goes against a wall. It has the same specs as our main Millennia system, but it's in a box with positive pressure ventilation, and it's a durable piece of goods for a mine office.

We have hot standby, in case the computer fails. We have what I will call our referee in the center that does nothing but watch the performance of that -- of the main primary computer.

If it hiccups for anything, it automatically switches over to a hot standby, which has been kept up to date with all the file transfers. Everything is ready to go. It steps in and carries on.

The flag goes up that the old computer died, and you can continue your operation. Switch back to the primary, when you get the hard drive fixed or whatever the problem was on it.

The PCs are not forever. As you know and as with Exhibit A here, you never know what's going to happen. Hard drives and dust and temperature, they're all killers of PCs. So you keep your cabinet PC and a wall mount PC.

We now have two different configurations. So it's functionally redundant. You have this kind of situation here, and another configuration there, and whatever happens to one probably won't happen to the other. So it's a good back up.

Anyway, hot standby with Windows is not an easy thing to do. It's something that we've developed, and it's quite a nice add on to our system.

This is -- the University of Missouri has one of our Monitoring Systems out there. Dr. Tien has a class that's using that in their mine studies, mine engineering studies. They have a simulated mine and that sort of thing.

I show you this because it indicates the graphics capability to import maps, use logos, use mine maps, put things on top of familiar landmarks so you can see where things are and you can put your sensor data right there and make it visible for you.

This is a fairly large mine. I don't mention a name for the mine because I don't have their clearance to do that. We call them other things. This is K mine.

The green spots are carbon monoxide sensors. This is just their setup screen. You can see how you can make a very big system out of these.

DR. WEEKS: Could you go back to that for a second? Are all those -- those are all entries where the carbon monoxide senses. Are those all belt entries, or are they other kinds of entries? Are they all entries that are used for face ventilation?

MR. KETLER: They are all belt entries. They all feed on the belts.

DR. WEEKS: Are they all used for face ventilation, all of those belt entries?

MR. KETLER: No. I would say no. I don't know which ones are or which ones aren't, quite frankly.

DR. WEEKS: So you're putting monitors on all the belts?

MR. KETLER: We use the thousand-foot rule. We put CO sensors on thousand-foot centers and link them into the system. We have the RPMs and the vibration and varying temperatures and the Delta Ps and that kind of stuff.

There are just some of the tools that you can use. Blinking lights, log in, the window maker. If you want to make an extra screen. You can put any number of screens on this thing, and you just click on it, and that screen comes up.

You can have it come up on a particular set of events. An alarm here, will bring up that screen for that particular section.

Units showing all of the addresses, what you've got underground. The signals and all the tags that are -- these are just menu choices there. They bring up all the details of it.

Alarms and PID controls. If you want to do any analog output controls, you can do that.

Logging. You set up for the logging every few minutes or every ten seconds. I think that's the fastest we can do it, every ten seconds up to every hour. It depends on how important that data is. You can put in -- you only log it if it exceeds a certain change so that your files don't get huge and you don't have repetitive data.

Communications. We tell you all of the options for setting up the speed. We can go up to 115 kilobaud. Our normal speed is 19.2 K for mining, but you can go higher depending on your distances and that sort of thing.

I have my little CAL NOW button just to nudge you into this automatic calibration concept because it's really slick. It would be ideal for coal mines.

We're using them on gas wells. We're using them on above-ground tunnels and transit facilities and things where you have a lot of sensors in one place. That makes it amenable to central a gas supply going out to different sensors.

Customized controls. We use visual graphics to show the controls. We have for the operators -- we have ors and ands and buts and ifs and all that.

Expanders and timers. We can do voice outputs on various alarms. We can set in a schedule so that you have a different set of consequences when it's on a weekend or on a third shift rather than on a normal shift.

We put in those kinds of details that allow the guard shack to get the alarm one day. On Saturdays and Sundays, maybe dial out to somebody else on weekends or on third shift or -- I don't know what. Whatever. Those options are available.

We can store wave files of messages that you want to have read out on a loud speaker or over the land, sending messages to workstations.

These are looking at logs -- log files of data that you've stored. If you want to see the temperatures on a particular motor last week or if you have an interest in CO levels for the last month, you just click in either using words like "today," "yesterday," "this week," "last week," "this month," or "last month."

So you don't have to type in dates and stuff. Mining people don't like to type. So they can just click and drag and get all these graphics to the printer without typing anything.

This is just a field IO station. The telemetry cards and power supplies and all that. This is a red-out station. Red is always fresh air. It's always dealing with sensors of fresh air.

When you want to go into a hazardous area, now we use our blue-out station. U.S. Steel people used to call this our blue baby. So it kind of stuck.

It's a blue baby integrated MSHA barrier box. We have all our barriers on one box. You can take a red-out station, which is sitting there, and stick this box in between; and than you can go out into a hazardous area with your Automatic Monitoring Systems, or AMS, with certified barriers and power circuit barriers and current regulators.

So there's no fuses to replace. It's a very handy little thing. We make our own barriers, by the way. We have UL approval and MSHA IAs on that.

These are some of the field IO cards that we manufacture. Some are more or less analogs and digitals and combinations of the two. It depends on what your sensor load is. You can pick the IO cards to match.

Now, this is our link configuration. A link is sensing a repeater. It's a repeater and an isolator. Each one of those blocks is a link. One block will go for about 8,000 feet. Then you can only put so many links in a strain.

This is kind of a configuration that you could walk to. This one shows 17 miles. It's not for the faint of heart to do this because it's keeping your reliability -- the data reliability and your speed.

It's a balancing act. Only by optimizing the software and the hardware in combination can you do this sort of thing.

This is the mine tracer. I mentioned earlier that this is for the personnel locator.

Now, each one of those blocks has an array of RF transmitters and transceivers and tags and all that stuff. This is just the backbone. That's the part that we're providing for Venture Design and Hillcom with their marketing link.

This can go out to 15 miles, and we don't need fiber optics for this. Going back to that last slide there, we show a fiber optic link there on the bottom, which can go out for ten miles in a spell. We can go 20 miles or 17 miles without fiber and without the maintenance nightmares, and this just on a twisted pair of wires. It's 20-cents-a-foot wire. We can go the extent of most of the biggest coal mines without fiber.

This one here, what's unique about this is that it's a loop. You can have a redundant path so that if you break the path somewhere, you don't lose the whole thing. You can communicate. The computer can switch communication directions and pick up whatever's left of the system that way.

This is another longwall operation. This happens to be up in Ohio. It's 6 -- it's about 10 miles into the existing longwall operations. We're doing that at 19.2 kilobauds.

It's 100 percent communications reliability. You get 10 million poles, and you don't have one failure. So, if it gets down to 95 percent, we get a phone call that there's a problem up there.

Well, 95 percent, that's pretty good. They're so used to having 100 percent, when they get a little bit down, they give us a call; and we have to go find out what they've got going or what's causing it.

There's a -- that's a big mine out in Illinois. I can't read the numbers there, but I think that's pretty close to 10 miles, also.

This is some of the gas sensors. You brought up the subject of smoke sensors. That one on the lower right is a patented smoke sensor. It's got -- it's all optical.

The question is always the ambient dust. What do you do with that? The old concept was to take it out of service, send it back to the factory, and stick a new sensor in.

On this one, you can clean and recalibrate it on the wall without -- in probably about two minutes. It's just a real simple approach to maintaining a viable smoke sensor because it has to be cleanable.

Somebody will come by with their lime dust spreader and cover up the sensor. You go in there and recalibrate it, and it's all ready to go again.

We have air velocity sensing. The one up on the green tube there, that's zero to 2,000 beats per minute. It's also reversible. It indicates reverse readings, plus or minus air velocity.

Temperature sensors, you have an IA on that. There's a carbon monoxide sensor, which is a workhorse. The CO sensor is in the middle. Over here we have a carbon dioxide sensor. On the bottom, we have moving sensors. We've got the sensors pretty well covered. You name it, we probably have a sensor that will handle it.

This is a list of some of the sensors. We have MSHA approval status. We have quite a few pending there, which are -- the smoke sensor is pending, IA.

It's already classified GH and L, but it's not IA. We have some of those IAs so we can use it in post-disaster applications. There's a lot of information there.

Alarms. Permissible alarms. We can alarm in hazardous areas, in the working place. Flashers and horns and strobes. Typical application. You all know those. Conveyor belt monitoring.

Rel-Tek products are truly advanced technology. We have been in the business for a quarter of a century now. This is the first -- I think we got the first MSHA approval, which was Ocenco back in those days. That was my company then.

Automatic gas sensor calibration. This is what I was eluding to. You're using actual gas and transmission of the gas on command to sensors and calibrating automatically through the computer, and it's just a lovely capability that might one day catch on in mining. I hope it does because it's working above ground.

We have big facilities with hundreds of sensors. They have any question about the sensor, you push the CAL NOW button, and it's like setting your clock to the National Observatory. It takes NIST certified gas and puts that accuracy into the sensor.

You can do that monthly or weekly. Some of the gas will be monitored daily because they have to have such precision on the accuracy.

So tanks of gas are inexpensive. You buy those big tanks, and you get an awful lot of gas for not that much money, and it's all NIST certified. It eliminates the trudge out to the sensor, the time to do that; the cost of the portable supplies; the possibility of human error.

They put the gas on, and the wrong gas is on. They didn't leave it on long enough. They turned the wrong pots on.

We get sensors back all the time for repair, and there's nothing wrong. They've just got all the pots screwed up.

So anyway, by doing it automatically, that transcends the whole problem. We have applied for patents on parts of that system.

There's an automatic calibration system for -- it's not a very good slide there -- gas well. This is a gas well operation. Those two tanks there will keep that -- the black sensor up at the top there, that's a methane sensor. It's zero to 100 percent methane. It's a thermal conductivity sensor.

It's got the IA -- MSHAs IA on it and UL approval class one and all that. Plus, it's got automatic calibration on it. So you have a little stand-alone package that takes care of itself, and it can calibrate itself for a year or more with virtually no attention.

This is the kind of thing you can also do where you look at the history of calibrations. These are the previous calibrations for a particular sensor, and you can see that the sensor is drifting upward or downward. You can see if the signal level is getting smaller, indicating that it's aging.

You can print out the graphs of historical calibrations. If you put your cursor on any of those bars, it will give you the details of what that calibration was before and after, the date and the consequences of it and all that.

This is an interesting analysis here. We use 12-bit resolution from zero to full scale. We only need 256 -- we only need 206 bits of data to expand it up to 8-bit resolution. So we only need a very small signal.

So a sensor where the zero has

come up from aging and the span has come down from aging, we can still put it to work as long as it doesn't get less than .8 milliamps out of a 20-milliamp excursion.

So we can take an old sensor and keep it working. It's essentially saving the replacement cost and the maintenance cost of taking it out of service or replacing it.

So, anyway, you can do this with automatic calibration. You can't do this without it.

Engineer complete systems. Everything in the system is a Rel-Tek product. We manufacture the sensors, the telemetry, the barriers, the software, the computers, the com drivers, the links. Everything about this system is part of our domain.

If something goes wrong, it's not pointing to some third-party suppliers if the software had a hiccup. Like, we have an update on the software here, and it's going to cost you $20,000 to replace it or do the upgrade on it. If you put the upgrade on and it doesn't work anymore, what do you do?

The fingers always point to us. We can sort out the problems usually over the telephone using PC anywhere or internet. So it's -- we support our system.

We have a training facility in Monroeville, where we have all the equipment there. People can -- our clients come in and schedule their training or retraining. New employees come in. They send them up for a day or two and put them through the paces. We show them how to actually repair stuff, how it works, from the basics on up.

So that's what we are, Rel-Tek. We are way ahead. That's what we would like to think, anyway. So that's the end of the slides.

MS. ZEILER: I'd just like to suggest that we take a 10-minute break before you ask Al any questions. We can find out where the other representative is, and we can decide how to use the balance of the morning, if that's all right with everyone.

(Short recess.)

MR. ZEILER: I would like to mention before we start that if you haven't signed up in the back, please do so at some point today; especially, if you've requested to speak this afternoon.

We're pleased to have our representative from Conspec. Once again, Kevin will do the introduction.

MR. HEDRICK: The next presentation is from Conspec Controls. Their main office in Toronto, Ontario; but they are in Pennsylvania and Colorado, as well as Australia and China.

With us today is Rob Albinger, A-l-b-i-n-g-e-r. He's the Vice President.

He's been with Conspec for ten years and works from the Pennsylvania production facility.

MR. ALBINGER: Good afternoon. I apologize for being late. I ran into some travel troubles, but I'm here and I've been instructed to make this as thorough and quick as possible.

Again I represent Conspec. We are a manufacturer based out of Pennsylvania. Our R and D is handled out of Denver, Colorado and Toronto, Canada, as well. We have facilities in China and Australia. We were founded in 1968.

Our market share consists of about 41 total AMS systems installed in underground coal mines and throughout the US. We have systems installed in 26 of the 39 most productive coal mines from 2006, based on the information out of "American Longwall Magazine." They had them ranked in a recent article.

Over the last four years, our

company has increased our production by over 100 percent. The mining market, with the increase in and the amount of coal in the mines, has been very beneficial to our industry.

One thing that -- Conspec's direction that we've decided to move into over the last several years, is becoming a bit of an integrator, as well as a manufacturer. We've worked with other companies to operate our system over existing ones throughout the mine.

A lot of mines are moving over to Ethernet over fiber optic cable. This allows them to use off-the-shelf software packages first, where they were originally using a Conspec-500-system-type server as compliant.

Here, we're using Bradley, Illusion, and Wonderwear with an off-the-shelf OPC that allows an open protocol, where we can communicate modified 485 or 232.

In the mines that already use Conspec and want to get away from our graphics package, we offer what's called a universal interface that allows them to convert that protocol from Conspec to either 232, 485, or Ethernet.

This has opened up a lot of opportunities for us over the last couple of years. It's very beneficial. It gives the end user a lot more flexibility. Where we are not really a software-production facility, they get the technical support 24/7 from larger companies that are specializing in that.

These are some of the new products that we have in for approval right now. We've designed a new blue out station. A blue out station, basically, takes a 24 volt down to a 15 volt. Our existing blue out station has been approved since 1982. So it's lived well past its prime.

What we used to call blue

barrier, we are now calling blue out station, based on the fact that it will not only take care of 15 volts, it's also going to drive your communication signal to allow the mine to operate at a much further distance than what they're used to.

We are also in development on a photo electric smoke monitor. We currently have an ionization monitor, which I'll move on to; but, right now, we're looking at photo electric, which is also infrared. We have a couple working in trial. We don't have that submitted yet for approval.

We also have the vehicle and personal tracking system. Back in '98, we did get an approval on the vehicle tracking with the receivers, and we submitted it here for the personal tracking.

The benefit there is any existing mine that's running a Conspec system, this just acts as another access along the trunk line; and then, as the vehicles or the personnel pass the receivers, it picks up their tag and reports that to the service.

We have a couple of different variations of smoke monitors. We have just a regular stand-alone smoke monitor. We have an MSHA-approved CO smoke combination monitor. That uses the ionization technology. Ionization is -- we're just looking for a change in the electrical conductivity through the detection chamber.

What they're saying there is basically smoke that's not visible to the human eye can actually be detected using this ionization. Whereas, a photo electric or infrared, it's picking up the visible particulates from smoke.

As far as the Conspec system reliability, some of the things we've done over the last several years is to try to make the system eliminate as many nuisance alarms as possible.

We've developed what's called a diesel discriminator. Basically, we're detecting two gases; CO and NO. As a diesel machine passes by a CO monitor, you tend to get a lot of spiking CO. The guys on the surface are getting alarms and moving on.

What we've tried to do is eliminate the operator from actually acknowledging these alarms by differentiating CO from actual fire and combustion to the CO from diesel fumes.

So what we're doing is we're measuring CO and NO. Then there's a correlation between the two, which was an algorithm designed by Carnegie. They have the patent. We just have it in our processor.

It determines the ratio of actual CO concentration. So you get what's called a corrected CO reading at your surface.

We also use a hydrogen compensated CO monitor, which will eliminate the nuisance alarms due to hydrogen gas from your battery charging stations.

Other ways we've eliminated nuisance alarms is we put in some temperature sensors. We have built combination temperature and smoke sensors that go around the battery charging stations, as well.

We've built in a lot of fail-safe features. If a cell is disconnected from the actual electronics, it will immediately go into a high alarm and send that signal -- that alarm to the surface. You know when it's at 50, there's a problem with the electronics. Then there's communication failures and other failures built into that system, as well.

Another thing that will help to keep the system reliable is we offer

24-hour service. We do on-site service and training. We do in-house training in our Colorado facility and our Pennsylvania facility.

One thing we pride ourselves on is a quick turnaround on product. Our average turnaround is ten days. In case of emergencies, we can usually get 20 to 40 COs built in a day or two. A lot of times we're called on, a mine will need ten; and we can get them out that same day.

So, in conclusion, on our Conspec's AMS system, we pride ourselves on being a customer-driven R and D company. The customers that have a system installed that work with it most frequently come to us on a regular basis and say "This would be a nice feature, we'd like to see this added."

We take that back to our guys in the engineering department. Usually, within a couple of weeks, we can come up with a solution. We are always trying to continue to keep up with today's technology and trying to incorporate that into the existing system.

One other thing that we also take great pride in is our hardware that has been running in mines since the late '80s is still operating in those mines; but you're still able to take that hardware and incorporate it into today's technology without having to actually go in and replace the entire system.

We feel that it's very important for the customer to take ownership of that system. When a customer has a full understanding of how to maintain that system, they're going to get the best performance from it. So we try to stress it as not only a safety, but as a production pull, as well.

That's a wrap up on Conspec.

DR. TIEN: That is a thorough and brief.

I do have a quick question. To the extent possible without getting into comparing companies, will you describe in principal how that will work with the personnel and vehicle tracking system underground?

MR. ALBINGER: Well, it's a range of frequency. It's a medium frequency signal from your transmitting devices to your receiver. Then, from your receiver to the surface, it's over a 24-volt four-conductor cable.

DR. TIEN: What is roughly the operating range? How far away?

MR. ALBINGER: Around a receiver, it's 200 feet in either direction.

DR. TIEN: That's around pillars? It can't be a straight line without interruption in between.

MR. ALBINGER: Right.

DR. TIEN: Thank you.

DR. WEEKS: Again, from what

you said and others, the primary source of nuisance alarms is diesel exhaust and hydrogen from battery stations and so on.

Could you give us some estimate of what percent of -- how the frequency of nuisance alarms has declined over the past 20 years or so. By using these discriminators and taking care of those other sources, what portion of the alarms now are nuisance alarms?

MR. ALBINGER: That would be a tough question to actually give you a direct answer on, but I can tell you that the diesel discriminator and the hydrogen compensated sensors are not going to completely eliminate a nuisance alarm situation. All they were designed to do is limit them.

There are still issues with some nuisance alarms, especially if you're running into situations where the CO and the diesel discriminator itself needs to be calibrated. If you've got a piece of equipment that's idling in front of that particular diesel discriminator for a long period of time, it will saturate that sensor and send you up an alarm.

So to prevent nuisance alarms, we're still looking and trying to determine ways to do that. What we've tried to do is just limit them as much as possible.

DR. WEEKS: Would you say by using the diesel discriminator in this hydrogen device, did that cut them in half?

MR. ALBINGER: I would say it cut them by about 70 percent, 75 percent, somewhere in that area.

DR. CALIZAYA: I have two questions. Both of them are related to CO sensors and oxygen sensors.

First, do you manufacture those products and sensing units?

The second question is: How sensitive are those units to changes in air velocity?

MR. ALBINGER: All the electronics are manufactured by Conspec. The actual sensor itself for your methane oxygen hydrogen sulfite is manufactured by City Technology.

How accurate are the sensors in high air velocities? That's not something that we've actually ever had to determine.

As far as our approval and what we've done over time, we're monitoring the air flow, as well as our toxic and combustible gases; but there's never really been an actual study on how accurate a CO monitor is at a certain CFM or FPM.

DR. CALIZAYA: When you do calibrations, I assume that you decide specific calibrations that you recommend to your clients how to calibrate?

MR. ALBINGER: Yeah.

DR. CALIZAYA: What do you do?

MR. ALBINGER: Our calibration

-- the manufacturer actually recommended a calibration quarterly, but the MSHA standard is a calibration every 31 days.

DR. BRUNE: You mentioned earlier that you are catering to I think 26 of 39 of the most productive mining operations. I assume those are all major mines.

Do you also have some small mine operations, say less than a million tons a year or maybe even less than 500,000 tons of coal a year that you are working with? If not, why not?

MR. ALBINGER: We have a couple, but not many.

My opinion on why we don't have more is the system, when it was originally designed as the Conspec 500 with our computer graphics and our client, was a little pricier than what the competition was. The smaller mines tended to go for the smaller systems.

Over time now, we've kind of

faded away and allowed the operator to choose what package they want on the surface, and then we just tie our hardware into that.

DR. BRUNE: Okay.

DR. MUTMANSKY: One of the questions asked of the other speakers was whether or not it would be feasible and wise to implement or computer program it into interpreting what the sensors are saying and suggesting a course of action.

Has your company ever done any thinking toward this end, and would it be possible to do this kind of thing, and would it be advisable to do that sort of thing?

MR. ALBINGER: Right now, we're working with a company called Pillar Innovations. They are a company owned by Beitzel Corporation. They have an approval through MSHA on an AMS system.

They don't manufacture any hardware. All they concentrate in is software for trending and everything that they see underground. Not only your gas concentration, but everything that's operating underground.

So, through these guys, we've done extensive studies on all types of different trends that we see.

DR. MUTMANSKY: What's the purpose of that, though. What are you hoping to do with that information, or what is that company hoping to do with that software? What will be the end product?

MR. ALBINGER: I can cite a specific example of a mine in western PA. We're running about 145 CO monitors throughout the entire mine.

There's one section in the mine where we're not seeing the life expectancy that we normally see throughout the rest of the mine. So what we've tried to determine is what other factors are in that airstream that causing our sensors to lose the life expectancy that is common with them.

So we're measuring temperatures. We're measuring the humidity. We're measuring the air flow. Through that data, we're then trying to determine how we can correct those factors in order to increase the life expectancy.

Does that answer your question?

DR. MUTMANSKY: Actually, I'm more interested in whether or not we should be developing systems that interpret the results and tell the operator on the surface or suggest a course of action to the operator on the surface.

What I mean by that is, it interprets any signals it gets that are out of the normal range and then makes a suggestion as to what the possibilities would be. If, indeed, it is an alarm situation, it suggests a course of action to the operator on the surface; whether it is to contact the responsible person or to make a decision to evacuate a section or any other course of action that actually could be all done by computer. At least to the suggestion level, not necessarily to be implemented, but to be suggested to the operator that "Here is the proper course of action to take at this moment using this data as we interpret it or as the software interprets it."

MR. ALBINGER: Kevin, in the requirements, isn't it written that the AMS has to be monitored 24 hours by an individual, and that individual is responsible for making those decisions?

MR. HEDRICK: The AMS operator has to be somewhere where he can see or hear the alarms on the surface and be able to respond to them, and that sensor continues.

MR. ALBINGER: So the system is actually designed where it's giving you all that information.

What the operator does with that information is based on, I think, a lot of what they're most comfortable with, which is having somebody there making that call, rather that relying on the computer to make that call.

DR. BRUNE: Let me maybe add to Dr. Mutmansky's question here.

The Australians have what's called the action response plan. Typically, it's four different alarm levels that require a specific action from the operator, and this action -- instead of showing just the alarm, it also shows the action that's required of the monitor or the control center operator to take.

Let's say the CO Monitoring System goes to say 10 PPM above ambient. It says right there "Evacuate section by this monitor." It tells the operator that. So you can essentially put somebody who is relatively untrained -- I'll put it that way and not go into specifics -- in there; and, if he or she sees that message flashing, this is what the system tells them to do because that's what the system manufacturer programmed in based on specifications that the operator made.

Is that something that's possible?

MR. ALBINGER: Yeah. In the system setup, you can have as many alarm points that you want triggered in there. Based on your air flow, if there is a condition where the CO is traveling, you're going to follow it all the way down the belt.

Any time you see a CO alarm, you can watch it move from one level to the other. I think in most cases, the biggest part of the determining -- the operators themselves or the mine itself is going to want to make that call and not have a computer say "I want that area evacuated."

That's my personal opinion. I

don't know if you guys agree with that at all.

MR. GRAF: I think Al alluded to this earlier, as well. It's not really in our purview to say it's the mine's policy. We can certainly say "The mine's policy is to evacuate if this event occurs," and we can message that in our software.

We don't want to be the persons to say "Do this," or "Take this action."

DR. BRUNE: I'm very clear there. I think it's the operator's responsibility to define what the response of the control room operator does.

The question is: Is it technically possible today with the system, instead of just flashing up a red light that says "This sensor is going into alarm mode," can I at the same time flash a message that says "Hey, what you as the operator should do today or at this point is call a responsible person; call the shift foreman, call the mine foreman, call the superintendant, call MSHA, or whatever the operator would designate the response to be"?

MR. GRAF: Yeah. The way the system -- the way you can set the system up is you can break in to sections, and you know that the chief is on different sections in that area.

If the system goes into alarm, you can have a voice communication from the computer travel over either a page phone system or a feeder and just go to that particular person in charge.

He'll know he's got an alarm in that particular area, and then he makes the call to either evacuate the section or to have a guy run over into that particular area and inspect what caused that alarm.

DR. TIEN: This is -- I don't know how to ask this question. It's to anybody sitting on the panel.

This morning, we have four manufacturers represented. There may be a few others, I presume, in the U.S. I guess my question is this. I heard this morning you were talking about how you have an open system. Do you see the merits of standardization? I'm thinking about 30 years ago, the VHS versus Beta. Now, you have so many systems, mines have a hard time -- do you know what I'm getting at?

MR. ALBINGER: Yeah. I understand, but I also believe that over the last several years, we've all kind of followed the trend that the mine wants to operate over Ethernet fiber optic cable in an open protocol.

I think one of the main reasons that the mine wants to do something like that is so that if there is a problem between the mine and the manufacturer, the mine can make a decision to go in another direction without pulling everything out from underground and start from scratch.

We're all on a level playing field, their equipment can tie onto their system; and ours can tie onto theirs. So, in a way, I guess that would be a standardization.

DR. MUTMANSKY: If you were to be -- if the superintendent at a mine offered you the opportunity to suggest the ideal operator for the AMS system, what kind of a person would you choose as the operator who's going to monitor the signals and make decisions?

MR. ALBINGER: You've got to look for somebody that, number one, wants the job and hasn't just been put into that position. A lot of times, you get guys that show an interest; and the people that show an interest are going to maintain the system the best.

You can usually tell in the first half hour of training somebody whether they are in that job because they want to be or whether they're in that job because they were put there to be.

You need somebody with a little bit of technical know-how that can navigate around a couple of different screens. You have where you're entering your points, where you're addressing your accesses, and then where you're mapping them out on our graphics.

So they don't need to be a computer programmer, by any means, but they need to have some computer literacy.

DR. MUTMANSKY: Should they have mining experience?

MR. ALBINGER: I would think mining experience is a big benefit, just based on their knowledge of what's going on underground when they're looking at what they see at the surface.

DR. BRUNE: Do you think this person should be certified in a way or demonstrate his or her skills in some kind of a fashion before the operator lets them run the control room?

MR. ALBINGER: Well, absolutely. We highly recommend -- in most cases, all of our mines have them come in yearly for refresher with -- there's usually three guys that are maintaining that system on a regular basis, sometimes five.

Once a year, we sit down with that group. It may take a day; or it may take two days, depending on how extensive they want to get. We just give them a refresher on any updates that we have or any questions that they may have.

DR. WEEKS: Who do you think should train that person?

MR. ALBINGER: Well, I think it's important that the manufacturer trains the individual on how the system operates, but I also believe you have to have a person that's in charge of making the decisions at the mine as far as what happens when the systems go into alarm as part of that crew, as well.

MS. ZEILER: If there are no other questions from the Technical Study Panel, then I would like to thank the panel members that came here from AMS manufacturers for the information you brought, particularly for the weather-challenged nature of your arrivals.

If there are no other questions, I suggest we take our lunch break; and we'd like to come back at 1:00 o'clock.

DR. BRUNE: Excuse me. We didn't have a chance to talk to Mr. Ketler who just finished his presentation.

I don't know if there are any questions. I do have one, if I may ask that.

MS. ZEILER: Sure.

DR. BRUNE: Let me find my notes. Okay. My question went into this CAL NOW button. I'm curious about this. You said this was not available underground yet. Why is that, and when do you expect that to become available? Do you have the CAL gases in a box and the ability from the surface to run a calibration directly from the surface?

MR. KETLER: It's not that it's not available. It's not presently used extensively.

The cost of adding the automatic calibration just about doubles the cost of putting a sensor in a particular location. So, if you have X dollars for a sensor you have two X when you put AUTO CAL on it.

Clients are invariably cost sensitive. The additional cost would have to be considered as an investment over a period of time and written off, less maintenance costs or whatever.

The initial cost is always up front, and it's just -- it adds additional costs to it.

DR. BRUNE: If I ran a mining

operation and my CO went to whatever, 10 or 15 PPMs above ambient, just to make sure the sensor was working properly, I would want to run a quick calibration.

If I found out the sensor was improperly calibrated, I would have a lot more information to tell these guys underground. I might say "Hey, I recalibrated, and something is more seriously wrong than just the sensor is out of whack, but it's not likely to be a nuisance alarm."

In my opinion, if I was the operator, that would be valuable information for me.

MR. KETLER: Automatic calibration takes about maybe six minutes. So you can calibrate it frequently on that basis.

The cost of a calibration is 50 cents. It's nothing at all compared to the labor to recalibrate it manually. It's quite easily implemented.

DR. BRUNE: Also, would this automatic calibration qualify for the MSHA mandate that legally mandates the 31-day calibration interval; or does somebody physically have go there and look at the sensor and see if it's physically still there?

MR. KETLER: It doesn't say that somebody has to go there. It says gas has to be applied, certified gas.

I think you read it, and the automatic calibration would fit into that definition. So it's not that it would be precluded. It's just interpretation of the words.

The records have to be kept. We keep them in the computer. You have to apply certified gas. We do that by an experienced person. We have somebody who oversees the system that's qualified. That sort of thing.

So I think it fits into the definition of the 31-day calibration.

MR. MUCHO: Kevin or someone from MSHA, can you kind of confirm that? I think that's a key point. Would that automatic calibration be acceptable as the 31-day calibration?

MR. HEDRICK: It's certainly a technique that we haven't studied. However, what the requirements are is that the device be calibrated by a qualified person periodically, per the manufacturers' specifications.

So, if that method is how the manufacturer specifies that it's to be calibrated and it is done by a qualified person with the proper equipment, I don't think there's anything to preclude it.

Once again, we have not had an opportunity to review it because it's something that's not being done in the underground mines.

MR. ALBINGER: Kevin, isn't there something in there that states you have to have a visual inspection of the

AMS system?

MR. HEDRICK: That's right. That's a separate activity from the calibration.

They can be done simultaneously, but it's every seven days, I think, for alarm units specifically.

DR. TIEN: Do I remember correctly you saying -- of course, MSHA is the 31-day calibration. Does the manufacturer recommend six months?

MR. ALBINGER: Quarterly. Once every quarter.

DR. TIEN: Is MSHA overly conservative, or what?

MR. ALBINGER: Yes.

DR. TIEN: I just wanted to hear it from you.

MR. ALBINGER: Basically, there is really no such thing as being overly conservative; but, on the industrial side, for a lot of the surface applications that we have, quarterly calibration is more

than enough.
I don't know if anyone else agrees with me on that one.
MR. KETLER: I think it depends on the sensors.
MR. ALBINGER: Versus electrochemical?
MR. KETLER: I'm thinking about carbon monoxide or oxygen. They may want to calibrate one type more frequently than another.
31 days is a good target, I think. It's a compromise on methane, which may be a little longer, more stable. Carbon monoxide and electrochemical is subject to aging. Oxygen and hydrogen are subject to everything.
You might want to calibrate the oxygen every two weeks, the carbon monoxide every 31 days, the methane every two months, or something like that. 31 days is a pretty good target.
DR. WEEKS: I have a question

for the whole panel, actually. If you added a smoke detector to the CO sensor in the AMS system, what additional information do you get from that? Is it -- how much utility do you get? Is it worth it to get that kind of information from a smoke detector, in addition to the CO monitor?

MR. KETLER: I can answer that. Our smoke box smoke sensor is optical; and it's used quite a few of them for conveyor belt monitoring, fire monitoring, synthetic composite materials that are used generally to decompose into smoke and tar compared to a bursting into flames with a stuck roller or whatever. Generally, a smoke sensor is the alternate fire detection device for that type of belt.

I think the CFR 30 allows either a CO or a smoke sensor to be used in those cases. In fact, in most cases.

DR. WEEKS: The aim here is

early detection of a fire. Which gives you a better early detections? Would it be the combination, or how does that work?

MR. KETLER: A combination obviously would be better than either because it would have the benefits of both.

There's an additional cost because now you have two sensors and two IO channels and two telemetry events. That adds additional costs.

One is a boot-strap sensor, a belt-and-suspenders kind of thing. That would be ideal. Either will work in their own situations; but, as I say, some of these conveyor belts, I understand that they decompose into smoke. I think it's black toxic smoke that's easily detectable with a smoke sensor that generates very little carbon monoxide.

So, in that situation, smoke would obviously be better.

DR. WEEKS: Any other panel

members have an opinion?

MR. GRAF: It's our contention at AMR that through our own testing and talking to our customers on smoke sensors, that be it the ionization or optically, they're either unreliable or maintenance nightmares.

The technology is not out there today. We are looking into different ways of doing it with different gases that are put off on these new types of fire retardant belts. I don't believe that there's that many out there that are actually in service right now.

DR. WEEKS: What's the maintenance problem?

MR. GRAF: Cleaning the optics, keeping them clean to be more reliable.

MR. KETLER: Most definitely a problem, but we've accomplished in the design method of the smoke sensor that it can be readily cleaned in the field, without removing it, as it filters for calibration so the smoke doesn't turn into a gas or anything.

It can filter the beam and calibrate the optical density. 0 to 1 percent optical density is the range of our smoke sensor. It's set at .2 percent, which is the alarm threshold.

Every sensor has its disadvantages. You have a combination of factors in a coal mine. Smoke looks like dust, and dust looks like smoke. That's just a fact of life.

If you have a way of cleaning it out if it gets a load of rock dust, you can clean it without a whole lot of effort. It makes it usable.

Of course, hopefully, the client trains its rock dusters to put the plugs in the holes before they rock dust. Of course, they don't.

DR. WEEKS: Any other panel members have any thoughts on that?

MR. KETLER: I'm sorry?

DR. WEEKS: I just wondered if there were any other panel members that had any thoughts on that.

DR. BRUNE: I know from our experience at NIOSH, we do have -- with all optical sensors, there are issues with both the mine dust and the float dust that's in the mine. Also, especially with rock dust, belts tend to be heavily rock dusted. So that is always a problem in any optical system. If you get rock dust in the system, the system can compensate to a certain degree; but, eventually, the receptor elements will eventually clog up and need to be cleaned.

That always has been an issue. I don't know where the manufacturers stand now, but they have addressed that where they will able to address that in a better way in the future. Certainly, that's an issue with optical sensors and ion sensors.

Also, if you have other

particles in the air that are fine coal dust, that could also lead to false alarms.

MR. MUCHO: Just to follow along, though, that's why NIOSH is in more final stages of looking at an combination of ion and optical smoke sensors because of the downsides of either or, and thus produced a combination sensor that's anticipated to be much more reliable and much more mine worthy and able to deal with rock dust, et cetera. We'll probably talk about that tomorrow.

DR. CALIZAYA: This question has to do with location and position of the sensor. How sensitive are the CO sensors to the location of the sensor entry?

MR. KETLER: Carbon monoxide is a moving molecule. It gets around. If CO is here, it's going to be over there, too. It's not something that just stratifies like methane, which is a heavy molecule.

Carbon monoxide is a mobile gas. If you put a sensor over the conveyor, you probably would have maybe a second or two earlier detection than if you put it safely away from the conveyor somewhere.

You have to have a trade off of where you put the sensor. You don't want to put people in harm's way when you maintain the device. So it could in a gob area, in a silo, over a motor, or something like that. So there's a trade off in that respect.

This also brings up the possibility of putting automatic calibration in a sensor that's in a hazardous area. If you happen to have a -- you have to have a sensor over a pond or in a silo or in a gob area, and you don't want to send someone in there to calibrate it, put in the automatic calibration; and that precludes the need for that.

DR. CALIZAYA: What's your opinion about this 50 feet per minute that's required?

MR. KETLER: 50 per minute on the beltway?

DR. CALIZAYA: Yes.

MR. KETLER: 50 feet per minute is not moving very fast. That's going to be the length of a football field in about six minutes. It's a very slow walk. So it's not carrying carbon monoxide to the sensor very quickly. It takes forever.

It could take, depending on the location of the fire or the incident, until the gas gets to the sensor, it could be six minutes. That would be, what, 20. It could be a long time and probably more than it should be, but it's either that or doubling up on the number of sensors or increasing the air speed. I don't know.

50 feet per minute is not very much ventilation. You can't feel 50 feet per minute. Most of our air flow sensors

will monitor 50 feet per minute, but you
wonder what it's measuring because you
couldn't feel it.
DR. CALIZAYA: Thank you.
DR. BRUNE: Just one more
question since we have the manufacturers
represented here together.
I understand, from talking to
old coal miners -- maybe I'm not one of
them yet -- that the human nose is still
the best fire detector; and it is better
than all the electronic detectors. I
don't know what you gentlemen say to that
kind of challenging question. Is the
electronic nose coming? Is that getting
there, or are we still waiting for that?
MR. COON: I'll take a stab at
it. For early detection, I think the CO
monitor is the monitor of choice because
as I mentioned in my presentation, CO is
odorless, tasteless. How can your nose
detect CO if it's odorless?
DR. BRUNE: I understand that.

Typically, you don't have just CO. You also have other tar and particulates.

MR. COON: That's true. If you have a very clean CO without any presence of any kind of odors with it, your nose is going to be lagging way behind.

MR. KETLER: There's nothing to smell in the gases that we monitor; hydrogen, methane, carbon monoxide, carbon dioxide, oxygen. They're all odorless, tasteless gases.

So what you would smell would be products of combustion. By the time you get the smell, I think that's much later than you would detect carbon monoxide.

DR. BRUNE: So would it be fair to say that with the help of the right array of detectors, you can detect a fire quicker? Let's say in the case -- one of the arguments for moving toward the face is that the crew that's working on the face will smell it quickly if there's a fire developing on the belt and get that as an early warning.

That's what the old coal miners say, that's better than what's available from the gas detection warning systems.

MR. GUNNOE: Maybe that's a maintenance issue on the gas detection system.

MR. KETLER: The smell is qualitative, not quantitative. We found that in monitoring for propane in certain alternative fuels operations, that people can smell propane; but they can't quantify it. It's desensitizing their nose for future stronger smells. It's not a very reliable way of monitoring smells.

DR. WEEKS: Quantification is not that important in this case because what we want to find out is whether or not there's a latent fire. It's an either or kind of question. It's not just a question.

One thing that I've always kept

in mind is that in one of the fires, that was detected before the AMS system went off. It could be the calibration. It could be lots of things, but that's what happened.

I think it's not a question of either or, either the nose or some monitor. I think we need to use our common sense. We have a variety of detection systems out there; CO monitors and people and so on and so forth. They're all important.

MR. COON: I can personally attest that in 1986, I had to be on ground helping troubleshoot a system. The operator of the system called underground to indicate that we needed to go to a certain location, that there was a monitor that was seemingly going up.

We thought it was part of our problems that we were looking for. We actually get to the belt, and we find that the belt is running off on the pillar block in the take up generating CO. We could not see it, and we could not smell it.

We had to use a hand-held unit that we had with us and trace it down to the actual belt that ran off at the pillar block.

So there's an example that there was no smoke, there was no odor, yet we were there; and I witnessed this.

DR. WEEKS: Well, it could go either way. I mean, we can think; and machines can detect.

DR. MUTMANSKY: Just for the Panel's information, we had previous witnesses that seemed to indicate that often these incidents can be detected by the human nose before any of the electronic instruments would pick up the CO levels. That was sure to happen over time, but we're bringing up these questions because of some of the testimony that we had heard previously. So that's why the questions have come up.

Are there any other -- I guess we have a captive panel here, and it's good that we're able to ask all these questions while you're still captive here.

Before we terminate, however, I would like to know if there are any other pressing questions that the Panel would like to discuss at this time.

Before we terminate and before Linda tells us what time to get back, I would like to say thank you to every one of the panel members. I know some of you had great difficulty getting here, but you persevered. We really appreciate that and thank you for being here this morning.

DR. WEEKS: Are y'all going to be around if we have questions that might come up? We can talk to you about them informally if you stuck around for a while.

MS. ZEILER: Okay. Thank you.

It's 10 after 12:00. So I

would like to suggest we reconvene at 1:30. We need to go off site to get lunch.

(Lunch break.)

MS. ZEILER: I want to thank you for your patience. Mr. McNider is here today to talk to the Panel about the mine tour they had at Jim Walter Resource's Number 4 Mine yesterday and the belt air issues he wishes to present to the Panel at this time.

MR. MCNIDER: Well, as I told the group yesterday, here's the rest of the story.

Anyway, I'd like to welcome the Panel to Birmingham. I certainly appreciate them taking what we offered, an invitation for the group to come and look at our mines.

We've been using belt air since 1979. The mine they went in was one of the first petitioned mines to ever use belt air. We've been using it now close to 30 years, not quite. We're approaching 30 years.

That mine -- originally, the petition was for 20 minutes between sensors, and now we're down to 1,000 feet and, of course, under the regulation. The progression was from 2,000 and then it went to 1,000. So we've probably got as much experience with belt air as anybody in the country.

The comments today from me will be primarily focussed on ventilation. When you were in Salt Lake City, in the west, a lot of the focus was on strata control, two entry.

In the east, the primary focus is going to be on ventilation and the requirements for ventilation and why we need belt air from a ventilation point of view. Although, strata control is a consideration. Even though the focus is probably primarily on ventilation -- or it will be on ventilation -- we cannot overlook the strata control aspects of it; and I will go into that a little bit.

We would like -- also today I'll be doing the part on the ventilation and the strata control. Keith Pylar, who is in our safety department, is going to do a little short talk on his experience.

He's been in our No. 7 mine for several years. I'll let Keith go through his history and just let him tell you from his perspective how he sees belt air.

Then Randy Watts is our manager of electrical engineering. Randy sat on the panel this morning because Jim Walter designed a lot of our systems ourselves. I believe we're one of the front runners in that.

As a company, it's very unusual. Most companies go to the AMS monitoring people to put the system together for them, but we had the capabilities to do that.

We do buy a lot of off-the-shelf components, and Randy will discuss that. From an operations point of view, I know you had a lot of questions about the AMS to the manufacturers, and Randy might be able to address some of those from an operations point of view.

Again, thanks to the Committee for going to No. 4. I think we had a good visit. Hopefully, you saw the professionalism with which we monitor the mines and the pride we take in using belt air and how we implement it.

Then I'd also like to remind the Committee of the comments made in Pittsburgh concerning belt materials and the AMS system, but Randy will expand on that today.

Although our mines have been degassed for years, there's still a great need to utilize all available air courses to carry intake air to the face.

No. 4 mine, the mine that you were in yesterday, is probably our least gassy mine today. It's been degassed for over 20 years. Even though it's been degassed, we recently applied to MSHA for a plan that we wanted to implement at the mine.

We were looking at reducing the air volumes through that plan; but, after a further review when MSHA came in to look at it, we are still going to have to remain with the historical levels of 19,500 at the end of the line curtain.

Our No. 7 mine is required 17,000 at the end of the line curtain. Those are large amounts of air volumes at the face. Like I said, even though we've been under degasification and there's no doubt degasification has lowered the overall gas volume in the mine, there's still a need for high volumes of air.

In order to get this much air to the end of the line curtain, the mine must provide at least twice that amount in the last open crosscut. It's not uncommon for us to have 50,000 to 80,000 cubic feet per minute in the last open crosscut and 120,000 cubic feet per minute at the return regulators.

In order to course that amount of air through the mine, we operate fans that are rated at 15 inches and 1,125,000 cubic feet per minute, with 3,500 horsepower motors.

It's not unusual for us to operate two fans in parallel on each return shaft. As a matter of fact, because of the ventilation needs, all the mines that operate in the Blue Creek Seam that I'm aware of in Alabama, utilize belt air at the face.

There's one other mine in Alabama that utilizes belt air that does not mine the Blue Creek Seam, and that's the coke mine that operates in the Cahaba Basin.

In that mine that I've got on the screen now, you can see the blue stars are the mines that are the mines that are in the Warrior Cove Basin. They're deep mines.

Typically, the cove dips from the Northeast to the Southwest. So, as you go up to the Northeast, you get much shallower. As you go to the Southwest, towards Tuscaloosa, you're getting deeper.

The mine you were in yesterday, the No. 4 mine, is about 2,000 feet deep as it mines north. You can see No. 4 mine in the bottom in the green on your screen there.

As we go north, as I said, and Northeast, we're getting shallower. The No. 7 mine is to the east of our No. 4 mine. The No. 5 mine at the bottom of the screen there is the deepest mine on average. I believe it was the deepest mine on average in North America, and probably one of the gassiest.

Our No. 3 mine is the mine to the right of the screen, which is here.

Here's No. 4, No. 7, and No. 5. It's the shallowest mine that we operate.

North of our No. 3 mine is the Oak Grove Mine. North of No. 4 and No. 7 mine is the Shoal Creek Mine.

The reason I'm showing you that is just so you can get a relationship. All of those mines use belt air. They are all in the Blue Creek Seam.

Probably, the shallowest part of North River, I would guess, is 900 to 1,000 feet deep. Also, the same thing for Oak Grove.

The North River Mine is the only mine in Alabama that I'm aware of that does not use belt air to face. It's in the Pratt Seam. That's about half as deep. I think North River is probably about 600 feet deep. I'm not sure of that, but I think that's probably about the depth. It has nowhere near the gas that we do operating in the Blue Creek Seam.

Also, the Coke Mine, that I mentioned, is a low-seam mine. It's in the Cahaba Basin, and it liberates quite a bit of gas when cutting coal.

So the question is: Why belt air? Before I go into that, I mentioned about the needs for the ventilation at the face. As you can see these line curtain lengths, when we line up, this particular one is a yield stable yield.

That's our standard pillar configuration at Jim Walter's Mines. This is a pillar configuration at our No. 7 mine.

The one you were in yesterday was a 125 feet centers on the yield pillar crosscut, and this one is 168. So the line curtain length in this particular mine is 285 feet.

So, in order to get the 17,000 at the end of the line curtain where you're operating, that's one reason why we require a lot of pressure and a lot of volume in the last open crosscut.

Why belt air? Jim Walter's engineering department utilizes an Ohio Automation Ventilation Simulation program to simulate the ventilation needs for each mine. We modeled the ventilation using a four-entry and three-entry section with and without belt air.

As you can see by the simulations, which I will go into here just in a moment, not to use the belt as an air course limits the amount of ventilation that can decourse to the face.

To course the amount of air that is needed in these mines requires large pressure differentials from intake to return utilizing all available air courses. To restrict the ventilation on the belt air course with some type of regulator such as a bulkhead, that creates high pressure across the bulkhead. This is a problem to the mine because of the high air velocity that has coursed through the small opening around the belt that creates a float and respirable dust problem.

Also, to restrict belt air course pressurizes the air course and creates leakage from the belt to the primary intake escapeway and contaminates the escapeway.

Another problem with limiting the flow of air with a flow on the belt is the creation of dead spots. When you put in a bulkhead and you're trying to limit the air coming from two directions, it's difficult to manage that.

From my experience -- when I first started in the mines, I worked at No. 3 mine. We had a neutral belt. We vented it to the return. Believe me, it was not uncommon to find dead spots in the belt and high -- extremely high methane levels to the point of being a hazard in the mines. So that is definitely an issue.

The most effective way to ventilate gassy mines that require large quantities of air is to utilize all available air courses and have a positive one-way ventilation on the belt.

I'm going to go into the simulations that we used. I wanted to run these. All these simulations were based on 15,000 feet. Now, that sounds like a long distance; but, in today's mines, it's not. We've got some that are designed to 19,000 feet.

As a matter of fact, in No. 4, the mine you were in yesterday, we've got some that are either approaching that or at that length.

The intake airway resistances that we used are from one of our mines. It was a .3 belt airway resistance per 1,000 with .337. Return airway resistance per 1,000 was .383. Both regulators would run at 120,000 CFM.

I told you the reason for that.

If you go 15,000 feet with a yield-stable-yield configuration, the number of stoppings that you have -- and I calculated that out -- if you use just 500 CFM for stopping, that gives you 60,000 cubic feet of leakage. You're doing a good job, with the kind of pressure I'm getting ready to show you in a minute, to control the leakage to that amount.

Then the left and last open crosscut, again, is 60,000. So that gives you 60,000 leakage.

The first simulation -- it's going to be a little difficult to see. I apologize. I was hoping that would show up a little bit better.

On the left and right regulator, is 120,000; 60,000 at the face, 15,000 for the length. As you can see here -- Jerry, you asked me in Pittsburgh to give you a pressure differential, and I calculated in my head about 10,000 feet. I said it was about six inches.

On this one, you can see that it's a 9.33-inch drop. It sounds huge, but I'm telling you it's in that range depending -- the Rs won't be exact, but these are the model Rs. This is what we use every day to simulate our mines.

The intake, I believe had about 123,000 -- and you can see it in your booklets that I gave you -- and about 116 on the belt. That is with a little over 50 percent on the intake, and it's closely distributed between the two entries.

Now, the next run is showing what, if we put a bulkhead up close to the face and we try to dump that air into the return? What happens on a four-entry section?

Well, the first thing is, we're going to kill about four inches negative to try to kill -- not kill, but to regulate this width to the point to where we can pull air back from the face and then through the regulator and back into the return.

We've got about 15,000 CFM. We started out with about 106 on this, and you can see when you put the bulkhead here what it's doing is pressurizing this belt, and the leakage now is in the wrong direction.

So, if you put a bulkhead at the face on a four-entry section, what you've done in effect is you've taken in and pressurized the belt. That's what I was talking about earlier. You've contaminated the intake escapeway. That's not what we're trying to achieve.

You've also lost air at the face. Where we had 60,000 before, now we've got 24,000; and, on the right side, we've got 57,000. The regulator, in effect, is wide open. So there's no pressure here to put any more air on that section.

Basically, that is all that section will do. Where we used both entries in parallel earlier, we had the leakage in the right direction, we had 60,000 on the face, and I believe we had a little bit of pressure at the regulator still in the reserve.

Now, we're wide open; and we've got nothing in reserve. We've contaminated our intake escapeway.

Okay. So let's put the bulkhead at the other end of the section and see what happens there. Well, in this case, we're destroying almost 12 inches of pressure, 11.69. The differential from intake to return on that section is 10.7 inches. We've actually lost air at the face.

Again, the regulators are wide open, and we're pulling air back down the belt. Our leakage is in the proper direction, but we've lost air in the face. That bulkhead right there -- and believe me, I've seen this in my career.

When you try to limit the air

around the belt -- and, normally, you're going to have the belt running through the bulkhead. We've tried a lot of different ways to control that. It is extremely difficult to control with those kind of pressures. It's a huge dust source. So that's a major problem with trying to regulate the belt.

Okay. Next, we went, and we looked at a three-entry section, which we run.

Again, the gateway length was 15,000 feet. The resistances were the same per 1,000. The right return regulator was 138,000.

To explain that, in order to get the -- and I'll show you on the base case here. We had 90,000 at the face because we're on three entries. We had 60 before for a fishtail, but now we're ventilating another place. So that's why that's higher.

On this case, you can see it

takes about 11 inches to do that in order to get the pressure proper from the intake to the belt. Then we had to limit the amount of air that was actually on the belt. It was 25,000, and 112 on the intake. We've got about 92 at the face, and, like I said, 138. That regulator is wide open.

So, with 11 inches, we're out of pressure with a three-entry section; but that does -- with belt air, we do get the air that we need to operate at a 15,000- foot-long section.

Now, we put the bulkhead near the face. We're destroying -- everything is the same. We've just added a bulkhead across and a regulator here to ventilate the air to the return.

Now, we're destroying about 2 inches of pressure to get that air. We've pressurized the belt again. Now, here we have 90,000, we've got about 53,000 at the face. So we've got a tremendous loss, and the section is wide open with no available pressure to get any more ventilation to the face.

If we take the bulkhead and we put it back down at the other end of the section, now we're up about 8 inches trying to destroy that amount of pressure. We're ventilating the belt back down into the return. We've got about 9.3 inches across from intake to return.

In this particular case, the intake is loaded up. We've got 145,000 because the intake is trying to course all the air to the section and back and back down the belt. We've got 57,000 at the face with no available pressure.

So with a four-entry or a three-entry, using belt air at the face, we're not as efficient. We lose ventilation, not counting the other problems that we've created by adding a bulkhead or a regulation to the belt which can contaminate this gateway and create a huge dust problem along the belt line and a clean-up problem.

All right. So now the question is: Why don't we add an entry parallel at intake so that we can replace the belt line? This sounds logical from a simplistic look, but to add an air course that's parallel with an existing air course does nothing to improve the escapeway capabilities of the mine or the overall ventilation.

It does replace the belt as an air course, but the section in the mine requires more additional air to ventilate the belt to the return. It requires more pressure in a mine that's already utilizing some of the largest fans probably in the world.

Together with the increased ventilation needs, there's still the question of the escapeway with only a couple of possibilities, one of which must be the intake which is now parallel with another entry, the belt, or the return.

So you've got the parallel intake, the belt, or the return as your possibilities for your escapeway. To simply add an entry parallel with the existing intake, the same possibilities exist for escapeway; and no improvements have been made because those two air courses on the intake are in common. So, if you had a fire, it's going to act exactly like if you had one by itself.

The question has been asked: Why not separate the entries? Have an intake, a brattice line, an intake, a brattice line, and a belt line. With unbalanced resistances such as the track and utilities in one entry and the other open, deterioration in one but not in the other will result in an unbalanced flow situation where there will be cross flow from one entry to the other and a mix of air from an escapeway point of view.

It would be extremely difficult

to control an unbalanced flow situation and try to keep those entries right, as far as an escapeway point of view.

We also modeled this to show the effects of having a five-entry versus say a four-entry. We modeled it at 15,000 feet. Again, we used the same Rs as we used before. We used 120,000 on the left and right, and 60 at the face again.

On the base case, in this particular case, you can see that it takes about 7.25 inches to ventilate the face -- or to ventilate the section; 60,000 at the face, 120,000 at the regulator.

In this particular case, we've got about 5 inches. If we need to improve the ventilation, we've got a tremendous amount of pressure to work with.

Now, let's say that we take a bulkhead, and we're going this time to regulate this belt to the return. We've got about -- I can't read that number. It looks like about 8,000 going through the bulkhead. We've got 1.21 inches.

So that's getting down more in the zone of what we can control, but we're a little bit less at the face. The right side had the 60, but the left side where we added return air is now about 52,000, and the regulator is out of pressure.

We also use more -- it took more air in this system. We've got about the same air in the face, but we've got about 150,000 on the left and about 120,000 on the right. So we've got about 270,000 versus 240,000.

So, even though we were able -- we were not able to 100 percent accomplish our goal of 60,000 in the face, we did come close. It takes more air on the section, and it takes more available pressure than it did before, 8.63. The other one was about 7.25. So it takes more pressure and more air to ventilate this section versus the other way.

One other thing about the

bulkhead at the face is, again, it's pressurized the belt; and that's pushing the pressure out toward the smoke-free escapeway. It's required that one of the intakes must be one of the primaries -- or must be the primary.

Putting the bulkhead back out at the mouth of the section. Here again, we were able to reverse the belt air. We had 10.81 inches of pressure. These regulators are wide open. We were -- we came out a little bit less; about 54 on the left, and about 55 on the right.

So we added an entry, we didn't really improve the escape capabilities of the mine, we used more air on the section, we used more pressure, and yet we are still less. So why add an entry?

Escapeway enhancement. The question has been asked: Should there be a minimum pressure differential from the intake to the belt? Here again, the reality of this is that it already exists.

Even though the differential may be small, there's already a differential required; and the intake must have at least 50 percent of the total air of the section, which means there will be some pressure drop from the intake to the belt.

Because the belt is more resistant than the intake, this in most cases is fairly easy to maintain; but to arbitrarily set a number for a minimum could mean that in order to comply, the mine would have to create an artificial means of regulation -- there again, the bulkhead -- to create this pressure drop.

This, in turn, creates a dust problem; and the ventilation gets more difficult to control. In most cases, the differential between the intake and the belt naturally exist and become greater as the mine develops.

We went to a point feed at our No. 4 mine yesterday. It was at the intake shaft in the north. We had the entry -- probably the point feed, which I'm not sure the exact width, but it was a roll-up door. It looked to be about seven or eight feet. It was approximately two feet off of the foot wall, and we estimated it. We did not measure it, but I'd say we easily had three to four inches.

So we had quite a bit of pressure differential. The primary reason for that is because of the belt line layout and the resistance of the belt line versus the intakes.

That gets back to the reason for the point feed because as the air on the belt line drops off, then that's the reason you use a point feed to pick it back up.

So, in effect, you have a minimum differential down; but to go back and artificially try to create a differential by doing something such as regulation, in my opinion, would be detrimental to the mine.

We've got to remind ourselves, why do we have the air in the first place. The air is there because of the needs of the mine. We've got 120,000 at the regulator. If we had a four-inch resection, which we have, and we're trying to utilize the full effect of all the air courses, if we go back and try to limit the velocity or create a minimum drop, I think that would be detrimental to the mine, limiting the velocity on the belt.

Oh, one other thing on the escapeway enhancement. We pointed this out yesterday. Under the MINER Act, there's already a requirement for directional cones. We saw those. There's 96 hours of breathable, should a person become trapped, and caches for SCSRs for every 30 minutes of walking to get out of the mine.

Limiting the velocity on the belt. Here again, this sounds logical to limit the velocity, but the reason the belt velocities are high in most cases is because of the ventilation needs of the mine.

In order to achieve 120,000 cubic feet per minute at the regulator for each section split means that the belt has to be utilized to its fullest. To regulate this air course to limit this flow will compromise the ventilation needs of the mine.

Regulating this split also creates dust problems and pressurizes the belt to a point that may create leakage in the wrong direction, and this will jeopardize the intake escapeway.

That's what I was showing about the bulkhead. Now, that was to reverse it and bring it away from the face. Depending on what that minimum requirement is, it could create the differential from the belt in the wrong direction.

Randy will speak about the

Atmospheric Monitoring Systems and their effectiveness in higher air velocity conditions.

Like I said, we've used belt air in Jim Walter for 30 years. It's not uncommon for us to get a 1,000 feet per minute belt velocity. As a matter of fact, if you think about the face case that I had up there as a four-entry, we had 123,000 in the intake and 116 on the belt.

So, if had roughly a 6 by 20 entry, that's 1,000 velocity. So, for us to see that is not that uncommon.

Why limit the velocity on the belt if the atmospheric monitors will detect heatings at a low prior to actually becoming a fire?

The people that were at the mine yesterday, there was quite a bit of talk about bearings that got hot, rollers that could be detected and detected in some of them on main lines and in high velocities.

As stated above, when belt velocities are high, it is for a reason; and the reason is the ventilation needs of the face.

Respirable dust on the belt lines, another concern in high velocities, has not been a problem and can be controlled through water sprays and proper chutes.

In your booklet here, we have all of the dust samples from No. 4 mine, respirable dust samples off the belt line. We had MSHA's attached, and we've got Jim Walter's.

The belt samples are a standard of one. These are single-shelf samples. So it's with a gravimetric pump, taking a single shift. This goes back to January of 2000. So it's roughly about seven years of data.

The belt standards, where we were over the standard, were seven; but you come back and you do a check on that because it is a single-shift sample. We were not out of compliance any. To my knowledge, we have not been cited on a belt dust -- respirable dust sample.

There were 164 samples taken. The percentages of the samples that were over the standard of one was 4.27, and the average, if you take and include all the over-exposure samples, was .46. If you exclude those, it was .4 as the average.

Now, if you take the Jim Walter samples, the belt samples that were over the standard, one is pretty close to what MSHA got. We had about an eight over that length of period.

Now, the thing that's a little bit different on the mine samples, if we have overexposed the standard of one, we have to come back with a five check. Under the law, it calls for five consecutive samples.

When we went back and we

rechecked it, we were not out of compliance any. There were 243 samples taken. The percentage over the standard was 3.29. Here again, it follows what MSHA got really close. The average was .44 including all samples and .4 when you exclude them. So that's pretty much the same thing that MSHA got.

So, when you take into consideration that AMS will do the job and respirable dust can be controlled, why limit velocity? You are going to impact the face ventilation. Again, it's a mine.

Strata control. As I said earlier, although strata control is a secondary in these mines to the ventilation, as far as the need for belt air is concerned, it's still an important issue. In order to properly handle soft floor conditions and deep cover, the yield-stable-yield pillar configuration was applied to these mines.

As a matter of fact, the first

mine that was developed for Jim Walter was in our No. 5 mine, the one that I told you was the furthest to the south and the deepest.

The yield pillars are designed to yield, while the stable pillar is designed to support the cover load and transfer loads from mining of longwall panels. This can be compared to standard conventional pillars.

This can be accomplished while at the same time narrowing the span of wall-to-wall section compared to standard conventional pillars.

The system has worked well and has been adopted as our primary pillar system for section development. When we need to add entries, such as in the mains, we must be careful in how this is done. We cannot simply add an additional yield pillar entry that might be in parallel with another yield pillar because the yield pillars support no load. If the span becomes too great for the main top, then deterioration in the roof will happen.

This can cause significant problems for the mine. If a stable pillar is added, then the overall width of the section becomes great because of the size our stable pillars at this depth; and development for section advance is diminished greatly.

If you'll think back to the size of the stable pillar that I had earlier, then you can see, to add another one of those, what that would do to the overall section.

Because of ventilation, we typically drive four entry sections for longwall development so that we can have a fishtail ventilation. To add another entry with a stable pillar would slow section development for longwalls to such an extent that it could impact the economic viability of the mine.

So it would be highly questionable how the economics would look for the mine if we tried to add a stable pillar. Earlier on, like I said, it really doesn't enhance the ventilation. As a matter of fact, it's a detriment to the ventilation if you course the belt air back.

One other thing I wanted to say is that we've got a long history with belt air. We've also had numerous fires in our mines. Our No. 5 had spontaneous combustion in it.

Bill Francart's been down and looked at our monitoring systems numerous times. Bill has seen firsthand the impact of having an AMS system can have as far as safety and having a baseline reading in the mine.

Once you come into a fire situation, one of the first things we try to do is evaluate our intakes and restore our AMS systems because they are critical to you. You can add numerous sensors of whatever you might want to look at, and that can greatly enhance the overall safety of the mine.

To my knowledge, we've been using belt air for 30 years, roughly, in our mines; and I don't know of anyone that's been injured or where we've had a problem utilizing belt air. In my opinion, it has definitely been an overall asset to the mine.

That's all I have. I was going to let Keith talk, and then Randy. We'll be glad to answers question when we get through; or I can answer them now, whichever way the Panel would prefer.

DR. MUTMANSKY: One quick question.

The dust samples that you've shown in your booklet here are interesting in a sense that most of your dust samples on the belt are relatively low .2, .3, something like that.

Then, you have these over standards, some of which are really quite high, like 3.95, 2.66, and so forth. Is there a reason for that? Is there an explanation as to why those happen to be very high?

MR. MCNIDER: I know you can get excursions with a gravimetric pumps. Everybody that's used them -- I mean, it happens.

This could be where rock dust or something that was an excursion from the norm that might have happened that I can't explain, or it could be simply something with the evaluation of a sample cassette itself.

That's one reason I wanted to put it in there and I highlighted it for the Panel, to show you that.

Normally, when they're high -- sometimes you'd see it would be 1.1, 1.2, and be slightly out. There are a lot of times you get it so far off the norm where it would be as high as 3 milligrams. Is that a real situation or not? I can't tell you.

That's why you come back and you do checks behind that, because it is a single-shift sample; and, with gravimetric pumps, that can be a problem.

DR. WEEKS: I've got a couple of questions about the samples, too, just for the sake of information.

Are these all designated area samples?

MR. MCNIDER: Yes.

DR. WEEKS: Where exactly were they taken?

MR. MCNIDER: I believe they were by the belt tailpiece.

DR. WEEKS: And they are eight-hour samples, or are they 12-hour samples?

MR. MCNIDER: They would be eight hours. Yeah. Let's say the standard today.

DR. WEEKS: These were for

compliance purposes?

MR. MCNIDER: Yes.

DR. WEEKS: Okay.

MR. MCNIDER: By the way, Jim, those are off the MSHA web page. I think any of you guys could call those up and get them.

That was for our No. 4 mine. I did not do both mines. So I'm not sure about No. 7.

DR. TIEN: How would you like to handle the questioning? Do you want the other two gentlemen to do their presentation first and come back?

MR. MCNIDER: Yeah. Let's do that, and then we'll come back.

DR. TIEN: Okay. Sure.

MR. MCNIDER: I will turn it over now to Keith, and he is going to make a couple of comments, and then we'll go from there.

MR. PLYLAR: Good afternoon. My name is Keith Plylar. I'm currently a safety associate at Jim Walter Resource's No. 7 mine.

I've been employed there approximately 27 years. I've served on the UMWA Health and Safety Committee. I was for there about 18 years at that place prior to taking the safety associate's job.

I've been a big proponent of mine health and safety for miners for several years, probably a couple of years prior to getting on the committee. I've been a big advocate for monitoring of belt lines.

I've spoken with committees before. When we started out with our Petition for Modifications, the 2,000 feet on the monitoring of our belt lines, I was a big proponent to change that to get it down to 1,000 feet.

Like I said, again, I guess I'm just here today to say that in my experience, I believe that we can mine coal with the safe use of belt air because we've been doing it for several years.

I also think there's advantages that we normally don't look at from using belt air. We always concentrate on the disadvantages of it, I think, instead of looking at some of the advantages.

That's another thing I want to talk a little bit about. As some of the people said today, with our Monitoring System we have, we've been able to detect and pick up smoldering situations, bearings going out on rollers, hot rollers or even a belt getting out of alignment and picking it up before it becomes a fire.

Any time you can get that early detection and get the notification to the people that are working nearby or get some action to the problem, that enhances the safety of the miners at the mine.

Without this system, without the Monitoring System, if you've got a belt line that's isolated or you've got a belt line that' in a neutral entry, then how big of a fire or how much of a flame or how much CO do you get before you would actually be notified of it?

Most of y'all can remember this. When I started in the mine, we had the old heat-sensor-type devices on the belt line. Luckily, I never saw it; but I can imagine a belt line completely -- an entry being completely engulfed before you got any warnings off of those systems. Enhancements -- we've come a long way today with our Monitoring Systems.

The other thing that I think is a big advantage of using the belt air on the face is that even though it's not dedicated as an escape way, it gives you another entry to get out of the mine if something does happen.

Currently, in our mine, we use an intake escapeway separated from the belt and return on the return escapeway.

We maintain them, clearance and everything. If something happened and you did get a contamination into your primary and then it got so bad it went into your return, it does give miners another way, another means of escape off that section.

With all that said, the key to it all is monitoring that air. That's the biggest thing. If you've got people or operations that are not going to maintain separation or that are not going to maintain monitoring or that don't maintain maintenance on the AMS system, then that's a whole set of different problems. That's not a problem with belt air.

Today, I was hearing some of the people; and some of the Panel was asking about the maintenance of our systems, who works on the AMS systems and who installs them. In our mines right now, I would say we have some of the best people there are that are qualified and dedicated to doing that job.

They install the systems, and they maintain them underground. They're hourly employees that have had training, and they have electrical backgrounds. Before they get the job, they have to take a test to see if they're qualified to step in. Then, they actually do the training and learn more on the system.

We know today each system that you put in a mine is only as good as the people that maintain it. It's only as good as what efforts you put into maintaining it.

Again, the early detection of having someone there at the mine site around the clock 24 hours a day is important so they can notify someone to start th withdrawal of the system.

I just think we're looking at going backwards if we start looking at trying to isolate these belt entries. If you think about -- like I said earlier, you have very little limited air on those entries.

You know yourself if you're not using the air off that belt to ventilate your work in sections, you're not going to be dumping a lot of it because you're going to need it at the face. That's what Tommy was talking about.

So, in our mines, you do increase the likelihood of a build up of methane in there, which brings on a whole set of problems in itself for getting into the explosive range.

Another thing, how much attention are people going to pay to that entry, as far as inspecting it properly, checking it, and making sure everything is maintained? Are you going to go specifically by the regulations at that time?

So I guess to sum a lot of it up today, again, we have been working around it for over 20 years. We haven't had any major problems. I guess, on the flip side of that, it has actually helped us to keep from having belt fires from the heating of the rollers and the hot spots.

As far as the nuisance alarms, when we first started off, we had a lot of problems with them, with diesel equipment or whatever. We actually had a track belt together at one time. They've come a long way.

People actually have designed our system to actually pick up and do away with nuisance alarms.

So, once again, just to reiterate, I definitely believe that we can use belt air safely today. There again, it's only as good as the people that are running the operation.

Thank you.

MR. WATTS: My name is Randy Watts. I've been working for Jim Walter Resources for 31 years. The current position I have is Manager of Electrical Engineering.

I want to talk to you a little bit about the JWR Mine Wide Monitoring System. First of all, I guess the first statement that I'll make is we are sort of in a unique position in that we are not a manufacturer of Mine Wide Monitoring Systems or AMS systems.

We don't make any of our sensors; and, therefore, I don't have any reason to try to promote one sensor over another sensor, other than what we've found to work. That's the only thing I will be speaking of, is our experiences with the different types of sensors.

As far as the system goes, we did design our own system. That came about primarily because of some of our experiences with the early systems.

As Tom mentioned before, we've had quite a bit of experience with Mine Wide Monitoring Systems because our early petitions required these AMS or CO systems to be installed to monitor the belt lines.

Actually, this slide says mid '80s; but, according to Tom's information, 1979, I believe, was the first petition that we filed. We started monitoring these belt lines since then.

Some of our early experiences with these system caused us to look into other areas. In 1990, we designed our own system and had the system approved and installed that in all of our mines.

I want to talk a little bit about the system itself. I'm going to try not to be repetitive, but some of the things that I'll be mentioning are similar to the other systems that were described. I guess maybe some of the things that I can comment on and will try to is some of the questions that the Panel asked to the other vendors at AMS systems.

In our control room, on the surface, we have a control room with an operator that is in the control room 24 hours a day, seven days a week.

I'll apologize for some of the photographs here. It's not real good quality on some of the photographs. I took them in a hurry and tried to put together something that would at least show what we're doing.

In the room here, you can see various computer screens. There's one over on the left and there's one to the left of the operator, and then you also see some video monitors on the back wall back here.

This system uses standard PCs. We wrote our software to run on these PCs. It uses a SQL database to store all the information.

As far as the hardware underground, each device underground has its on address. So it's scanned by the system. Our system is pretty fast in scanning these devices.

With the current load that we have on the system right now, we can make a complete scan or scan every address on the system in about one to two seconds. So we're checking not only the value or the CO reading at each of those sensors every one and a half seconds, but we're also checking the status to make sure that those sensors are actually working as they're supposed to.

We have the capability of 32,000 points. We also have a redundant system in the fact that we have two computers that are essentially sitting there running all the time, with one computer doing all of the scanning. If something were to go wrong with that one computer, we could very easily switch over to the other computer.

Sensors. As I mentioned before, we do not manufacture our own sensors. We buy our sensors from all of the vendors that were represented here today.

We have primarily standardized

on a couple of sensors that are smart-sensor type. They communicate directly with our system, and they have a lot of features for calibration, subcalibration, and monitoring themselves to make sure that they are operating in good condition.

So, even though we don't manufacture the sensors ourselves, I think that we've had a lot of influence on the sensor manufacturers because we have asked for quite a few improvements in their sensors through the years; and they have been very good to work with us and have met the things that we've asked for in most cases.

We also use our system to monitor other devices, and I put this slide up here to show you that we monitor our conveyor belts, our fans, our pumps, our hoists. Just about every major piece of equipment underground, we bring that into our Monitoring System.

A lot of times, the information that we get from these other devices can be just as valuable as the information that we get from the CO sensors. So we try to use the term "Mine Wide Monitoring System," rather than just "AMS system" because our system does monitor the atmospheric conditions; but we also monitor all these other devices.

Just to point out for reference here, this card right here is the fiber trunk extender, and up here is a multi-function card. This particular outstation right here would be typical of a station that would be connected to the system without any type of PLC or any other smart device on it. It would just be a station that's monitoring several parameters.

Very quickly, here is the system layout. Up in the control room, you have the computers running the software for the Monitoring System. Down the shaft is a fiber optic cable, and then underground is a fiber optic backbone.

One of the other, or maybe two of the other vendors mentioned in their presentations the fact that the communications are the part of your system. That is a very true statement.

We, just like some of the other vendors mentioned, try not to tolerate any errors on our system. We expect to see 100 percent communication all the time.

Now, we don't always achieve that, but the guys that you will see in a minute that work on these systems, when they start seeing a few errors popping up every once in a while, they know something's wrong; and they immediately go to start checking those devices and try to find that problem before it becomes something that actually is going to affect your communication.

We use fiber optic cable as our backbone. We've been using that since about 1994. We have quite a lot of experience with this. Our system is very fast and very tolerant to noise, and that's primarily due to the fact that we've had this fiber optic backbone installed.

Each one of these boards that are labeled "FTE boards" here, they are sort of an interface between the fiber and the cable. Once you get to the belt line itself, the CO sensors have to be powered. They also have to have communication.

It's at that point that you break out of the system, break out the fiber and go to cable and pick up all of these sensors that are along the belt.

The system would not be effective at all if it were not for the people that we use to monitor and to maintain the system. In our control room, as I mentioned before, we have control room operators with all the tools.

They have the mine map, they have computers, they have the video, they have two-way communications, and they have access to the people that they need at any time to make sure that they can make good decisions about what the system is doing at the time.

These operators are in the room 24 hours a day, seven days a week. To my knowledge, they are all certified mine foremen; and they have all been trained in the operation of the system. We feel like we've got some pretty good control room operators at this time.

They have a pretty busy job when they're in there and things are busy during the day with the normal operation of the mine. They take care of it very well.

Also, we have at least one CO technician per shift at each mine site. These men are UMWA employees. They're also very skilled at what they do. They've received training.

One thing that I will say about

your UMWA employees -- and I will say this with utmost confidence -- these men are dedicated, and they believe in what they're doing. It's because of that, that they do such a good job of keeping this system up.

They are very responsible in the things that they do. They have a pretty big job to keep up with calibrations and making sure that the system is operating correctly and making sure that we have the system moved up.

The mine is very dynamic place, and there's always a sensor that has to be moved to make sure that we're meeting the requirements of the law.

One thing that I mentioned a while ago is that you've heard several terms. You've heard the system referred to as a CO System, and Atmospheric Monitoring System, a Mine Wide Monitoring System.

In our system it sort of is --

the Atmospheric Monitoring System is -- obviously, the reason we put the system in was to monitor these belts; but we've also expanded it and gotten a lot of benefits by carrying it on to a Mine Wide Monitoring System.

We keep that part of the system separate, though, in the fact that we have one screen that the operator keeps up all the time. This is a screen that shows the status of all the CO sensors on all the belts underground all the time. That screen stays up all the time, and he can look over at any time that he wants to and see what the status is.

Each one of these little blocks that shows the value there is color coded so if any of those sensors went into an alarm level, it would immediately notify him visually, in addition to the fact that the system is going to set off the alarms.

He has this just as a backup. He doesn't have to do anything else except turn his head and look at the screen, and he can see the status of the CO sensors.

As far as Mine Wide Monitoring System, this would be a typical screen that would be created to watch the status of some of other devices in the mine. It could be as simple or as complex as they want to make it. Their tendency is try to keep the screen simple; and, therefore, they lay the mine out in a very simple way there.

That's the status of the belts. You can also see the status of the bunker. There are also other parameters there; such as, water pressure, water gallons per minute, and air pressure from compressors.

There's a lot of information contained on this screen. We will point out one other thing right here. As I mentioned awhile ago, sometimes this information can be just as valuable as the information that you get from the CO sensor.

In this particular case right here, I just happened to take the photograph at a time when this N10 belt right here had been turned off. It's a little hard to view from your standpoint because you don't know the legend, but the operators have it to where they have it memorized where they don't have to look at it.

This little red dot here signifies that this belt was turned off by remote. Also, in addition to that, I have these two lines right here that -- I cut off the name of that particular spot right there, but that is N10 belt right there.

What it's telling me in those two squares right there is that 79 is the first out code -- which they have a page that they can go to and it tells what that code is -- and that's what actually stopped the belt. Then, the block next to it is the current status of the belt, and that shows a 20.1.

What that's telling them is that the remote switch at the tail piece of the belt is the one that actually stopped that belt. So not only do we know that the belt stopped, we know that it stopped because someone pulled the remote switch; but we also know that that remote switch is on the tail piece of that belt; and that's where the stoppage occurred.

Now, had this been an unplanned stoppage of this belt, the control room operator would have immediately begun investigating what the problem was.

So I think there's an added level of safety right there in the fact that certain things go on. These people are on top of everything that's going on at the mine, not just the CO that's on the belts.

One of the questions that was asked a few times, and I don't really know how to answer it maybe specifically because there are a lot of variables that would go into determining how the CO sensor is going to respond in a belt entry that has what you might consider high velocity.

How much CO is it liberating? Where is the CO being liberated in relation to the structures and the air flow that's going through there? So a lot of things can happen that might change the way this might respond.

Obviously, the more air flow that you have there, the more the CO is going to be diluted. So the only thing that I could think of to do is to maybe give you a few examples of things that have happened in our mines that might give you a little insight into how sensitive these sensor really are.

This first example here is one what I've marked "case one." Several years ago, one of our mine sites began noticing elevated readings on their CO sensors along the main line. You know, it's typical of a fire or some real problem that you will see CO begin to go up on one sensor, and then the next sensor will begin to go up, and then so on down the line.

That's exactly what began to happen in this case. It never reached the alert level, but the levels were going up. So the control room operator immediately launched an investigation, and what they determined was they could smell a little smoke. They tracked it, and they went all the way back, it was coming into the intake shaft.

The final determination was made that this air was actually coming down the shaft. The smoke was actually coming down the shaft, and it was coming from a forest fire that was several miles away.

So, with just the smoke in the air coming down the shaft, all of the sensors along that mine line where the air velocity was as high as it could be, were all starting to go up.

Actually, before that day was over, every sensor in the mine or practically every sensor in the mine showed an elevated level from its normal level.

The control room operator caught it. Even though this was well before any of the sensors even went into the alert levels. So the system is very sensitive, and these sensors that we're talking about have come a long way since the early sensors that were put in.

In another case, we use shaft heaters sometimes to deice or prevent ice from building up in our shafts when the weather is cold.

We had a very similar situation the first time that we used one of these shaft heaters. We turned it on, and we immediately began seeing CO going up on all of these main line sensors. The operator launched the investigation, as he should have; and the determination was that the shaft heaters were causing this problem.

I'm not sure how to quantify how sensitive these are, but these are very minute values of CO that are going down through here. Even in these high velocity entries, these sensors were easily picking them up; and the operators were easily identifying that there was some sort of problem going on.

One of the questions also asked by the Panel was have there been any cases where men might have detected the smoke before the sensors did, and I'll be honest with you and say that that has happened a couple of times in our mines.

In one or two particular cases that I can recall, we were testing some new types of belts or new belts at that particular time that were supposed to be more flame resistant. Those belts when heated did not produce as much CO. They produced a lot of smoke, but there wasn't a lot of CO in those particular belts.

So we had a couple of cases there to where there was smoke in the entry, and men had found it before we picked it up with the sensors. That also prompted us at that time to try smoke sensors. We did not, from our experience, have very good success with those smoke sensors.

That doesn't mean that some day that technology might come around and might be something that -- obviously, if there's good technology out there, we would try to use it; but that particular time, we didn't get a very good success or very good results from those smoke sensors. They tended to go into an alarm condition after just a couple of days operating underground.

Also, we've had a couple of places where possibly changes in the air screen -- you know, somebody has moved a piece of equipment or moved a sensor or a sensor has fallen from a roof or whatever. There's been a couple of instances where the sensor nearest the CO liberation didn't go off before someone walked through the area.

So we have had a couple of cases where people had found the problem, but the CO system alarm went into alert level later on. A person was there first, the CO system did its job. It just didn't react quite as quickly as the man did.

Several others have testified and spoken to the fact that we have detected many hot rollers. We've detected these hot rollers on all the belts, not just the belts going to the sections. We have detected these on main line belts.

I don't know what percentage it is; but it's a very large percentage of the time that these were detected very early, before you could even -- you have to really search for the source. It's not like just walking up and you see a flame or something. You have to really get in there and search to find where the CO is being liberated.

Emergency situations. I won't take too much time to talk about that, but it is a very important situation.

Obviously, in an emergency, you need information and you need it accurately and you need it to be there as soon as possible. We've had a few conditions to where we've had the system tested under emergency-type situations.

This is where having a system like this gets you the double benefit, the fact that not only are you monitoring for CO, but you also have all of this other information available to you that might help you to make a better decision about what's going on in the mine at that particular time.

We have monitored for many

different conditions. We've had a lot of special geological conditions that we've had to set up special sensors for. We've been able to do that, and I think we've been able to do that successfully in all cases to help make the mine safer by monitoring.

One reason that I put this picture up there for was to just kind of show you what the operator might see in a condition where there's alarms going off. If you see down here in this area, these are all of the alarms that are currently active. They're all showing up in red.

This particular case right here, I had them set off all of the section alarms for a function test. So they were doing a function test. So you've got this long line of alarms going off all at one time.

As he clicks on each of these alarms -- again, the photograph is not very good -- over here on this side -- not only does he know that he has a point-end alarm, but over here on this side, it's telling him where that point is. There's a detailed description of what the point is and any other information that you want about that point.

It's also telling you what the level is at that particular time, and it's also - the alarm will not stop sounding until he actually physically acknowledges the alarm by clicking his mouse on the point.

So he can't ignore it. It's not something that's going to go away by itself; and, even after he has acknowledged it, it stays in this alarm box and stays red as long it's above the alarm value. So it still does not go away visually, even though he has acknowledged that he knows it's present.

Some others have also commented about the conventional way of ventilating the belt. Of course, Tommy has talked extensively about that. I'm not a ventilation person, but I do know that under the current regulations, that if you use the conventional method for ventilating the air, it does not require a Monitoring System on these belts.

Personally, I think that that would be a step backwards because I think that in many situations, you might allow a situation to get to the point where it would be a much harder fire to fight. You may get into a more serious situation by not detecting the fire early enough.

Also, I think that we might be limiting ourselves in what we might accomplish in the future because many of the advances that we've made in technology in the mines is because we've had to do this type of monitoring. We've had to look at these sort of things.

We've learned a lot by monitoring things in the mine. Had we not been in this situation where we've been required to monitor these things, we might not have been at this point.

I think that we might in the future be limiting ourselves in some way if we don't continue to push this technology forward.

In conclusion, I won't speak too much. I just want to make sure that we're all -- make sure that I make the statement that I believe that the system has made the mines safer. I think that the Mine Wide Monitoring System is something that we need to continue doing. I think that belt air is a safe way of ventilating the working faces.

We need to continue monitoring in this way. I think the Monitoring System allows this to be done safely.

Again, I can make the same statement that Tommy and some of the others have made; that is, with all of our experience over almost 30 years of doing this, we haven't had any problems related to the Monitoring System and the fires caused by this belt air. I think that's a pretty good track record, as far as the experiences we've had on that.

Thank you.

DR. TIEN: Very interesting and informative testimony. I have a question.

What does your structure look like, your organizational structure? Who runs the system?

I know Tommy might be a user. You interacted with Randy quite a bit. I'm just curious because you mentioned you have a CO technician in each mine. What other people do you have, and so forth?

MR. WATTS: Each mine site has basically its own Monitoring System. We don't monitor anything centrally. So their organization is at the mine-site level.

So there would be a supervisor that is in control of making sure that the system is all -- meeting all the standards. All the control room operators would report to him. The control room operators are there 24/7.

We typically have four control room operators. They work seven days on and seven days off for staffing that. Then, at least one CO technician, UMWA employee, is on site per shift.

DR. TIEN: What's the relationship between them and you?

MR. RANDY: With me? I just provide technical assistance for keeping the system operating properly.

DR. TIEN: How does Keith fit into the interplay?

MR. PLYLAR: I'm there on a daily basis as a safety supervisor. I interact with them to make sure if they have any problems, they will let us know.

I just oversee the system. They take care of the system on a daily basis and make sure it's maintained, calibrated, checked, and monitored and all that.

During the period of the daytime, we're constantly in and out of the control room. We are on the screens when we're outside.

That system -- they're set up usually to handle it all themselves right there from the control room to the technicians that actually go in the ground and do the calibrations.

DR. TIEN: Well, it looks like the system has worked. All three of you have worked very effectively because you want them to work and because of your expertise and so forth.

Are there others, Keith and Tom and Randy, in 30 years to step into your shoes when you retire?

MR. PLYLAR: From my perspective, that's one of the ongoing problems of the mining industry, is to make sure that you continually train these folks to bring them in and not wait until you get to the point where we're all gone and then start training them. You have to continuously train as you go along.

I think that's -- that would be in any area of the mines, to make sure you do that continuous training as you go.

MR. MCNIDER: One of guys that traveled with us yesterday was a young CO electrician or technician. I think the guys worked under him. He's been in the mines nine years.

So we are in the process of training, but there's a large gap between Keith and Randy and I and that level. We're like everybody in the mining industry. We are scrambling to try to bring people on and train them.

As a matter of fact -- I think this is what you were getting ready to say -- we started a training program where we're trying to bring in young people that show inclination in that area and get them trained. In electronics and a mine-wide system like you said here. It would be all inclusive. The monitors, the PLCs.

In Randy's comments, he said today you're liable to see just a -- you're just as likely to see a computer going underground as you are a pick and shovel. That's true. Probably more likely.

DR. TIEN: It looks like you grew up with the system, or the system grew up with you guys.

MR. WATTS: I will make one other comment. Early on, we did have to spend a lot of time with the system, but guys that have been working on the system, these UMWA guys, have pretty much stayed with it.

These guys are dedicated, and you don't have to go tend to a lot of problems. They pretty much take care of 99 percent of everything themselves. It's a rare case that we have to go deal with something.

DR. TIEN: Thank you. I have some other questions for Tommy, but we'll come back to that.

DR. WEEKS: I've got a number of questions about the AMS operator training. Let me just lay them all out, and you can sort of answer them as you want to.

It basically has to do with selection of training of the AMS operators. You mentioned they're all certified mine foremen. Why is that? Do you think it's better to take an experienced miner and train him on the AMS system or take someone that's more computer oriented and teach them about mining? Where's the balance there between expertise in dealing with the system or expertise in mining?

Another question is: What do the operators have authorities to do? If they get an alert alarm that comes up, what can they do? Can they evacuate a

section? Can they shut down a belt, or
would they have to call the mine
superintendent; and that person makes the
decision? How does that play itself out?
Also, do you have much turnover
amongst your operators? Those are just
questions about the training and the
selection.
There was a question raised
earlier from one of the company reps. He
said "Well, the first thing is to find
somebody who really wants the job." Do
you agree with that?
MR. MCNIDER: In our minds, the
guys in the control room -- like Randy
said, it's Mine Wide Monitoring System.
They actually do a lot towards running the
mine. They are heavily responsible for
what goes in the ground every day.
Do I think they have the
authority to withdraw the mine?
Absolutely. I think it came out -- you
may have asked that question yesterday to

one of our control room operators. The reason we feel like our person needs to be certified -- they are mine foremen, and they are certified under the State of Alabama -- because we need them to be knowledgeable of what goes on in the mine, not just sit up there and review what's on the screen, but to actually understand the day-to-day activities.

So that's why we -- I think all of our people are certified. Isn't that right, Randy? I don't think we have anybody that's not certified, as far as the control room operators.

As far as turnover goes, as far as our technicians and our control room operators, we have not had a large turnover, have we?

MR. WATTS: Technicians especially. They tend to get into these jobs, and it takes a pretty good while for them to gain an understanding of the system.

They take a lot of pride in what they do. You don't typically have a whole lot of turnover in these jobs.

One thing Tommy was alluding to is our control room operators. They are also the responsible party in all these areas (inaudible.)

DR. WEEKS: Do you have occasional unannounced fire drills to test the system, you know, the machinery and the people and everything? Do you do that sort of thing?

MR. PLYLAR: We do quarterly fire drills. Part of that system incorporates with the CO room operator. We'll give them a planned thing, and they call the operator.

As far as the -- understanding your question, does the CO operator initiate it? No, not necessarily. What they do is on their functional test, when they do the functional tests and stuff, they won't give advanced notice. They'll call up and have them set the system off to see if they react to it.

DR. WEEKS: That's what I was wondering, whether someone like one of y'all would say "Okay, we're going to test the system and see how it works," and not tell anybody about it, just push a button and see if people responded.

MR. PLYLAR: We have done that in the past; but, to say it's on a set pattern, no.

Like I said, when they do their functional test, they're supposed to document then this crew or this crew called back and ask them why it was; and then they'll tell them.

MR. MCNIDER: As far as whether we'd rather take an experienced miner with very little computer skills or take one with computer skills and then -- you know, which one would come first, that's a hard one for me to answer.

I don't know, Randy, if you've

got a better feel or not.

All our guys are certified. They do come out of the mine. They're people that have actually operated sections.

So I guess that I would answer that first and foremost to me that it's a certified person; but then they've got to have the skills to operate the systems.

As you could see in our control room, there's a lot going on. It's fairly complicated.

So I'm not sure about how that part comes in, Randy.

MR. WATTS: I think that's probably pretty accurate. They have to have the mining experience first; but the system, as far as normal operation of the system, doesn't require a whole lot of computer expertise. Basically, they need to know a few things about the system.

We have other people that are there all the time that support them, like our technicians, our CO technicians, and our chief electrical guys. They would take care of any problems that they have.

The control room operators don't have to know the inside workings of the system. They don't have to know how that data gets in and out of the mine site. They don't have to know how to troubleshoot that system.

They just have to know, okay, "I've a problem," and be able to recognize what type of problem that is and get the appropriate people to handle that.

So the mining experience is very valuable. It should be that the person is not totally computer illiterate. I mean, we need people in there that have some computer skills; but I'd say that the mining part of it makes a lot more sense to have that first.

DR. MUTMANSKY: Tommy, back in DC, in our first meeting, you told me that you had been using flame resistant belts in your mines for quite a long time, and that you eventually got rid of them all.

I would like to hear your rationale for doing that because I think it's very important. This is an AMS problem, but it's something that you have referred to in the past. I think it's a good time to get your thinking on that.

MR. MCNIDER: I'm glad you asked that. The CEO of our company came to address the three members of the panel that came to the mine yesterday.

The point that he wanted to make and we as a company wanted to make is that we are not adverse to more -- a higher specification belt than a 2G belt. We use the type of belt that's NCB 158. The belt that was our primary used belt was PVC.

The problem was that it was not -- it did not meet the application of the mine from a durability point of view. From a lot of the operational side, the belt just would not hold up. That was the reason that we eventually went away from it on the PVC side, because it just did not perform.

It created so many other problems underground from an operations point of view that it outweighed what we were trying to gain from the belt-specification side.

Then, in '92, the BELT spec came out, and we went to that higher grade belt. It was a rubber belt where they added a specific compound in it to meet the fire requirements of the BELT spec.

What happened with that belt was that we had numerous points where the belt would run out of alignment a little bit, and we would get shavings from the belt that would drop onto the foot wall and create alarm situations. I mean, it happened numerous times. It was to the point that it was more of an operational hazard than it was a benefit to the mine.

He got asked yesterday whether he -- if a higher specification belt came out, would he try it or would he use it; and the answer was "Yes." However, it's got to meet the operational needs of the mines. In other words, it's got to be durable enough to where it will hold up to the rigors of the underground.

So we're not opposed to a higher specification belt. As a matter of fact, I think he would absolutely promote it, and we would use it provided it will also provide the operational needs of the mine.

That was where we had the problem with it. It met the higher flame retardant aspects, but it did not provide what we needed from the operational side.

DR. WEEKS: I've got another question. Do you think that the AMS system should have an independent power source from the rest of the mine? The question was raised during the break. The issue is, if there's a mine emergency, one of the first things to be cut is the power to the mine.

It would be useful to acquire the information from the AMS system during the mine emergency. So the way to do that is to have an independent power source.

MR. MCNIDER: Are you talking about underground?

DR. WEEKS: Yes. What are your thoughts on that?

MR. MCNIDER: Well, from an emergency point of view, Jim, that's a good question. I'll let Randy go into the AMS part of it.

I can tell you one of our first things to achieve is to try make our main line intakes and get to a point where we can restore power to a certain part of the mine where we've actually gone in and we've made it. One of our first things is to try to establish that AMS system back because it is invaluable to you from an emergency point of view.

You can monitor methane. You can monitor oxygen. You can monitor CO. I mean, you can --

DR. WEEKS: If it has an independent source you, don't have to worry about --

MR. MCNIDER: I don't know what that leads to. Randy, you can answer that.

MR. WATTS: That is something that we have considered and probably would be a little farther along with it except for working with some of these other tracking and communication issues that we're having to deal with.

I think that would be something that would be very useful. Of course, the system has a back up in cases where the power has to be removed completely. In those cases, we would want the system to be either intrinsically safe or have some means of getting that power restored again.

I think it would be beneficial. We've looked at it, and we probably will look at it again pretty soon.

MR. MCNIDER: I think the answer is: Yes, we would like that.

I know from my point of view, when I'm looking at actually trying to get back in the mine, yes, I would like to have it.

So, eventually, Randy, you guys have looked into that aspect of it.

DR. WEEKS: I guess the limiting factor is whether it could be maintained in a permissible fashion.

MR. WATTS: Yeah. It's going to require approval through the approval process, that's kind of where we got hung up on it the last time we pursued it.

DR. CALIZAYA: : I have two questions. Both of them are for Tommy.

I was checking your diagrams, the three system, four and five. In some cases, you used the belt in three for intake. In other cases, you used only two. What makes you -- how do you decide on that?

MR. MCNIDER: Well, what I was trying to do was demonstrate three different things. One, was what I called the base, where I was trying to show that if you use belt air in a three-entry, a four-entry, and a five-entry section, this would be your available air at the section. This would be your regulator, which we held at 120 because that's typically what we'd have at regulator for a 15,000-foot-long section. Would you have any reserve pressure or not?

Then, the next step would be to direct that air off of that belt line just to show that we would have to take that air to a return entry and show the impact that it has on the face and show what some of the other detriments are.

When I put in there "why belt

air," that's part of what I was talking about. I was trying to summarize ahead what those models were showing. If you put a bulkhead in here, it creates a huge pressure drop.

You have to let the belts run through it. Therefore, you've got a dust source. It also pressurizes the belt, which contaminates your escapeway.

That's what that model was showing. The other one was putting the bulkhead back at the mouth of the section. The reason I was showing it at the mouth was because then the flow is in the right direction, the leakage is in the right direction away from the intake to the belt line; but the face air is heavily impacted.

We have no reserve in the regulators, at all. So, in effect, we cannot ventilate a working section 15,000 feet long, either three- or four-entry without belt air. We cannot do it.

I'm telling you -- and this is one thing that Mr. Richmond addressed yesterday. These mines -- they are designed with the use of belt air, and it would probably shut these mines down if we were not able to utilize the belt line as an air course.

Then, I went into the five entry because I wanted to address, okay, let's add an entry. When you add an entry, you think well, I'm going to get escapeway enhancement. You don't, because it's parallel and it acts as one entry; or you try to separate it. Then you've got imbalance because of the resistance values.

So that was the line of thinking, the way this was laid out.

DR. CALIZAYA: : Okay. The next question is related to the air velocity. In the figures that you have here, for the belt entry, you have high velocity, at least at the very beginning.

Near the face, that one drops significantly.

MR. MCNIDER: Right.

DR. CALIZAYA: I think yesterday we were at the face with belt air. It was reasonably -- you could feel the speed of the air.

MR. MCNIDER: Right.

DR. CALIZAYA: What velocities are we talking about, in general?

MR. MCNIDER: Well, we've got two different sets -- the mine you were in yesterday was our No. 4 mine, which has been degassed for years. When we were up there on that section, I would estimate we had about a 300 velocity, probably, at the front of the section.

If you had 300, that entry was probably at least between seven and eight feet high by 20 feet. That's 140. So, if it was 300, that's still 50,000-something on the belt. So, if you had 50,000 in the intake, you've got 100,000.

Back at the back, you're going to have twice that amount. So, rather than a 300 velocity, you've got at least a 600 velocity.

In our No. 7 mine, that mine -- you remember me pointing out the twin seam? That's the reason the higher entry. In our No. 7, we single seam. So we have a little bit less height, but we also have a little bit greater demands.

We're required more air at No. 4; but, at times, we have excursions at No. 7 that requires a little bit more of a demand. So the velocities can be even a little bit higher in No. 7, especially because of the restrictions in the area.

DR. CALIZAYA: One last question regarding pressure drop. Based on your figures, the pressure between the beginning of the entry and the face is about two inches; but the pressure across intake and return is in the order of 10.

MR. MCNIDER: Right.

DR. CALIZAYA: If I'm not mistaken, all your stoppings were of the same kind.

MR. MCNIDER: Yes.

DR. CALIZAYA: I'm guessing that the highest pressure is near that.

MR. MCNIDER: Let me walk through that just a minute. When you start out and you've got the intake and you've fed onto the belt line, you know, like when we had the point feed; or if you start out at the mouth when you first start out, as you go further away, that resistance in that entry is starting to drop off. The resistance between that and the intake is climbing.

There's a higher resistance on the belt than on the intake, either because you've got the belt line in there and a single entry, open entry that has just the tracking. In the mains, it's a multiple entry.

The belt line is building in pressure loss quicker because the resistance is higher and it's dropping off in air volume. Therefore, the negative between the intake and the belt is starting to increase.

Now, the model we ran was just simply showing that -- we created an intake and a return just to demonstrate to you what an 15,000-foot-long entry would do.

When you get in a real mine situation, you start out where you have a huge pressure drop, or it may be very small and starting to change based on the resistance between the two entries on the ground. That's where the point feed comes in.

If it's starting to climb, if you don't have an intake like another shaft, under normal conditions, if you have multiple entries, you would still need to point feed that belt to pick it up occasionally because that pressure drop usually is growing as you get further away.

The belt line is still trying to get its air through the leakage. It's actually hard to control.

DR. MUTMANSKY: One more question, and then you're off the hook, Tommy.

DR. BRUNE: Actually, my question goes to Keith, and not to Tommy.

Keith you've done a nice job pointing out some of the advantages of belt air, and I also appreciate that your perspective is from the mine-workers point of view.

Would you know of any disadvantages that it has to take to the face?

MR. PLYLAR: Of the belt air? No. I guess over the years, my only concern with the belt air was the Monitoring System. Now, when we started out with Petition for Modification, we were only sensing 2,000 feet.

So I actually think in the Blue Creek Seam, as everyone else calls it, I think it's a disadvantage not to have it that, that amount of air to get your section to render harmless the gases. So you've to weigh it out.

You can get statements from where it's more dusty or everything else. If you get down and look at the pros and cons of it and the benefits, I think your benefits outweigh the other one.

The whole key factor to it all is proper separation and proper monitoring. That's the key to it right there. I think there are regulations and plenty of them that cover that already.

DR. CALIZAYA: Thank you.

DR. MUTMANSKY: Linda, how many speakers do we have still remaining

MS. ZEILER: We have several in the NMA block grid. I was going to suggest we take a ten-minute break so we can get ready.

Those that have Power Point presentations need to come and see Kevin on the break; and we can load it all on one computer; and that will expedite the process.

DR. MUTMANSKY: Okay. Thank you.

(Short recess.)

MS. ZEILER: I think we're ready to start again.

Okay. This afternoon we have a group from the National Mining Association and the Alabama Coal Association to speak to the Panel.

First up will be Bruce Watzman, who is the Vice President of the National Mining Association.

Bruce.

MR. WATZMAN: Thank you, Linda.

Mr. Chairman and Members of the Panel, in the interest of time, we're going to try to compress as much of our presentation as we can possibly do.

On behalf of the members of the National Mining Association and the Alabama Coal Association, we appreciate the invitation time to be here today.

We especially appreciate the time that some of the members of the Panel took to go underground and visit Jim Walter Resources' mine yesterday. It's critically important that you have a sense and a visual appreciation for how we conduct our business and why belt air is so critically important.

On behalf of NMA specifically, let me thank you for inviting NMA to appear at each of the public meetings. As you know, we declined until this time to afford the Panel the opportunity to hear from operators using belt air safely and effectively to provide a safe work environment for their miners.

The Salt Lake City Hearings and

the testimony you will hear following me today, we belive, accomplish this objective. The question "why belt air," we believe, is settled.

Belt air has been and continues to be a safe practice to improve the working conditions for miners working at the face. Operators demonstrated at the Salt Lake City Hearing the absolute critical necessity and safety advantages of using belt air to reduce the number of injuries required to sufficiently dilute and render harmless methane and dust away from the working face.

You will hear more about this today from Jim Poulsen who testified at the Salt Lake City Hearing that has come here today to respond to some of the questions that Dr. Weeks had.

In non-two-entry situations, it's demonstrated by the testimony presented earlier by Jim Walter Resources and others who will follow me who will demonstrate that belt air is equally essential to control methane and dust where ventilation resistances preclude doing so in its absence.

While it should not be a consideration in this group, as many in this room are probably aware, some in Congress believe that belt air should be absolutely unequivocally prohibited. They do so without a factual basis or rather on emotion alone.

Your decision will be driven by facts that prove, we believe without question, that belt air can and has been used safely and has enhanced miner safety.

The focus has been and the question that's been asked is: Why is belt air necessary? We think it's equally proper to ask the question: What if no belt air, and what is the factual basis for advocating this view?

The record of these proceedings is clear. The positive attributes of the use of belt air have been shown. They've been shown in the testimony that's been presented and the research results that have been presented to you -- better ground control, enhanced ability to dilute and render harmless methane, better dust control, the use of advanced technologies to provide early warning to miners in the event of a fire in the mine.

Contrast this to a record devoid of a basis for prohibiting the use of belt air. Some point to negative consequences, but we're at a loss to try to quantify this.

Some have talked about increased dust concentrations on the face where air ventilated through the belt is brought to the face, but NIOSH research has shown these increases to be inconsequential. In fact, operators are required to maintain strict limits of the dust concentrations of the air coursed through the belt air that has been brought to the face.

In closing, I would only draw your attention back to MSHA's presentation at the least hearing where they presented the findings of the Aracoma Report, a tragic event where two miners lost their lives.

MSHA concluded for that is that 12 miners escaped because belt air was used to ventilate the face. This should be all the basis required to for you to find that belt air is a safe practice that has and will continue to improve the working conditions for miners working underground, the goal that we all strive for each and every day.

Thank you for the time.

With that, Linda, I'd like to turn it over to the other industry presenters, in the interest of time.

MS. ZEILER: Okay. Thank you, Bruce.

Our next speaker will be

Dr. Pramod Thakur, the manager of Coal Seam Degasification for CONSOL Energy.

MR. THAKUR: Chairman Mutmansky and Members of the Technical Safety Panel, I thank you for the opportunity to speak to you about the merits and demerits of using the belt air for face ventilation.

Many of you know me; but, for the benefit of others, I am a Mine Ventilation Engineer by education and training, and I have specialized in the area of coal seam degasification, respirable particulate control, and occasionally mine fire control.

Since I worked with most of the members on the panel for a long time, you know very well my life's work has been devoted to improving mine health and safety.

Seventeen years, two months, and two days back, my idol, Jack Stephenson of Jim Walter Resources and I commented on this subject in Reston, Virginia and have strongly advocated the use of belt air for face ventilation to make mines safer.

The changes in the coal mining industry during this period compel me today to say, in even stronger terms, that we need the belt air at the face.

Most of you know CONSOL is the largest producer of underground mine coal. We are mostly longwall producers. We do a good job of degasification, but even then we need some air.

My perspective would be to tell you that even if I've taken the gas out of the coal seams, they still need a certain amount of air.

Tommy did such a good job of explaining how the air is conducted, but my ventilation department does a similar job, and they tell me they need all the three or four entries that we have for delivering air to the longwall face.

Except for the past two years,

the price of coal declined in both real and nominal terms in the last 20 years. The underground coal industry survived because of nearly 250 percent improvement in productivity and a substantial improvement in safety.

The most important innovation that led to higher productivity and safer mining is the longwall method of mining. The second most important innovation is coal seam degasification, but for which mines in Alabama and Southwestern Virginia could not be economically viable undertakings.

Today more than 50 percent of all underground mined coal is produced by longwall mining. Driven by safety and economic priorities, the trend for panel sizes and mining equipment in the coal industry is to continue to go forward pushing production capacities and productivity to new levels.

Today, it would be quite

realistic to plan longwall panels that are 1,000 to 1,200 feet wide and 10,000 the 15,000 feet long containing more than 2 to 4 million tons of raw coal. Such longwall panels have many benefits.

The main benefits are:
Improved safety and reduced injury rate because of improved longwall to development coal ratios and fewer longwall moves; improved recovery of coal in the ground; and improved productivity and cost per ton.

On the other hand, these large panels introduce some concerns; for example, ground control, ventilation and methane control, respirable dust control, and escape from the face in case of an emergency.

I submit to the Panel that a careful consideration of these four issues can provide us an answer to the question of whether to use the belt air for face ventilation or not.

Ground control.

Ground control is a function of the local geology, the depth of the coal seams, as well as the longwall face length. The coal industry throughout the world has used one, two, three, and four entry systems to develop the longwall panels.

In very deep European mines, single entry is the norm. In Western U.S., ground control issues do not permit more than two-entry development. In Eastern U.S., three- or four-entry development is common that use yield pillars and a stable pillar to support the gateroads.

Making the development section any wider, as Tom indicated, will slow down the development section advance beyond economic limits. Thus, we need to bring all the air needed to the longwall faces using these three or four entries.

Usually, in thicker, moderately

gassy seams, three entries suffice while in thin but very gassy mines, four entries are needed that use yield-stable-yield pillar design.

Let's talk about ventilation and methane control. My job is to take the coal from the coal seam, measure the gas content, predict the amount of gas that's going to come out, recommend degasification, design the degasification, and tell the ventilation department how much air they will need. That is what I intend to do.

They tell me that if I need that much air, I have to use the belt air in the face, just like Tom explained.

In a recent article, I have discussed this subject in great detail. Somebody in Pittsburgh claimed that all coal seams are gassy, but they vary in their degree of gassiness.

Unfortunately, I don't have a Power Point presentation, but I'll walk you through, and I will paint a picture with my words.

Degasification and ventilation needs for longwall faces are different in different coal seams. I divided all the coal seams into three categories; mildly gassy, which is less than 100 feet of gas per ton; moderately gassy, anywhere from 100 to 300 like you have in the Pittsburgh area; and highly gassy, the mines in Alabama and Southwestern Virginia.

We don't do any degasification in mildly gassy mines. The only mine I had like that was Shoemaker. In all other mines we do pre-mining degasification, during the mining, as well as post mining.

In moderately gassy mines, they remove 50 percent of the gas before mining; and we require about 40,000 air at the tailgate. Air in the bleeders is anywhere from 150 to 250,000 CFM air.

In highly gassy mines, we remove 70 to 75 percent of the gas from the seam before mining. We need at least 60,000 air at the tailgate, and 250 to 350,000 air in the bleeders. This same width has a very high degree of degasification. That's more gas than all the mines Jim Walter Resources' mines produce. That's one mine.

On a 1,000-foot-wide face, it's been our experience that we lose 65 to 70 percent of the air in the gob. If the belt entry is isolated, there will be further loss of intake air. We need every single entry we have to fill get the air to the face. Insufficient air on longwall faces can cause gas layering leading to face ignitions and, sometimes, fire or gas explosion.

MS. ZEILER: Dr. Thakur, I'm sorry to interrupt you; but we need to adjust your microphone.

MR. THAKUR: Thank you.

Can you hear me now?

Air requirements in a

development section are lower than that for the longwall panels.

The Jim Walter folks did such a good job on it, that I don't want to belabor the point.

To sustain a development of 10,000 to 15,000 feet, we need the highest ventilation essential quotient that this amount of air that's needed in the face divided by the amount of air you have at the mouth of the longwall that is multiplied by 100. So that's a very high percentage, 50 to 55 percent at least.

If belt air entry is used as a secondary intake, it will reduce air leakage and enables the operator to achieve the highest VEQ. Again, this can be easily verified by ventilation simulation.

There's another reason why we need the belt entry. Eastern coal, as you know, is very high in methane. Methane accumulations and gas layering in belt entry is a distinct possibility in Eastern U.S. coal mines.

Using the belt air at the face will enable a larger quantity of air to flow through the entry and eliminate any danger of gas layering.

Respirable coal dust. Somebody already mentioned that. There was a question that was of concern. Well, if the air is going over the belt and the velocity is high, one of the drawbacks of using belt air at the face is a potential increase in respirable dust concentration. It is possible if proper dust control measures are not used.

However, actual records indicate the mines where they use the belt air at the face have been able to comply with the legal requirements. Keeping the coal dust wet and the air velocity below 1,000 feet per minute will minimize this problem.

Last, but not least, detection

of fire and escape from the section. All belt entries are protected by CO Monitoring Systems, but using the belt air at the face provides a redundant detection system.

Someone asked the question, can the nose be duplicated electronically? I doubt very much whether you can duplicate the nose. The nose is very sensitive. There are some compounds that come out from coal heating. Some you can detect them with your nose at one in a billion, even one in a trillion parts per minute. There are no instruments now that can go that low.

Also, it has to be a special nose. I have one of them. So I know.

Spontaneous combustion or an incipient fire can be smelled at the face long before a CO monitor alarm can be relayed to the face.

There's one more thing I want to say from when I talked to DR.

MUTMANSKY. CO alone doesn't tell you that you have a fire. There's a lot of things in the mine that can give you a false CO reading, especially if you've hot air like in Alabama and Virginia. They have propane.

These things are detected through the handheld CO monitors and other monitors working on similar principals out of here. In my 33 years in CONSOL -- many, many times I have been called at midnight, "We have a fire, come over here." We go down and see 300 parts per million. When you take a sample and analyze it, it's basically 5 PPMs or 1 or 2 PPMs higher than the background.

I ask the Panel to put your faith in that and nothing else. It's a good alarm system. If your dog is barking, something is there. Go out and check. The dog may be hungry or whatever else, but it doesn't mean a fire.

Air traveling in the same

direction as water flow provides a safer and faster access to water lines in an emergency. Emergency people and equipment can get closer to the trouble area, and water line integrity can be better maintained if the belt air is flowing to the face.

Belt inspection, maintenance, and visual detection of hot spots becomes a lot easier if larger volumes of air are flowing through the belt entry. If the belt air is used at the face, it provides an additional intake escapeway.

For extended longwall panels with a length of two to three miles, it is a distinct advantage. Such escapeways, when equipped properly with breathable air and lifelines, can considerably improve the chances of a safe exit from these sections, in case of an emergency like a fire.

In summary, I'd like to say continued success of underground coal mining depends on safe and efficient mining techniques; for example, longwall mining.

I know it can solve longwall mining, entire degasification, and selling insurance in South Dakota.

Ground control needs dictate that development sections can have only a limited number of entries; usually, two, three, or four; but no more.

Ventilation simulation can show that even with the largest available fans, it would be essential to use all available airways to provide the necessary volumes of air to the longwall faces.

Adequate respirable dust control techniques must be used to prevent any dust pick up in the belt entry. Air velocity in belt entries should not exceed 1,000 feet per minute, in my opinion. Dust pick up will start around 800 feet per minute if the coal is moist.

All belt entries should have a

reliable CO Monitoring System. Again, it's just an alarm, a dog barking. You've got to go verify what it is, take a sample, and analyze it. The index I live by and die by is not the CO index.

My old friend Don Mitchell used to tell me to watch both. You watch the trend of CO, as well watch the ground ratio. If both are increasing, you've got trouble.

All escapeways should be provided with lifelines, and self-contained self rescuers, and breathable air. Needless to say, training is very good for them.

So I would say belt air can be and should be used to ventilate working faces because it makes underground coal mining and escape from longwall face fires much safer.

Thank you. If there are any questions, I'll be glad to answer them.

MS. ZEILER: Thank you very

much.

The next speaker will be David Decker. He's the General Manager of the Brooks Run Mining Company, a subsidiary of Alpha Natural Resources.

MR. DECKER: Good afternoon. My name is Dave Decker. I work with Alpha Natural Resources. On behalf of my company and the National Mining Association, I appreciate the opportunity to address the distinguished panel and provide comments relative to the use of belt air in underground coal mines.

I have a couple of tough acts to follow here. Nonetheless, I hope I can make some important points to you. My comments are certainly more general than the previous two presenters you've seen, but I think they are important.

Alpha Natural Resources is a relatively new company compared to most in the Eastern United States. We mine on properties that have historically been mined by the more traditional larger mining companies that have since either been acquired by other companies or simply gone out of business.

While we are a young company, we are not unlike nearly every other operator in Central Appalachia in that most of us are all mining reserves that are either immediately adjacent to, above, below, in between, and in some cases through old works.

That creates a tremendous strain on resources; not just economically, but from the practical aspect of engineering coal mines to successfully mitigate the associated issues that come with that.

The ability to use belt air to ventilate our active faces provides one area of flexibility that enhances mining in a mature coal field.

For a quick overview, we have operations in Kentucky, Pennsylvania, Virginia, and West Virginia. We mine, prepare, and sell approximately 25 million tons a year by operating 38 deep mines, 27 surface mines, and 10 preparation plants.

All of our deep mining is room-and-pillar-type mining. We use single and supersection continuous miner fleets using continuous haulage and shuttle cars to transport the coal back to the belt line.

Our mining height ranges anywhere from three foot to eight foot; and not all of that is coal, I might add, just to be clear on that.

Face ventilation is provided by sweeping air or fishtail-type ventilation schemes by splitting the intake air to either side of the faces. So that depends on the type of face operation. Typically, our operations are outcrop access or drift mines, although we do have some slope and shaft access mines.

We use both positive or blowing ventilation pressure and exhausting negative pressure at these mines. Ten of our mines currently use belt air interface to supplement the primary intakes. We have four of these in Pennsylvania, using both continuous haulage and shuttle cars.

Continuous haulage, by its very nature, makes it almost impossible not to use belt air in the face. Some of the mines have more than one unit mining in different locations. In one of our mines, Kingwood in Northern West Virginia, has four individual units running full-out supersections.

All of these seams, with the exception -- all these mines, with the exception of two of them, are in gassy seams. In order to provide the required volumes to these active faces, we need to use belt air. The inability to do so would render these boundaries uneconomical to recover.

When we have mining going on around older works -- and, unlike the previous two speakers, we are closer to the surface -- we need the capability to reduce the number of airways. It's not all just a function of the volume of the air, but sometimes it's mitigating geology.

Again, if we were unable to make use of belt air interfaces, we would have to drive the additional airways to overcome the resistance to ventilate. In essence, an additional split. More entries, in turn, creates a Catch-22 situation where we start to reach the critical span of the overlying rock strata; and it becomes hard to control the entries.

From that aspect, it's not just a matter of having the area in the room to do it, even in lower cover. In many cases, where we have to squeeze in between old works or sometimes in addition to old works, we have to mitigate the undulation, rolls in the seams, and address a pressure bulb from an overlying or an underlying barrier panel that presents problems to us.

Again, additional entries become extremely difficult, and they are not without expense when keeping them open out by us. When we get the greater depths, going outby and maintaining all the entries, it's a major problem for us.

As some of the presenters coming up next will say, they have some of the similar issues that we have. Again, in younger coal mines, you have numerous inconsistencies in the seam conditions.

Roof conditions, problematic outlying, or maintaining more than seven to nine entries, in good conditions, we can do that. Again, that's the exception, not the rule.

Belt air allows you more volume pressure for use in the face. Monitoring systems, I don't think there's any doubt that those are impressive tools that we can use in addressing the use of belt air.

It allows us to use the air in the face behind the face curtain, instead of trying to balance between all the entries that we would have to drive. With continuous haulage especially, it is extremely difficult to keep the belt air out of the face.

In roof issues associated with the greater widths with more entries, if we can use the belt air, we don't have to provide a greater volume. We have more pressure to use at the face, less total pressure, less leakage between our airways, and a better balance.

In conjunction with the use of these CO systems, I believe it's a safe way of ventilating coal mines; and it provides a higher pressure and volume where it's needed the most, at the mine face.

Thank you for your time. Any questions?

DR. MUTMANSKY: Mr. Decker, in a room and pillar mine where you have the options of either using belt air at the face or using other systems, have you ever done an economic analysis of a mine ahead of starting the mine, where you're beginning to plan the mine and you do an analysis where you investigate the costs of the mine throughout its lifetime using belt air at the face with the necessary costs of adding an AMS system to the mine versus a mine where you don't use the belt air at the face but are not required to use an AMS system?

MR. DECKER: I'm like the guys from Jim Walters. I think the use of AMS systems is prudent irregardless. I like the notion of being able to monitor things other than CO.

Now, we don't have them in all of our operations, of course. To answer your question specifically, I have not; but I lean toward the use of the

Monitoring Systems period.

DR. WEEKS: I have a question. I think the original thinking behind the prohibition against using belt air to ventilate face is that if there's a fire in the belt, the smoke goes to the face; and belt fires are not uncommon.

How do you -- when you go to start using belt air, how do you deal with that particular problem?

The AMS system is going to detect fires, but it's certainly not going to prevent them. So, if you've got a fire in the belt and you're using that entry to ventilate the face, what then? How do you deal with that?

MR. DECKER: Our outside person would detect an issue from an alarm. We would be in contact with our people underground, and they would go back to the primary escapeway and look over into the beltway and try to determine the cause of the fire. We can access it from the outside and go toward it.

If it's not known and the smoke goes to the face, obviously, we would have the same issue. We'd call or communicate with others outside and draw on our people from elsewhere in the mine or at the face to go back at different locations and assess the situation.

DR. WEEKS: You know, if the belt entry were not used to ventilate the face and if there's a fire in the belt line --

MR. DECKER: Without an AMS? Without an AMS system, you're saying?

DR. WEEKS: No. I'm just saying if the belt entry is not used to ventilate the face and there's a fire on the belt. I mean, I think the whole reason behind the prohibition was that you didn't want that smoke to go to the face where the miners are.

MR. DECKER: Right.

DR. WEEKS: I mean that's

another way of preventing the smoke from going to where the miners are.

MR. DECKER: It would have to be detected on an inspection that happens throughout the shift and addressed accordingly, based on the location, of course, and the relative positioning of our outby people in the face, wherever it might be closest.

MR. ZEILER: Thank you, Dave.

Our next speaker is --

DR. BRUNE: I have one more question, Dave. If you would, just briefly explain why in the case of a continuous haulage system it is almost impossible to route the belt air away from the face. I think we'd like to hear a little bit more about that.

MR. DECKER: You have a breach system that extends from the miner back to right on top of the belt line. As that carrier on top of the belt, the Long John, moves back and forth, it advances up and down and through curtain on a continual basis. It's very difficult to seal that air off.

DR. BRUNE: Okay.

MS. ZEILER: Our next speaker is Patrick Leedy, the Manager of Engineering for Lone Mountain Processing, Incorporated, a division of Arch Coal.

MR. LEEDY: Okay. Good afternoon. My name is Patrick Leedy, and I'm the Manager of Engineering for Lone Mountain Processing, and Lone Mountain is a division of Arch Coal.

I'm a graduate of Virginia Tech with a BS in Mining Engineering. I am a Registered Professional Engineer.

During my career, I've worked at several coal operations; and several have used belt air. I appreciate the opportunity to stand before this panel today and speak about the use of belt air at Lone Mountain Processing.

I wanted to respond, before I

start into my presentation, to DR. WEEKS' question to Mr. Decker just a minute ago about the prohibition on belt air.

It's my recollection that the belt air prohibition was put into effect before the AMS systems were available or to the point that they are now, and I would think that that was one of the reasons for that prohibition at that time. We didn't have a way to monitor for fires on the belt line, as we do now. Due to that, I think that makes a big difference now.

Okay. As I said, Lone Mountain Processing is a division of Arch Coal. We operate three underground coal mines in the State of Kentucky and one preparation plant and rail load out in the State of Virginia.

The coal is actually belted up the mountain, through the mountain, and back down the mountain across the state line into Virginia.

All three of our mines are continuous miner room-and-pillar-type operations. We basically drive a main line system, and then we develop panels and retrieve those panels off our main lines.

We use five sections, and -- we use sevens sections total. Five of those sections utilize continuous-haulage bridge systems. They are generally mined at a height of about five feet.

Our other two sections utilize shuttle-car haulage, and they're generally a height of about 15 feet. You can see that on the slides here.

We have an employment of around 375 people, and we draw employees from the areas of Eastern Kentucky, Southwest Virginia, and East Tennessee.

We are a multi-seam operation. As you can see on the lithologic section that's shown on the slide, we mine in the all Owl, the Darby and the Kellioka coal seams.

As you can see on the slide, the Owl seam is located quite a ways down in the lithologic column of the area we're located. You've got the Owl seam here, and then about 50 feet below that, we've got the Darby seam. Another 50 feet below that, we've got the Kellioka seam.

There's mining in all three of those seams, plus the Harlan seam, which is shown below that. That's been mined in a lot of places in the area.

The Darby Fork Mine, which is our mine, is operating in the Darby seam. Out Huff Creek Mine is operating in the Kellioka seam. The Clover Fork Mine is operating in the Owl and Darby seams combined.

That's an area where our Owl and Darby come together. Generally, they're 50 feet apart; but, in that area, they come together to make the coal seam that I mentioned that was about 15 feet in height.

Then, we have a neighboring company that's not part of our company. They are a neighboring company, and they operate in the Owl seam. They are on top of our mines.

If you will look at the next slide, you can see the mine layout that's shown on the map here. What's in the blue is our neighboring company, the company that neighbors us. They're operating in the Owl seam in the northern part of our reserve area.

Our Darby Fork Mine is shown in the red colored workings, and the Huff Creek Mine, operating in the Kellioka seam, is in the gray and black workings that you can see. That's on the bottom. Down in this area, is our Clover Fork Mine, and it's operating in the Owl and Darby seam.

You can see how all the workings are stacked one on top of the other, especially in the panels. You can see across there, there, and there. We've actually got three coal seams with workings stacked one above the other.

So our layout is constrained by previous mining. Whatever has been previously mined and whatever is mined now, the mining underneath or above that is going to have to follow the same pattern.

Our typical method of mining is to drill five-entry panels with full length, and we recover the pillars during retreat mining. You can see, in this more detailed look at the maps, the upper seam.

I think this is probably where the Owl seam was mined up and retreated back, and then the Darby has followed it up and then retreated back. Then, the Kellioka, at a later date, will follow underneath that.

Those are separated by a barrier pillar. The barrier pillar, that's an area where you can have sever stresses. For the panels above and below, you have to stay within the subsiding shadow of those panels; or you're going to risk some pretty severe stresses out in those barriers.

Let's talk about ventilation constraints. Both our Darby Fork and Huff Creek Mines typically employe a five-entry layout, as shown. When possible, we use return on each side of the section, as you can see here and here.

Then, we have a belt line, of course. Then, we run an entry that is common to the belt line. That's used for our roadway. We use rubber tire diesel, man trips, and then we use one single intake entry.

Why do we have to have the roadway in a separate entry from the belt? Well, the biggest reason is because we use continuous-haulage bridge systems where the haulage system comes out of the base and connects to the tail end of the conveyor belt; and there's no room to get the man trips by there. So that's the biggest reason that we have to use a separate roadway for the belt entry.

Another reason is for supply storage, other things such as that, which we need to store in the neutral entry there, the neutral belt entry. So, for those reasons, we have to -- we're limited to really only one intake entry.

DR. TIEN: Did you say you use continuous haulage?

MR. LEEDY: Yes.

DR. TIEN: Is the entry crosscut from 45 degrees?

MR. LEEDY: They are in 45s, yes. That's just a typical layout that's shown. Typically, we do mine a 45.

We do mine 90, at times; but, generally, it's a 70-degree crosscut.

Okay. As I've already said, the bridge sets only allows for one entry for intake air using the five-entry system.

At our Darby Fork Mine, again, in the Darby seam. I mentioned we have the Owl seam up above, and then the Darby, and then the Kellioka seam.

The Darby generally has several areas that have sandstone very close to the coal, plus it's operating in cover -- depths of cover as great as 1,500 to 2,000 feet. So it's prone to bumps in certain areas. You can see that on this map that I've shown.

We tried a six-entry system back in 2003 and had a severe bump in this location. One of the reasons that -- during the investigation, one of the reasons that was attributed to the bump was the width of the panel. So, for that reason, we limit the panel width to five entries.

Can we increase the number of entries? We don't feel we can and keep bump control where it needs to be.

Also, in our Darby Fork Mine, we have a history of areas that contain sandstone roof and in the coal seams in several other places where we have limited thickness of the seam.

The seam in those areas may be reduced from -- a normal seam height is, say, 50 inches or so. It may be reduced to 24 inches of thickness. It's very hard to cut the roof for it. A lot of times you'll have real hard floors to go along with that.

As you can see on the map in these red and yellow areas through here, we have some low coal and sandstone here, through here, and down in this area. What does that do? That lowers the mining course and causes additional resistance to our ventilation system.

Okay. At our Huff Creek Mine, as I said previously, each of these seams must remain in the footprint of the other.

So Huff Creek has got to remain in the footprint of the overlying Darby workings. Again, this necessitates using a five-entry layout.

Also, at Huff Creek, they have a large area of sealed works. Oftentimes, we must skirt around those existing old works while staying in the footprint of the Darby seam. So this created areas where we may only have three entries or four entries, and it's caused some bottlenecks in our ventilation system.

There's a couple of examples here. You can see where we've got a three- entry system. Here's four entries here. This is actually our main line system that we're using for the section that comes up and out.

As you can see there, it goes back to the working station. So, with those three entries, we are very constrained there.

There are additional

restrictions on both the Huff Creek and the Darby Fork Mines. They've been in operation since the early '90s. I think they started in 1991. Their working sections are deep. They are four to five miles from the slopes and shafts.

This entry length that you're going to have from the slopes and shafts further adds to the ventilation resistance.

Just a quick summary of some of these constraints we've had. We've had mining within the footprint of a previous mine. We only had one entry available for intake in a five-entry system. Bump prevention does not allow for widening of our panels. Reduced coal thickness and sandstone roofs are in the Darby seam.

A lot of times, we have to skirt around old works while staying within the shadow of previous mining; and, as I just said, there's also distance that we've mined underground away from the slopes and shafts.

So what do we do to have enough ventilation to ventilate the sections? We're using belt air at those two mines, at Darby Fork and Huff Creek. By this use of belt air, again, we provide additional entries; and those entries, in turn, provide higher volumes of air at the working face.

What's the key to using belt air safely? We feel that fire prevention and preparedness is a big key to using belt air and using it in a safe manner.

Number one, we make sure that -- well, we have a CO system, of course, a CO Monitoring System. It remains operational during -- continually each shift. It's installed along the belt line of each mine.

We have, of course, an operator that monitors that outside. The operator can communicate with the sections any time there's an alarm that needs attention.

We do preshift and on-shift examinations of all our belt lines. Again, that's each shift. Those are going to identify any areas of concern, any hazardous conditions that we may have along the belt lines.

We have fire suppression systems at each drive. Again, those are heat activated to where they will automatically make a -- they are fire deluge systems. So they are going to try to put out the fire at the first sign of heat that activates those.

We have fire fighting boxes where -- those are located at each belt drive. The hoses are connected with nozzles on the end. All we have to do is pull them out of the box and hook them up to the water line, and they're ready for someone to fight a fire.

We, of course, perform regular servicing of our drives or take-ups and head and tail pulleys. That's keeping our areas clean of dust, oil, grease build up, and helps prevent any bearing failures that would possibly cause heating. Of course, if we have coal spills, we promptly clean those up.

So, again, we feel like preventing a fire and being prepared for a lot of the fires is certainly a key in the safe use of belt air.

Something I didn't list on here but something that we also do is our safety drills with our section crews. We, of course, practice fire fighting, but also evacuation drills in case there was a fire. So we do have evacuation drills with the crews to show what to do in case there was a fire in the belt line.

I mentioned that Darby Fork and Huff Creek do use belt air, but we also have the Clover Fork Mine, and it does not use belt air. As I've already said, it's got a mining height of about 15 feet; and it's mining faces are not that deep.

We haven't had the need to use belt air at that mine. So we don't use it there.

Are there any alternatives to belt air? I was thinking of a couple of things and wondering if we could do these. One is upgrade our main fan. Each one our mines are ventilated by an eight-foot Jeffrey fan that's powered by a 500 horsepower motor.

A fan upgrade would supply more air at the source. The problem is delivering it to the working sections.

What are some obstacles we would have? Number one, the distance underground to the working face. Number two, numerous stoppings, overcasts, and the associated leakage with that. Number three, a limited number of entries. Number four, limited entry height in areas where we've got sandstone. Number five, stoppings at the shaft or slope bottom that may not withstand the increased ventilation pressure.

What about additional air shafts? Someone could say "Add some air shafts to the back of your property." Much of our cover is 1,500 to 2,000 feet. So that's a very deep area to install additional shafts.

Much of the surface is very remotely located to put -- say, if we put a fan there, it would be very difficult to get electrical power to that. Due to our ever changing seam conditions and uncertainness of mining two certain areas, preselecting a shaft location is very difficult.

Okay. In summary, belt air has been used successfully to help ventilate the working faces of the Darby Fork and Huff Creek Mines. We know of no other viable alternative that exists to supply ample air to the section.

Through the use of a CO Monitoring System and the other fire prevention measures that I outlined, the welfare of our personnel are protected. So we highly recommend that belt air continue to be available to ventilate working faces.

I will be glad to take any questions.

DR. BRUNE: In your schematic, you have two entries common with the belt; the belt entry, what you called neutral, and only one entry isolated intake.

How do you manage to keep the isolated intake pressurized over the belt to avoid or to prevent the belt that's contaminated with smoke from migrating to the intake?

MR. LEEDY: We do have doors that we have to install along our belt line from place to place, you know, as need be. To keep that from happening, we'll put a door there to slow down the air going to that.

DR. BRUNE: Okay. So you do

introduce additional resistance in the belt entries?

MR. LEEDY: That is correct, yes.

DR. TIEN: Is there a reason you use fishtail as opposed to --

MR. LEEDY: We do that sometimes. Using the continuous haulage, our ventilation is much more effective using the fishtail ventilation, as far as dust control goes.

Also, for our roof boulders, the dust control is much for effective for our roof boulder operations using the fishtail ventilation.

There are areas where we do have to use the sweep ventilation, from intake coming up the right side and return coming down the left side, generally.

DR. TIEN: Even with an additional set of stopping lines?

MR. LEEDY: With additional set of stopping lines?

DR. TIEN: Yes. To use the fishtail, you've got return on both sides. To isolate the belt and track, it looks like you have --

MR. LEEDY: I'm not sure I follow what you're saying.

DR. TIEN: You have this set of stops here. I'm talking about with the fishtail, you have an additional set of stoppings. Do you think it's worth the additional cost?

MR. LEEDY: Right. The fishtail does require another stopping line, exactly. Right. We do feel like it's beneficial to do that.

DR. MUTMANSKY: Are you using the continuous haulage system, even in the high coal mine that you have, whatever the name of that one is?

MR. LEEDY: No. In the high coal mine, we have three sections in it. Two of the sections -- two of the sections are high coal, and the other section is in the lower seam only as the seams split apart. We're using the continuous haulage on the low section and the shuttle cars on the two sections.

Any other questions?

DR. WEEKS: I want to get around to responding to what you said at the outset of your comments. I think it's a very useful discussion to have, and I have a couple more specific questions for you.

To start, at the Darby Fork Mine, you said that limiting the panel would help to control the occurrence of bumps. This is an issue that a lot of operators in Utah raised, as well.

It makes sense, frankly; but it's not convincing because there's really insufficient detail. There's no data kept on bumps, when a bump occurs.

I just wondered if you have data, like "We did it this way, and we've got so many bumps. We did it that, and we got so many bumps."

It would simply be much more convincing if you have some real information about what the concrete improvements were doing it one way versus another, in terms of these bumps. I think that was the problem with the operators in Utah, as well.

Do you have any more detail on that? Do you keep records on that sort of thing? Is that stuff that you could share with us?

MR. LEEDY: No. I really don't have any records specifically that would show that; but I will say that in the investigation, the resulting -- you know, in the conclusions from the investigation. I guess these were investigations done by both consultants that we had hired plus MSHA Tech Supporters.

I think the modeling that they did showed that the increased width did contribute to the bump. They ran the models using -- I forget the name of the simulation program that they used to model that.

DR. WEEKS: Was that Agapito?

MR. LEEDY: No. There was another one we consulted with.

MR. MUCHO: Jim, let me comment on the bump statistics. There is a bump database with statistics that was put together by NIOSH that's available. We can get that for you. That was kept over statistics kept on the bumps that occurred over the years.

The key points from that have been researched by a number of people; and conclusions were reached as to the impact of overburden, impact of strong strata, the interactions of a number of those factors.

So there's a quite a library of research, really, which has ended because we developed mine designs that have fairly well addressed these issues in the United

States. It's not the issue that it once was, but we can get a lot of that data research and so forth along with the bump database information.

DR. WEEKS: Some of the information that we saw in Utah was modeling data, which is one -- it's one source of information.

The other is real data, which is the actual occurrence of these events in the field. If the database is real events, that would be quite useful to see that and see that in relationship to different methods of mining.

If it's modeling data -- well, as I said then, if that's the best we've got, that the best we've got. That's simply not the same.

MR. MUCHO: That was the original approach, really, was to use the empirical data, Jim. We found that generally bumps don't occur at overburdened depths of less than 1,000 feet or, 1,300 sometimes. We started to see the impact of the strong strata and how that impacted bumps, how the two interacted together.

So that was the original approach, and really modeling and those kinds of approaches have been more recent looks to kind of verify a lot of the empirical looks that were done early on.

DR. WEEKS: Well, yeah. Okay. I'd like to get that data, if you can put your hands on it, Tom.

MR. MUCHO: We can get NIOSH to supply that data. So Linda ends up with that assignment.

DR. WEEKS: The other question I had was from your discussion of fire prevention preparedness.

Have you considered using belt material that is more resistant to burning than the material that is currently used as a method of fire prevention?

MR. LEEDY: I would -- I'm not

sure about the answer to that question. I think we would certainly consider it if the strength characteristics of the belt was up to where the current belt we use now is. If we can get a stronger belt that had higher fire resistance, I'm sure that's something that we'd consider.

DR. WEEKS: Right. That's what the other folks at Jim Walter said. I certainly agree with that. It would have to be able to conform; but, in order to prevent belt fires, it would be useful to have belts that didn't burn.

MR. LEEDY: I agree.

DR. WEEKS: Let me go back to the comments that you made at the beginning. Let me just pursue this.

As I mentioned before, the original reason for prohibiting the use of belt air was to prevent fire and smoke from going to the face. You said that was before AMS systems came along. That's certainly true. I think the AMS system is definitely a step forward in mine safety.

The question is: Does it prevent smoke from going to the face? Does it, in fact, prevent belt fires? There's very little evidence that it does. In fact, if we look at the frequency of belt fires over the past 20 years, it's virtually unchanged.

So whatever is being done to prevent belt fires, whether it's this list of things that you mentioned or belt material or AMS systems or whatever, it doesn't appear to have much impact upon the occurrence of belt fires.

So that's just a problem, if we're going to prevent fires rather than merely detect them. When I was talking about occurrence of reportable fires; that is, 30 minutes or more, there is very little reliable information about fires that are not reportable, primarily because they're not reported.

So I don't see the solution to

that problem, and I don't see what the AMS system does to -- it doesn't appear to have much affect on the occurrence of belt fires.

MR. LEEDY: It should provide early warning.

DR. WEEKS: Right.

MR. LEEDY: By doing so, the section crew would be contacted to evacuate; and then they evacuate out the primary escapeway.

DR. WEEKS: But what do you view as early warning? If a fire burns for 30 minutes, and thereby becomes reportable, surely we can do better than wait 30 minutes before -- you know what I mean? It's a problem.

MR. LEEDY: I guess if the CO is -- I would think CO is the main concern, as far as injury or fatalities for smoke coming up on the section. As we've heard previously, those CO detectors are going to detect even minute levels very quickly.

DR. WEEKS: Considering that is the case, then early detection should lead to early control.

MR. LEEDY: Right.

DR. WEEKS: It doesn't seem to have worked.

MR. LEEDY: I don't know why that would be. I don't think that would be the case at our mines.

DR. WEEKS: Maybe a closer examination of the data on the belt fires over the past several years would reveal more about why that they occur; but, if we're going to use belt air and the expectation is that we're going to prevent belt fires by early detection, I don't see it happening. I don't quite know what to do about it.

One thing to do about it is to improve standards of belt materials so that they don't burn.

MR. LEEDY: And then doing your

maintenance along the belt system. That will allow -- doing the maintenance will allow bearings to run hot and will keep the spills cleaned up and that kind of thing.

DR. WEEKS: But maintenance is obviously a key issue, and it's required now regardless whether there's belt air or anything else.

MR. LEEDY: Right.

DR. WEEKS: It's like -- maintenance is like motherhood. You should love your mother. You should maintain your mine. The point is everybody pays lip service to it, but there are a few mine operators that don't. It just creates a problem for the whole industry.

DR. TIEN: Jim, I'm just wondering if it is true that the number of fires -- the frequency over the past 20 years remains relatively similar; but, if you look at the coal production, it has actually doubled or at least increased dramatically.

So, as for performance, are we doing better; or are we doing just as bad?

DR. WEEKS: I think we're doing the same. I don't think the coal production is a useful denominator in this particular instance.

DR. TIEN: Well, if the coal production has doubled or whatever the percentage of increase is, you must have increased that many activities of that. If there is a constant number of fires -- I'm just wondering and thinking in that direction.

DR. WEEKS: Let me be specific. It's not the number of fires. It's the number of mines per thousand mines because the number of mines has gone down.

The straight number of fires has gone down, but so has the number of mines. So, if you calculate that in terms of the number of fires per thousand mines, it's about constant.

The best way to do it would be the number of fires per miles of belt. You could get more sophisticated or however you want, but, you know.

DR. TIEN: Well, that's right, per mine. Our mine is getting bigger, too. It used to be a mile-long mine. Now, it's a five-mile long mine.

DR. MUTMANSKY: May I suggest to the Panel Members, that that's a good topic to take up in subcommittee in upcoming weeks.

It's basically a philosophical question. It's a good question to bring. It's a good thing to study and take a look at, but maybe we should let Patrick off the hook on this one because it's something we have to decide.

MR. LEEDY: We do have several other speakers.

MR. MUTMANKSY: In that case, we probably should move on. Thank you very much.

MS. ZEILER: Our next speaker is Greg Dotson, Mine Manager at Mingo Logan Coal Company of Arch Coal.

MR. DOTSON: Good afternoon ladies and gentlemen, Member of the Panel. I appreciate the opportunity to come and provide some comments related to the topic of belt air in the face.

When I sat down and looked at what I was going to present today, I sat down and decided there were three major topics that I wanted to touch on that I thought would be significantly improved by using belt air in the face. Those are: The overall mine ventilation, the roof control, and the belt inspection and maintenance.

When we're talking about the overall mine ventilation system, we're talking about how much air is actually being delivered by the belt entry, which is limited by more air being directed to

the working face by the intake, which is
pretty much what this is.
Also, the belt entry is not
used as a primary escapeway in the mine.
So that affords two opportunities. Your
belt entry can be used as an escapeway, as
well as a primary escapeway.
In addition, I believe that the
use of belt air for face ventilation
results in a more efficient ventilation
system, as well as giving you additional
methane dilution in the mine.
We talked a little bit about
carbon monoxide monitoring and atmospheric
monitoring. I think everybody here in the
room agrees that there is an added benefit
to using AMS systems.
That gives you an opportunity
to detect carbon monoxide, methane, and
other harmful poisonous gases, as well as
giving you an opportunity to get early
detection in case there is some type of
thermal event of obstacle or issue in your

belt entry.

In addition, there's something that I skipped right here. Utilizing belt air for face ventilation does add additional fresh air to the intake of your actual working face, rather than diverting it to the return. So that's air that you can use to render harmless and sweep away harmful gases and dust.

Back to the atmospheric monitoring. We utilize atmospheric monitoring at the Mountaineer II Mine. We have trained qualified personnel at our operation. They are there 24 hours a day, seven days a week.

We also have audible and visual devices on the working section to advise our workers in case there is some type of event that they need to be notified of. Again, that's back to the early detection.

Also, their AMS system monitors our intake airways. Again, it gives an opportunity to have early detection.

In summary, as far as our overall ventilation, I think the usage of belt air in the face does a couple of things for us. It gives us additional air to help dilute the methane and harmful gases and things like that; and it enhances our ventilation system.

As far as roof control, the first thing I want to talk about is that as our coal reserves are being depleted, the industry is continuously having to tap into reserves that have more geologic challenges.

That could include things like deeper cover, overmining, undermining, rider seams, weaker floor, weaker roof, and a lot of other different issues. In doing so, one of the major ways to combat these geologic challenges is to minimize the number of entries and increase the pillar and narrow the entry widths.

In doing that, it becomes very necessary to utilize belt air so that you can achieve the required volumes to dilute the methane and sweep away harmful gases and sweep away the dust.

This is a typical geologic cross section at the Mountaineer II Mine. We intend on mining this seam, which is the Cedar Grove seam, as well as this mixture of seams, which is the Alma seam.

The inner burden between these two seams is approximately 35 feet. In areas where second mining is going to be conducted, longwall mining, remnant pillars are going to be left, barriers are going to be left, and things like that.

It becomes essential to minimize the number of entries while you're developing under the remnant pillar barriers to sustain the roof in this seam. Not only that, you can see this is kind of a hodgepodge of splits of the Alma. It's the Alma 1, 2, 3, 4, all the way down to the Alma 6.

The seam that we are

predominantly mining or the split that we are predominantly mining is the Alma 2 through Alma 4. So you can see we've got a rider seam that pretty much continuously lays over our reserve, as well as a hanger seam underneath us.

In areas where we've got low cover or extremely high cover, it's essential to build a narrow entry and take as few entries as possible to maintain adequate roof control and to minimize floor (inaudible.)

In addition, as far as roof control, without the use of the belt air for face ventilation, additional overcasts and additional rockwork would have to be required to sustain our ventilation system.

We believe that that increases the exposure of our employees to hazards related to excavations, highs, overcasts, and explosives.

Now, I'll talk about belt

inspection and maintenance. In a lot of mines, the belt entry is often common with the track entry when belt air is used for intake face ventilation. This allows easy access for inspections, detection of problems, cleaning, maintenance, rock dust, and things that we know that we need to do.

Without this being common with our other entries, this practice could be compromised and could make maintaining the system more difficult; and we think it's the right thing to do. We want to maintain our system, and we believe that prevention is the correct way to combat issues with belt air.

In addition, we've talked about our Atmospheric Monitoring Systems that can monitor for a number of events. Well, there's also another system of monitoring that we believe is your sight, your sound, and your smell.

If you're traveling in an

entry -- our belt entry is in the number four entry. Our track entry and hallway is an adjacent entry. You can see that there's no stoppage in between it.

As you travel in and out of the mine every day, you have an opportunity to use those three basic senses. You use your sight. You can look right at the belt, and can see if there's an accumulation of float dust or debris underneath the belt that needs to be cleaned.

You have an opportunity to use your ears to hear if there's a roller stuck or if the shell on a roller has been damaged or deteriorated, and you can smell to see if there is some type of event occurring up there.

So, without the utilization of belt air in the face and keeping these entries common, that would be compromised. Again, we believe that that is a necessary means of early detection.

Everybody in the coal mine travels in and out this same travel way. They travel adjacent to our belt entry. So everybody that goes in and out of the mine has an opportunity to use those three things, regardless of the AMS system.

Again, I've been going in and out of the mines; and I've heard belt rollers that have sweeping, shells that have been shattered. You get down in the mine and shut the belt down because we've got a problem, and it happens on a routine basis. There's also fire to the belt without knowledge, if this entry is isolated.

This also shows our typical ventilation, and these yellow dots here -- I think you can see them pretty well on your hard copy -- shows where we do Atmospheric Monitoring along our belt system. As you can see, a lot of these are redone.

We've got an inby and an outby

at our belt heads. We've got them along our drives and power centers. We've got them along our intake course and up the required 1,000 feet along our belt and intake.

So there's a lot of monitoring that goes on throughout our system to give early warning. We believe that Atmospheric Monitoring maintenance and inspection and it being common with our travelway where people can see, hear, and smell it every day is the best means to prevent any issues with your belt entry.

This is kind of what it would look like without belt air. Again, a numerous amount of stopping lines would have to be constructed, as well as additional overcasting in this area.

What you would have to do for people traveling in and out of this mine that no longer get an opportunity to look at that is that you would have to rely solely on atmospheric monitoring or one person traveling in and out this beltway, one per shift, during your preshift and on-shift examinations. So you're limiting it to one person's opinions versus everybody traveling in and out of the coal mine.

Last but not least, miscellaneous topics. Just to reiterate some of the things that you've heard earlier on today, the engineering development in most mines has already been done.

It's the same as what we've done at the Mountaineer II Mine. We sat down and did an evaluation. How do we want to design this mine? In how many entries do we want the belt in our mine? All those things were considered.

We were fortunate enough early on to be able to design our mine so that we could utilize belt air in the face based on the previous regulations.

Most mines are considerably

deeper than what we are and have design systems based on the same premise that they were allowed to use belt air in the face. If that was to be changed abruptly, it could significantly impact their operations to the point to where they could possible be shut down temporarily.

So, in conclusion, I think that I promote belt air in the face. I think it can be done safely. I think it can be done with early detection. I think it can be done with good maintenance and prevention. Again, my ultimate focal point is prevention.

So I appreciate the opportunity again to provide comments, and I'm here to answer any questions.

DR. TIEN: I'm sorry, I didn't get your name.

MR. DOTSON: Greg Dotson.

Thank you very much.

MS. ZEILER: Our next speaker is Bill Olsen. He is the Director of

Safety for Mountain Coal, also Arch Coal.

MR. OLSEN: On behalf of Mountain Coal Company, I'd like to thank the Panel for the opportunity to provide comments related to the use of belt air to ventilate working faces in underground coal mines.

Mountain Coal Company is a subsidiary of Arch Western Bituminous Group, which is a subsidiary of Arch Coal, Inc.

My name is Bill Olsen, and I'm the Safety Director at Mountain Coal Company's West Elk Mine in Somerset, Colorado.

In addition to my comments, Mountain Coal Company supports the previous and post comments from the National Mining Association, Colorado Mining Association, Utah Coal Operators, and the Alabama Coal Association and their related companies.

The West Elk Mine faces many

geological challenges, specifically deep cover, high horizontal stress, faults, spars, and multi-seam mining. Based on the current mine plan, cover will reach depths of 2,300 feet.

Horizontal stress reaches approximately 3,500 PSI. Fault displacement ranges up to 2,300 feet, which also serve as conduits for increased methane and water inflows.

Rock spar, typically composed of sandstone, ranges in thickness from several inches to eight feet thick with a hardness of approximately 200 feet of interburden between the active seams.

Two of the most difficult challenges at West Elk are related to maintaining methane concentrations at acceptable levels, and reducing the potential for spontaneous combustion throughout the mines.

For the methane history of the mine, room and pillar mining began in the

F-Seam, the upper most mineable seam, in 1982. Fortunately, we did not encounter any methane. In fact, it was rare to detect even 0.1 percent.

In 1992, when longwall mining began in the B-Seam, the lower most mineable seam, we encountered large quantities of methane. The majority of the methane was stored in the roof rock and was liberated by caving on the longwall.

Methane in the continuous miner sections was typically associated with the faults and spars that we frequently encounter. As mining progressed in the B-Seam, methane liberation exceeded 1,000.000 cubic feet per day, putting us on MSHA's five-day spot inspection program in September of 2001.

With the increased methane liberations in the working sections, Mountain Coal Company filed a Petition for Modification to allow the use of belt air to ventilate working faces in May of 1990. The primary purpose for filing the Petition was to provide an increased air volume to the working face, thereby safely diluting the methane encountered as well as respirable dust and diesel emissions in the section.

MSHA approved the Petition for Modification in May, 1991 and the Petition was implemented in the continuous miner sections and the longwall section in June of 1992. The stipulations in the Petition were fairly close to the requirements of the current belt air regulations published in June of 2004.

Using VNET PC for modeling our ventilation system over the past several years, we compared predicted air volumes in the working sections, both with and without the use of belt air. In a typical three-entry longwall headgate, the volume of air provided to the working face is increased by nearly 30 percent when belt air is utilized to ventilate the working section.

In mines with elevated methane liberation, the additional air provided in the belt entry is absolutely necessary for methane dilution purposes.

We have continuously and safely utilized belt air in every working section since implementation in 1992. Through a combination of vertical degasification holes and a high volume mine ventilation system, we have been able to safely control a methane liberation of between 10 and 20 million cubic feet per day.

Without the use of belt air to the working sections, we would have struggled to maintain methane concentrations within the legal limits. From this aspect alone, the use of belt air has actually enhanced miner safety in the working sections.

In regards to dust generated in the belt entry, Mountain Coal Company agrees with a previous statement made by NIOSH when they provided input on MSHA's proposed rule on belt air that stated: "The use of belt air may have a positive effect on reducing dust levels in the face area."

In reviewing MSHA's database on valid operator respirable dust samples that are required to be submitted for designated areas at the section loading points due to the use of belt air, the database indicates 173 samples were submitted by the West Elk Mine from January 1, 2000 to May 18th, 2007.

I have provided tables for the sample results. Seven of the initial samples required additional sampling due to exceeding the 1.0 milligrams per million standard.

The average of all five subsequent samples for each sampling location was in compliance with the 1.0 milligram per million standard. When reviewing the samples above the 1.0 milligram per million sample, several were attributed to a damaged transfer point that has since been replaced.

Several of the samples were also the result of the belt entry being rock dusted. This has also been corrected by modifying the shift schedule to allow rock dusting of the conveyor belts between shifts.

In reviewing MSHA's database on samples collected at the section loading points by MSHA, 97 samples were collected during the same time frames. Grouping of MSHA sample results is indicated in the second table on page two of the document I have provided to the Panel.

In reviewing available records at the mine, the last citation related to exceeding the designated area dust standard was in October of 1997 when the sample results averaged 1.1 milligrams per million.

To Mountain Coal Company, this indicates that belt air can be safely used to ventilate the faces without contributing excessive dust to the working section.

The second difficult challenge at West Elk is spontaneous combustion. This is not unique to West Elk Mine, but is common in the North Fork Valley with several other western mines having similar propensity for spontaneous combustion.

The B-Seam and E-Seam currently being mined at West Elk indicate a moderate susceptibility to spontaneous combustion with a self-heating temperature ranging from approximately 120 degrees Fahrenheit to 180 degrees Fahrenheit.

West Elk has incurred two major mine fires in the B-Seam as the result of spontaneous combustion. One occurred in 2000, with the second occurrence in 2005. As the result of these mine fires, we were out of the mine for a period of approximately six months and three months respectively.

In addition, we have encountered minor heating events in pillars that did not result in mine outages.

The use of belt air at West Elk has allowed us to lower the main mine fan operating points and ventilation pressures. For the air volume needed to control methane liberation, our four main mine fans operate at pressures ranging from approximately a 9.0 inch to a 10.9 inch water gauge.

However, if we were not utilizing belt air in the sections, the fan pressures would have to be increased to over 15 inches in order to maintain an equivalent air quantity in the section that is necessary to control methane liberation.

We believe the increased pressure differential, specifically across our pillars and gobs, increases the likelihood for spontaneous combustion to occur as the air passes through the natural cleats and fractures of the pillars and within the caved area where we unfortunately have a demonstrated history of spontaneous combustion.

We believe that both of our mine fires were the result of significantly changing the pressure differential across the gob area.

To further reduce the likelihood of spontaneous combustion, we have reduced the sizes of our longwall districts, modified our mining plan such that we progressively seal the gob as we mine, and minimize the pressure differential across the gob.

As we begin longwall mining in the E-Seam, we hope to further minimize the potential for spontaneous combustion in the gob by utilizing a modified bleederless system.

In addition to safely controlling the methane and reducing the potential for spontaneous combustion, the use of belt air provides additional protection, including the following: Early detection, even prior to detection by the AMS of heatings such as hot conveyor rollers.

Although it is very subjective for detection purposes, we have had several instances where employees detected such heatings with the sense of smell. Their quick investigation to the cause of the smell may have well prevented an escalation of a heating into a mine fire.

The AMS carbon monoxide sensors are much better in detecting fires at the incipient stages when compared to point-type heat sensors still utilized in mines where belt air is not used. The sensors have proven to be protective for smoldering and flaming coal-type fires whereas point-type sensors rely on latent fire properties.

Fire fighting capabilities in the belt entry are enhanced when belt air is utilized. This allows fire fighting to be conducted from the upwind side with the air flow and water flow in the same direction, minimizing the potential for damage to the water supply line.

Although air changes could be made where belt air was not in use to provide similar protection in the event of a mine fire, such air changes could have detrimental effects on personnel trying to escape based on their knowledge of existing ventilation practices.

Use of belt air in the working sections allows for the alternate escapeway to be on intake air, rather than using a neutral or return air split for escapeway purposes.

In closing, I would, again, like to thank the Panel for the opportunity to provide comments on the use of belt air. Like many other underground coal mines, West Elk has safely utilized belt air for many years. We have been successful in controlling the methane and have reduced the potential for spontaneous combustion.

We agree with MSHA, NIOSH, the Advisory Committee, and academia who universally state that belt air can be safely used to ventilate working faces, and in fact state that the use of belt air provides potential enhancement of miner safety.

The use of belt air improves the overall quality and quantity of section ventilation, directing affecting methane control, dust control, diesel emission control, spontaneous combustion mitigation, and fire detection and fire fighting capabilities.

We encourage the Panel to support its continued use. Thank you.

MS. ZEILER: Our next speaker

will be Jim Poulsen, Manager of Safety at Utah American Energy, Incorporated.

MR. POULSEN: Okay. I would like to tell you that I hopefully am the last speaker.

MS. ZEILER: One more after you.

MR. POULSEN: Okay. Good afternoon. I would like to thank the Technical Study Panel, MSHA, my fellow colleagues, and others for the opportunity to present comments regarding belt air, concerning the safety of the underground miners in America.

My name is James Poulsen. For the last 30 years, I have worked at Peabody, Energy West, Valley Camp Coal, and Skyline Mine in various management positions; and I was an underground employee.

Right now, I am currently the Manager of Safety for Utah American Energy, Incorporated, which is a subsidiary of Murray Energy Corporation. I am also a member of the International Society of Mine Safety Professionals, and I am a Registered Certified Mine Safety Professional.

Utah American currently operates five underground coal mines, employing 500- plus employees from within Utah and the surrounding states. Three of the five Utah American Mines are currently in full production. Aberdeen and West Ridge are currently utilizing belt air at the working face in combination with the two-entry longwall mining system.

Crandall and South Crandall Mines successfully used belt air to the working face in the past, but are not doing so at the present time.

Utah American has currently commenced ground work on an additional property named "Lila Canyon." Use of belt air at the working face utilizing a two-entry mining system will be necessary for the safety of our employees at that operation, also.

We consider the safety of our employees to be a value which we will not compromise. We believe it is our moral and ethical responsibility to protect the health and safety of all our employees, which is what brings us here to day.

I cannot emphasize enough that changes to the current belt air standards would be very harmful to the safety of our underground miners.

I personally have been involved with the use of belt air at the working face at many operations and openly and willingly testify from a safety perspective that ground control, dust control, dilution of dangerous gases, and overall miners' safety is improved when belt air can be utilized at the working face.

Previous testimony and numerous studies have shown that use of belt air definitely increases the efficiency of the Mine Wide Ventilation System. This additional air increases dilution of methane and respirable dust, reducing worker exposures to these hazards.

Some questions have been raised about increased dust levels with the increased ventilating pressure or currents. MSHA and NIOSH data, testing, and operator sampling substantiates that the use of increased belt line ventilation provides an enormous reduction in respirable dust and increased gas dilution.

It is a well-known fact that concentrations of respirable dust are inversely proportional to the air quantity used to dilute them. If you double your air quantity, your dust concentration is cut in half.

In Salt Lake City, Panel Member Dr. Weeks, requested sampling data with regards to dust concentration and belt line entries. That information has now been provided to the Panel, which appears on the chart on the following page entitled "Belt Line Samples."

In todays Western US Mines, 1,500 to 3,000 feet of cover is commonplace. To control the adverse roof, pillar outbursts, and bouncing conditions and enhance worker safety, two-systems were developed. At these depths, studies and experience have proven that it is just not good practice to develop more entries than absolutely needed. The less entries you have, the more likely you are to be able to control the ground and bouncing.

In Salt Lake City, Dr. Weeks asked for some comparisons of two-entry mining systems compared to the multiple-entry mining systems. The following chart entitled "Comparison of Two-Entry versus Three-Entry Gateroads," compiled by the Utah Mine operators, has been developed and submitted as requested.

What you see there is a list of mines utilizing the two-entry method with a total of 921,929 feet of gateroads with 17 reportable roof falls. That translates into .018 reportable roof falls per 1,000 feet.

Down below you can see that the same mines reported their three-entry gateroads, which is at 749,696 feet. They had 62 roof falls, which shows you .083 roof falls per 1,000 feet. So there is a considerable difference there in the number of roof falls from three-entry to two-entry.

Operators desiring to utilize two-entry systems had to file a petition pursuant to Section 101(c) of the Federal Mine Safety & Health Act. If granted, these petitions obligated the operator to a multitude of additional requirements. Unquestionably, the most rigorous requirement contained in the petition is the use of the AMS systems.

Other common petition requirements for two-entry development were: Automatic fire suppression systems on diesel equipment, tracking and monitoring of equipment entering and leaving the sections, diesel discriminating CO sensors no greater than 1,000 feet apart in the intake and belt line extending 4,000 feet out by the section, two separate and independent means of communication (one was in the intake and one was in the belt line) and phones no greater than 1,000 feet apart, additional SCSR's stored at the headgate and tailgate (prior to the additional requirements of the MINER Act of 2006), fire fighting outlets extending into the intake escapeway every 300 feet, trained mine monitor system operators on duty on the surface 24/7, and sometimes even operator use of a PED system when entering the section.

Some mines had various other

requirements, but all of these requirements improved miner safety.

Previous testimony has described the functions of AMS systems. So I won't go into detail about their capabilities. In Salt Lake City, Mr. Wendell Christiansen offered comments regarding today's AMS systems. Given the performance of these systems, it would be foolish for this Panel to do anything which discourages their use in our mines.

The use of belt air at the face carries with it the requirement to use CO sensors rather than the more common but far less reliable point-type heat sensors.

I offer to you my opinion that a mine approved to use belt air along with the accompanying requirements, including state of the art AMS systems with CO sensors, provides a safer and healthier environment for miners than a similar mine which does not use belt air, but does use point-type sensors.

In my 30-plus years of mining, I believe the AMS system is one of the most important devices introduced into the mining industry to improve overall worker safety.

At the end of this document is the basic Conspec operator training requirements, entitled "Exhibit A" and Friction Factors and Infrastructure Resistances entitled "Exhibit B" which were requested by the Panel in Salt Lake City. They are also included for submission.

Congress, MSHA, NIOSH, mine operators, individual miners, and many others had a hand in propagating the current belt air rules. As far as I know, the current belt air rules have not been shown to be a contributing factor in any of the disasters which tragically occurred in this country during 2006, not even in the Aracoma disaster, which involved a belt-line fire.

We would encourage this committee to acknowledge the previous experience and endorse the current belt air rule.

DR. WEEKS: Well, I have never fully appreciated the statement "Be careful what you ask for." You know the rest.

Anyway, aside from that, thank you for providing this. This is quite interesting.

I especially appreciate your including in the data on roof falls, the feet of the gateroads. I believe that makes the data that much more meaningful.

MR. POULSEN: In addition to that, keep in mind that this is only gateroad development, too.

DR. WEEKS: Right. I understand that.

Having been provided this data, I feel I am at liberty to cross-examine you. If you will give me your phone number, I will call you about that.

I do have a couple of questions on the dust data. The final column that you have here is the dust weight. I take it that's the difference between pre-weight and post-weight?

MR. POULSEN: Yes. The pre-weight and the post-weight.

What we do is -- let me explain this table a little bit better for you. This is in-house sample results, and we request from the Agency to use dust casettes for in-house sampling.

Then, what we do is a side-by-side sampling. One of the cassettes is the one that's to be sent to the Agency as required. A lot of times, I will sample with another dust cassette just to weigh the actual results and make a calculation of how much dust I am actually seeing there.

As you know, we submit a sample to the Agency, and it takes weeks or months before we actually know what concentration that it was.

This gives us an immediate result, and I can actually make corrections immediately if we have a problem where we are out of compliance.

DR. WEEKS: So this is the backup sample?

MR. POULSEN: Yes, this would be a backup.

DR. WEEKS: In the last column, you listed weight. Is that weight or concentration?

MR. POULSEN: That would be concentration. I'm sorry.

DR. WEEKS: That would be cubic meter.

MR. POULSEN: Yes.

DR. WEEKS: Okay. I will have a look at it. Thank you.

MR. POULSEN: These are all DA samples, too.

DR. WEEKS: Yeah. I notice you

make a comment on page five "In my 30-plus years, I believe the AMS system is one of the most important devices," et cetera.

I don't think you would find anybody on this panel or anywhere that disagrees with that, but that's not the issue before the Panel, whether or not the AMS system is beneficial.

The issue is whether or not belt air ventilation is safe and how it can be done safely, and so on and so forth. I think there's a lot of confusion. We all do it. We sort of equate the AMS system with belt air. They are independent and separate creatures.

It just became quite apparent, when I read that, that absolutely that's true, but the issue before us really is about belt air. It's not about the AMS system. They're clearly related, but they are different.

MR. POULSEN: I believe someone stated here earlier that I believe one of the greatest things we can do as operators is prevention. Regardless, prevention.

MS. ZEILER: Thank you, Bill.

Our next speaker is Gary Hartsog, who is the President of Alpha Engineering Services. Gary will be the final speaker for the NMA/Alabama Coal Association.

We have one speaker after that before we conclude.

MR. HARTSOG: My name is Gary Hartsog. I am the President of Alpha Engineering in Beckley, West Virginia.

Alpha Engineering is an engineering consulting firm that has provided engineering services to the mining industry for the past 16 years. Our work is mainly in deep coal mines dealing with mine design, ventilation, mapping, and system design.

I am a Registered Professional Engineer and Surveyor and a graduate of West Virginia University with BS Degrees in Mining Engineering and Business Administration. I have been involved for over 30 years in designing and operating coal mines for the safe and efficient mining of coal.

For 15 of those years, I worked at longwall mines, many using belt air in the working faces. I have helped develop the 101(c)Petitions for Modification and help today administer ventilation plans and systems to use belt air in the working faces.

I greatly appreciate the opportunity to stand before this distinguished Panel today to present some of my experiences and thoughts concerning the use of belt air in the working faces and use our clients' experience as examples.

My purpose here today is to offer this Panel comments on how the use of belt air that has been used to ventilate conveyor belt entries is important, sometimes critical, to the coal mining industry.

For many years, there was a prohibition against using belt air to ventilate the working faces. As technology developed, improved, and became more dependable, belt air was allowed to be used to ventilate working faces so long as there was a heightened vigilance against fires in the conveyor belt entries.

Belt air is not necessary to ventilate the working faces in every coal mine in the United States. In fact, there are relatively few underground mines that need to use belt air in the face.

In many coal mines that use belt air to ventilate the working faces, it is generally a very important component to a safe and healthy working environment by providing additional airflows, allowing greater pressures to be used in ventilating gobs and other improvements in augmenting the safe operation of the mine.

I would list these mines in the categories as follows. This is not an exhaustive list, and it emphasizes mainly the eastern coal fields, leaving some of the special circumstances of the western coal fields that have two-entry development, for others to address.

First, there is the development for longwalls. Longwall gate development consists of driving three- or four-entry panels for some distance until a block of coal has been isolated for mining with the longwall. Some of our clients develop gates that are in the 10,000- to 18,000-foot deep range. Since these gateroads can become quite long, they become difficult to ventilate, especially if there's significant methane liberation.

The use of belt air in the working face allows the leakage to be minimized between the intake and the belt entry and therefore delivers more air to the working faces.

Let's say that we have a three-entry panel where the air is coursed up the intake and a split of the air ventilates the working face while another split ventilates the belt outby to the mains. Something like you see on the screen. As some of the air flows outby in the return and belt entries, the increasing pressure differential results in the increase of leakage from the intake to the other two entries.

In some cases, the intake to the section may be over 100,000 CFM at the section mouth; and, due to leakage, less than 15 to 25,000 CFM may reach the split point. That would not be adequate flow to ventilate both the entries and the faces.

If the belt air is allowed to be used in the faces, the flow of the belt entry air is in the same direction as the intake; and the pressure differentials are minimized, similar to what you are looking at on the screen now.

Under this scenario, there can be significantly more, maybe double or triple, the air reaching the face. Therefore, the belt entry and the faces are both ventilated with greater, safer, and more desirable quantities of air.

Second, there are those mines who need maximum airflow for the purpose of diluting and carrying away methane. This can be a longwall or a room-and-pillar mine. In deep mines, especially where there is split or fishtail ventilation, it is necessary to get large quantities of air to the faces for methane dilution and control of respirable dust.

Due to haulage and supply constraints and requirements in the faces, it is not unusual for there to be as many as three or four haulage or belt air entries in mains or panels. These entries must be adequately ventilated to prevent stratification of methane, for the belt conveyor as well as for any diesel equipment that may be in use.

When belt air is not used in the faces, significant return capacity is used on the section just to ventilate the haulage and belt conveyor entries. This reduces the amount of airflow available for the face operation.

In addition, when this belt-haulage air is not used to ventilate the faces, it is more difficult to ventilate two continuous miners operating using split ventilation because of the additional distance the air must be conveyed to the far end of the working section by curtains, and the air tends to leak into the belt-haulage entries and to the return rather than traveling to the faces, as shown in these screens.

Third, there are those mines where distances and pressure differentials required for ventilating gob areas on second mining makes it extremely difficult to make the belt air go outby to another return. This can be in either a room-and-pillar or a longwall mine, as shown here.

There are many cases where the pressure requirements to keep the gob adequately ventilated are so great that the air, once it goes to the section loading point, cannot be induced to travel outby to the mains in the belt entries.

For example, in a longwall, if adequate pressure to pull the belt air outby to the main returns were available, the leakage from the intakes to the belts would be so great that inadequate airflows would reach the working section.

In another example, in many second mining situations, it is advantageous to make all the entries leading to the working faces intake so that all the air will go through and/or around the gob, like you see here. This helps with allaying respirable dust and makes the ventilation at the section simpler. It also delivers more air to the working section.

This eliminates the potential for air from the gob to pull out into the working section. All of these are significant safety features when ventilating a unit on second mining and ventilating an active gob.

Fourth, there are those mines in the early development stages between 30 CFR part 77 and 30 CFR Part 75. When a mine is starting from a slop or shaft bottom into a virgin area, those first developing areas are very hard to ventilate. Invariably, there is a gray area between the end of Part 77, which applies to shaft and slop development, and Part 75, which applies to normal mine development.

In order to move from Part 77 to Part 75 as quickly as practical, some mines use belt air in the faces for this period of time and then switch to a permanent ventilation system that does not use belt air to ventilate the working faces.

The reason for using belt air in these situations is that the mine is typically on smaller, temporary fans with limited delivery capabilities; such as, tubing or small bore holes, until all the mine openings are connected and the main ventilation system is placed in service.

In these cases, every bit of airflow is needed in the faces because of the limited flows that are available. As more US coal mines are developed below drainage, this approach to starting a new mine will become more important.

Fifth, additional quantities of airflow cannot always be met by driving additional entries. For example, the number of entries in may be limited by ground control concerns; such as, deep overburden, use of yield pillars, or multiple seam mining that result in heavy stress zones.

In those cases, overall mains or panel widths cannot be increased due to safety concerns for roof falls during advance and outbursts and abutment falls during retreat mining. So a limited number of entries must use a small corridor between stress zones.

Other cases also occur where the number of entries must be limited. For example, when working in low-coverage areas and when mining around and in the vicinity of old workings.

In conclusion, not every mine will use belt air to ventilate the working faces. However, to some mines, it is very important that this method of ventilation be available for the safe, systematic mining of coal.

It is obvious from the previous examples that the use of belt air in the faces is more prevalent in the deeper mines that develop greater distances or must handle higher levels of methane. However, there are also other mines that need the belt air option where the number of entries is limited by over mining and under mining and other factors.

The technology for detecting hot spots or fires in conveyor belt entries has made huge advances since it was first introduced in the 1970s. In fact, CO monitoring systems for belt air monitoring have been the backbone for much of the mine monitoring, tracking, communications, and data systems in development and use today.

That technology today is a tool that allows operations managers, design engineers, and safety professionals to be confident in design, support, and operation of mines where belt air is used in the faces.

The use of belt air in the

faces is not for every mine. It is, however, an extremely important tool and an option that needs to be freely available with proper monitoring and safeguards for all mines, and most especially for those mines with the more difficult conditions and greater distances to ventilate.

MS. ZEILER: Thank you, Gary. We do have one final speaker who signed up in advance for public-input hour today.

That speaker will be Dave Maguire from Goodyear. You may remember Dave because he was part of the Conveyor Belt Manufacturers Panel for the Technical Study Panel Meeting in Pittsburgh.

MR. MAGUIRE: You'll be glad to know I've only got about 15 minutes.

My name is Dave Maguire. I'm the Director of Technology for Goodyear Engineer Products. We make a few conveyor belts.

This is just a follow-up to the

March presentation. I know there were some questions and data that we said we would get in the near future. So here we are.

These are the items. We wanted to confirm that we mentioned we talked about halogen-free conveyor belts, which are the materials for flame-resistant conveyor belts that would meet the BELT -- the Belt Equipment Laboratory Test -- that NIOSH and MSHA developed.

We have further smoke analysis on both halogenated and halogen-free belts, both in the BELT unit; the Cone Calorimeter, which is an accepted test method in other industries; and then also ASTM E662 of the Boeing Standard; some static conductivity results; and drum friction.

Just to refresh, we talked a little bit about most standards for conveyor belts only deal with flame resistance at both ignition and propagation. We're proposing you should at least consider both smoke density and toxicity.

As we talked about, a lot of industries do both flame resistance and smoke resistance as part of standard because it's generally the smoke that can kill people.

Just a little refresher, again, there are two ways that you can make them flame resistance. You can either do it with halogenated materials, which are typically fluorinated or brominated materials. They're very effective for propagation resistance. They tend to be lower in cost than alternate materials, but they do produce thicker smoke and toxic gases when they're heated.

For halogen-free materials, you do need higher levels for propagation resistance. Other industries have gone towards them in a big way. They are cost affective, and they produce significantly less smoke and toxic gases when heated.

There's nothing unusual about these materials. They are off the shelf, and they are available. So it's not some mysterious materials that we're dealing with here.

This is the data on five of the most common sizes of belts that are used in U.S. mines. I labeled the belt as belt type by the number of plies of fabric; two plies, three plies, and four plies. Then the belt reading is plies per inch and width.

So, typically, it's two-ply 400, three-ply 600, three-ply 750, four-ply 800, or four-ply 1,000.

The BELT test specifies that after you burn the belt five minutes -- I'm going to show you some video clips of some of these samples -- a certain section of the belt has to remain. This test involves a nine-inch wide by a five-foot long piece of belt. You burn it in the

BELT equipment.

It doesn't specify how much has to be left. Okay. It could be an inch, two inches. I've just put up here greater than six inches.

As you see in these examples, they're generally anywhere -- on the halogen-free belts that we tested, these are typical results -- anywhere from 25 to 30 inches of belt remaining. So at least half the belt remains after the five-minute test.

That was one of the questions that you wanted me to come back with. Can I confirm that the halogen-free belts meet the BELT test. The answer is yes.

This is a sample of one of the belts burning on the BELT unit. It's a little video clip. This is the BELT test. It goes on for five minutes. I have obviously shortened this.

What I've shown is the smokestack that's at the end of the gallery, just to give you an example of the amount of smoke that comes out in the five-minute test.

This is getting to the end of the five-minute test. The burner is off. That's typically when you get the most smoke, when the actual flame goes out. Then, as you see, it can die down.

DR. WEEKS: What's the air velocity there?

MR. MAGUIRE: 250, per specified. It's 200 or 300.

MR. MUCHO: What's the diameter of that stack, roughly?

MR. MAGUIRE: It's about a foot. I'm getting that it's 10 inches, about 10 inches.

I can tell you it's a new one. The other one got corroded.

So that shows the halogen-free. You notice that very little smoke came out there.

This now is a halogenated belt.

This meets the standard, as well. Again, I've shortened the video clip. It's burning for five minutes. This is pretty typical. You don't see very much smoke at the start; but, after you get into it two or three or four minutes, you'll start seeing a lot more smoke here compared to the halogen-free.

You might see a jump here when you move on. Here we go. We're getting toward the end of the five minutes. Significantly more smoke is generated, but this belt does meet the requirements. There's about 20 inches left or 25 inches left of the belt on that.

Then, when the flame goes out, you'll start see a lot more smoke. It eventually dies down, though. See the amount of smoke generated from part of the halogen-free materials.

We're getting to the end of the task here. Okay. So a couple of video clips to show the difference between halogen free and halogenated. These are rubber belts, by the way.

Then, what we did is -- we've instrumented the actual -- this is getting toward the smokestack. The smokestack is up here. We instrumented with smoke density at photoelectric just to measure the actual smoke density. You can get a relative number. With halogen-free, we were getting in the order of 25 percent. Whereas, with halogenated, it eventually got to 100 percent in the flaming conditions.

So just to show that you can take the BELT unit, and you can instrument it for smoke density. We also have an apparatus coming in to also measure carbon monoxide and HCL. That's up and running.

A lot of industries use accepted task methods. I mentioned some of the previously. I'm not going to show pictures of the equipment. The cone calorimeter, ASTM E1354, is a test that's used by other industries to measure both the flammability resistance of the products and also give you some information on carbon monoxide and HCL and smoke density.

You generally use a three-inch by three-inch sample of conveyor belt. It's obviously on a laboratory scale. I show this to show the differences in what's happened with halogen-free conveyor belts versus halogenated.

I think the interesting one si carbon monoxide. Generally, we're getting three times less with halogen-free materials when it's burning. HCL was basically zero PPM, part per million for Halogen-free; a level of 300 with halogenated. Then, the smoke density is of the order of two to three times. The average smoke release is two and a half, and the total smoke release is zero to two.

DR. MUTMANSKY: What are those

units?

MR. MAGUIRE: Good question. This is actually -- the carbon monoxide is the amount of carbon monoxide that's yield per kilogram. So that's .03 kilograms of carbon monoxide per kilogram of the product.

This is -- you can go to actually meters squared by meters squared by surface area. This is just the way the cone calorimeter does it. This gives it those meters squared by kilogram. So it's a volume.

DR. BRUNE: Shouldn't it be meters cubed?

MR. MAGUIRE: It actually comes out meters squared. It's the surface area of the sample divided by the -- sorry -- the surface area of the smoke divided by the width of the sample. In this, total smoke is the meters squared released divided by the meters squared of the product.

DR. TIEN: How would you measure these smoke areas?

MR. MAGUIRE: This is a calculation that's done. I'll dig out the test method and show it to you -- and get it to you, but that's the calculation it comes out as.

DR. MUTMANSKY: That's fine. It's a strange set of units. That's okay. If it's standard.

MR. MAGUIRE: Standard is standard. The cone calorimeter is probably the most standard piece of test equipment you use for measuring heat release with gas analysis and then smoke density. It's generally used by all industries. I'm showing it as relative comparison on these conveyor-belt samples.

This one might be a little bit easier. This ASTM E662, and this gives -- you do it both smoldering and then when it's flaming after four minutes.

Here we're doing optical

density. It's a comparative. It gives photoelectric. Again, you see a lot -- the same sort of difference. It's a little bit higher. This is a halogen-free. This would be a halogenate material when it's smoldering, and then this the current 2G belt, and the current standard is used.

Then, when it's flaming, smoke density -- again, you see the same differences. Halogen-free, significantly less smoke compared to the halogenated version of that, and then 2Gs in the middle.

Toxic gases. Again, it's a pretty similar difference. This is gas. This is PPM. It may be a little bit easier to understand here. BELT, smoldering, the value of 10, and then 2G and halogenated at 0 to 50.

Then hydrogen chloride, huge difference, obviously between halogen free, 2G, and the BELT. Obviously, if you want to go to something like a BELT standard, this hydrochloric acid, if you do nothing, will increase significantly because they're going to be more flame resistant than the current 2G.

DR. WEEKS: It seems almost axiomatic that the halogen-free belt is not going to have any hydrogen chloride in there to begin with.

MR. MAGUIRE: Yes.

DR. WEEKS: There are other toxic gases that come off there that wouldn't show up, you know.

MR. MAGUIRE: Yeah. Well, generally, what we have done is, we have looked at other industries that are addressing both smoke and flammability. Certainly, the BELT test does something to address ignition and propagation.

When we're looking at smoke density and toxicity, we're going to other industries, both in the rubber and plastics. Generally, the gases they look at after smoke density are carbon monoxide, carbon dioxide, hydrochloric acid, and hydrogen cyanide.

I didn't want to put too much up here. We have HCL. Generally, with halogen-free you see no HCL. With halogenated materials, you see trace amounts, as well. Not huge, but in the order of five, ten, fifteen parts. I think we showed that many, many years ago.

Are there other gases? The halogen-free, I'll give you a little hint. A lot of what is done to reduce the -- to improve the flame resistance is water release. So water is pretty dry.

Then, is the flaming again. You see the same differences.

So what we have done is we've done both the BELT comparing halogenated and halogen-free. Of course, also the cone calorimeter. Then, also, this standard which measures gas analysis. Then the ASTM E662.

Static conductivity was brought up as well in drum friction, other areas that could cause a fire. Basically, halogen-free, when you're dealing with rubber materials, you have no problem meeting the static conductivity levels.

Most international standards are 300 mega ohms maximum, and these are negligible. Rubber is very easy to get. Very low static conductivity.

Drum friction, again, is another nice feature of halogen-free-type materials. Generally, most standards -- I showed the video of the drum friction previously. You run it through the belt for two yards on a frozen idler, and you should get a maximum.

They don't want you to go above 325 centigrade. These are very low levels. Some of the lowest we've ever seen with rubber, in the area of 100 to 120 to 150 centigrade maximum.

DR. TIEN: Which one is more

desirable, higher or lower?

MR. MAGUIRE: Lower. The lower the temperature the better.

People have done -- there's two ways that people have done the passive drum friction that other standards have adopted. Either you keep the temperature below 325 so coal dust doesn't ignite or that allows the belt to melt and break. I don't personally like that one, but that's okay.

Again, if you're going to have a frozen pulley and you allow the belt to break, your going to cause (inaudible.)

Static conductivity, obviously, the lower the better.

So this is what we would recommend in our conclusion. Obviously, halogen-free materials significantly reduce smoke density and toxicity when smoldering or burning. They comfortably pass the BELT and static conductivity and drum friction.

We strongly recommend the smoke density and toxicity should be added as part of our flammability standard for conveyor belts. Drum friction static conductivity should also be added, as well.

That's what I had.

DR. MUTMANSKY: Dave, the last time you gave us a little bit of cost comparison. I don't recall what it was. Would you just sort of repeat that for us, please?

MR. MAGUIRE: Well, I skillfully said that I'm not allowed to talk about costs or prices because I'm a technical guy. Certainly, moving from 2Gs to the BELT tests, belts will cost more. You're going to be using more flame-retardant material. So the cost of the belts will increase.

I really cannot say anymore than that, as I think the other conveyor belt manufacturers did, as well.

MR. MUCHO: Dave just to be a little picky here on a point. In the conclusion, you talk about the halogen-free reducing smoke density and toxicity when smoldering or burning. That's sort of a double-edged sword in a way.

We talked a little earlier today about smoke detectors, and, in the future, we think maybe we can actually get some smoke detectors that will be pretty reliable in our minds. If we can use that and combine that with CO detectors in some form of belt fire detection, actually, smoke coming off early in the smoldering stage is not necessarily a bad thing. It gives us a precursor and prewarning and gives us time to act and react and know that we have a problem.

So it's sort of nice that we don't get a lot of CO and smoke off in the smoldering stages; but, if, in fact, it's working against our fire detection systems, it is not a good thing.

MR. MAGUIRE: Yeah. I think that's a good point. Obviously, I listened today, as well.

I think you're going to find that the task I'm doing aside from the BELT test, which is a nine-inch wide by five-foot long belt -- that's a pretty severe burn test -- there's still plenty of smoke coming off.

Don't forget the massive conveyor belts that are underground. If a fire starts, you're going to have plenty of smoke.

What we're suggesting is, this is a way to significantly reduce it, and I would think that there's two points in both; smoke density, and smoke toxicity. I think any time that you can have less smoke and there is a fire, you're going to have more time for people to get out.

In my personal opinion, I think that would be a big consideration for certainly the toxicity. Even with the carbon monoxide levels, you're still going to get carbon monoxide coming off; and that could be further study. That could be work that could be done. That shouldn't be difficult to work out.

Even though we make belts significantly less than smoke density and toxicity, is it enough to trigger the detectors? I don't think that would take a lot of work to do between conveyor belt manufacturers and the smoke detection people.

MR. MUCHO: Of course, the other end if it is that if it doesn't ignite initially and it won't propagate, then it becomes less of an issue of whether we're getting the CO or smoke, anyway; right?

MR. MAGUIRE: Yeah. But, as I showed in the last testing, it's never the conveyor belt that catches fire first. A conveyor belt has got a much higher ignition temperature than any other material.

The coal dust and the idler grease is going to catch -- coal is going to catch fire first. That's what's going to cause the fire. So it's only a matter of time.

MR. MUCHO: That's not what causes the fire. Causing the fire could be the heating of the conveyor belt conveyed to the heat, to the coal, which then catches fire. So it's the initial starter, but it's not the cause of the fire.

MR. MAGUIRE: Yes. But --

MR. MUCHO: So, in some situations, while this last chart is important, the belt is acting as a medium to start some other material burning.

MR. MAGUIRE: I think it's the other way. The other medium is going to cause the belt the catch fire.

MR. MUCHO: Well, yeah. Down

the line. Since you've got it burning now, it's coming back and catching the belt on fire.

I'm starting with friction, conveying it to the belt to the coal, get the coal burning. The coal burning gets the belt on fire.

MR. MAGUIRE: Right. Unfortunately, if such an event like that happens, probably, a conveyor belt is going to start smoldering and catch on fire.

DR. BRUNE: I have one more question. We heard today from representatives from Jim Walter Resources that Jim Walter tried a number of years ago to utilize BELT standard passing flame resistant belts, and they went away from that. I'm not sure whether that was your brand or somebody else's brand. It really doesn't matter.

They went away from that, from what I understand, because this belt material tended to rub off on the stands and then create piles of rubbing shavings, which then started smoldering and then, in fact, created more of a problem that they had to deal with.

If they used this material that the industry belt manufacturer is offering today, would that problem still be a problem that the operators would have to deal with?

MR. MAGUIRE: A couple of points. First of all, it wasn't our brand.

The second thing is -- there are a couple of other points. Tom mentioned both here and the previous time that the durability -- which we agree durability is something you need to look at. Obviously, when we're looking at halogen-free materials, we're going to ensure that the durability is going to be equivalent.

He did a lot of the

conversations previously comparing PVC belts with rubber belts. PVC is well recognized to have much lower durability and breaks much quicker and causes breaking. It is very aggressive on the idlers, and it builds up coal dust.

So there's a lot of splitting and cracking problems. There's a lot of issues with PVC, as well. The durability of PVC is not as high as rubber.

He also mentioned about rubber BELT. These were certainly not our formulations. I can attest to them. I would be stunned if our halogen-free materials behaved in that manner, in terms of shavings causing excessive heat because of the way that it operates.

All I can tell you is that halogen-free materials, the way you go about it in terms of getting your flammability resistance, if anything, it may be cooler.

So I don't quite understand the

materials that were used that Tom tried in Jim Walters' mine from the rubber side; but, from our side, we should not expect to see that with our rubber materials, particularly the halogen-free.

DR. BRUNE: Thank you.

DR. MUTMANSKY: Thank you, Dave. I think we've run out of questions at this moment, and we would like to thank all of those participants this afternoon.

I'd also like to thank the Panel for not abandoning us at the end of the afternoon. We appreciate very much everything that our speakers have done for us in terms of giving us data today.

We're looking forward to tomorrow's testimony, as well; and we'll invite you back at 9:00 a.m.; is that correct?

MS. ZEILER: Yes.

DR. MUTMANSKY: Do you have any announcements, Linda?

MR. ZEILER: No. I'd say we

stand adjourned for the day. Thank you.

(Whereupon, the Technical Study Panel on the Utilization of Belt Air and the Composition of Fire Retardant Properties of Belt Materials in Underground Coal Mining adjourned for the day, to reconvene on June 21, 2007 at 9:00 a.m.)

CERTIFICATE

STATE OF ALABAMA)

COUNTY OF JEFFERSON)

I hereby certify that the above and foregoing deposition was taken down by me in stenotype and the questions and answers thereto were transcribed by means of computer-aided transcription, and that the foregoing represents a true and correct transcript of the testimony given by and witness upon said hearing.

I further certify that I am neither of counsel, nor kin to the parties to the action, nor am I in anyway interested in the result of said cause named in said caption.

Susan Bell, CSR

Notary Public