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I certify that I have read the transcript for the January 10, 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

TRANSCRIPT OF PROCEEDINGS

IN THE MATTER OF:)
)
TECHNICAL STUDY PANEL ON THE)
UTILIZATION OF BELT AIR AND THE)
COMPOSITION AND FIRE RETARDANT)
PROPERTIES OF BELT MATERIALS)
IN UNDERGROUND COAL MINING)

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UNITED STATES DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

IN THE MATTER OF:)
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TECHNICAL STUDY PANEL ON THE)
UTILIZATION OF BELT AIR AND THE)
COMPOSITION AND FIRE RETARDANT)
PROPERTIES OF BELT MATERIALS)
IN UNDERGROUND COAL MINING)

Polaris Suite
Ronald Reagan Building and
International Trade Center
1300 Pennsylvania Avenue, N.W.
Washington, D.C.

Wednesday,
January 10, 2007

The parties met, pursuant to the notice, at 9:07 a.m.

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Designated Federal Officer

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P R O C E E D I N G S

(9:07 a.m.)

MS. ZEILER: Good morning. I think we're ready to pick up where we left off yesterday.

Mike Kalich, the Senior Mining Engineer from Coal Mine Safety and Health, is going to talk to you about the compliance guide for belt air.

MR. KALICH: What I have is an overview of the compliance guide. The full version of the compliance guide is in the handouts. The compliance guide was developed after the rule to answer the numerous questions that came in on various interpretations of the rule. What I'll provide today is an overview of that compliance guide. For more in-depth, you have the full copy there in that handout.

One question yesterday was asked by the panel about the two entry longwall development. On development of the two entry systems, the belt is on return, okay? There are a few permissible belt drives out there, but not very many. They use a dog-leg system to course that belt air off of the belt line before it goes over the belt drive in most cases.

So on development, yes, the belt is on return. Provisions for that are included in the

101(c) petition where it requires methane sensors and some other safeguards there along the belt, but they do not use belt air when they're developing that two entry. They do use the belt air on the longwall then.

The rule, as we talked about yesterday, allows all mine operators the option of using belt air as intake air and using the belt air at the face. As of June 1, 2004, all granted petitions for modification except those mines that use the two entries were superseded by the rule.

One of the questions that came in that we answered is who can be an AMS operator. There's a definition section in 30 C.F.R. in 75.301 that defines some of the various terms that are used. An AMS operator is the designated person who's on the surface and monitors the system and notifies appropriate personnel in the event of a system alarm or system malfunction.

The operator must be properly trained and knowledgeable about the operation of the system in order for this to operate properly and to get the proper notifications. The AMS operator's performance is critical if you're going to safely use belt air at the face.

This AMS operator also must have a working

understanding of how the AMS system operates and how it's integrated with the overall mining system. Like I mentioned yesterday, the AMS system not only monitors the CO on the belts, but it is used for a mine-wide monitoring and can be used for a number of functions at the coal mine -- weekly fan checks, monitoring electrical installations, just a wide number of uses for it, operate the belts, even operate the longwall for that matter from outside the mine or even possibly from your home.

If you have your connections through the internet, the capability is there to actually turn belts on and off by the mine manager from his house if he wanted to do something like that. So it does have a wide range of possibilities and uses, and I'm sure new uses for it are discovered every day.

Appropriate personnel. Who's an appropriate person? It could be different individuals. It depends on what type of signal you get. The person designated by the operator to perform specific tasks in response to the AMS signal would be the appropriate personnel and could be the responsible person as outlined in 1502.

It could be a maintenance person. If you get a signal for a malfunction, the appropriate person

to call would be maintenance personnel so they could go to that location and effect the repairs.

What's a belt air course? It's the entry in which a belt is located and any adjacent entry not separated from the belt entry by permanent ventilation controls. It includes any entries in series with the belt and terminates at a return regulator, section loading point or the surface.

The thing to remember is that the air course may not always contain the belt, but it would still be a belt air course because you may split off from the belt air course. It's still considered a belt air course for ventilation purposes until that air is dumped in to the air, so it doesn't necessarily have to have a belt in it to still be considered a belt air course.

Carbon monoxide ambient levels. It's the average concentration of carbon monoxide detected in the air course. The average is representative of the composition of the mine atmosphere over a period of mining activity during non-fire conditions. You can have separate ambients for different areas of the same coal mine.

The folks at the mine must provide sufficient data to MSHA and to the district manager so

that it can be evaluated and determined what a proper ambient level might be. MSHA would expect that the mine operator would at least have five consecutive shifts worth of data in order to determine what ambient level might be proper for a mine.

Five shifts or maybe more, depending on conditions at the mine. This is on a mine-by-mine basis, and you're taking into consideration various conditions that you may run into at the different coal mines.

Point feeds. We talked about that yesterday also. What it is is the process of providing additional intake air to the belt air course from another intake air course through a regulator. There's minimum air velocity requirements of 300 feet per minute to be maintained through the point feed regulator.

The use and location of point feeds must be approved in the ventilation plan. Also there's provisions in there for the point feeds like remote closure of the regulators, position of the sensors, where they need to be located.

We had that slide up yesterday. That shows an example of a point feed, and the blown up portion there on the right-hand side indicates sensors on the

intake and sensors on the belt that would indicate the CO levels and shows the air through the regulator mixing with the belt air and continuing on to the face.

We had questions about how detection systems and fire suppression systems would interact and how they're treated in the rule. 75.350(a)(2) requires that the air velocities be compatible with all fire detection systems and fire suppression systems that are used in the belt entry.

There was a number of tests done years ago on fire suppression systems and on the CO systems, but these tests, actual fire tests, were done with smaller belts than what we have in operation now. I'm not exactly sure what the size was. You know, 36 or 48 inch belts is what the testing is done on. Now typically you see 60 and 72 inch belts.

You know, there may be an issue there of is the fire suppression system adequate now with the higher air velocities and with the larger belts that are in use now.

Sensor spacings. It shows that sensor spacings are 1,000 feet in areas where the velocity exceeds 50 feet per minute. If you reduce below 50 feet per minute you reduce the sensor spacing to 350

feet. Testing has shown that that is effective for the early detection of a fire.

Also, the testing indicates that five and 10 parts per million above ambient gives you an early warning of a fire in velocities that are less than 500 feet per minute. If you have over that you have to look at lower alert and alarm levels.

We do have mines that use the AMS systems in lieu of point type sensors. We still have a lot of mines out there that still use strictly point type sensors also. The AMS systems and the CO sensors are far superior to those point types.

We do have some plans out there that allow for larger spacing, 2,000 foot spacings, and higher alert and alarm levels, 10 and 15 parts per million, but those are older versions, older plans.

As the plans come up for renewal, we are requiring 1,000 foot spacings and five and 10 parts per million in the new plans even in the mines that aren't using belt air at the face also because of the testing data that we have that shows the 1,000 foot spacings and five and 10 parts per million are the best solution for an early fire detection warning system.

MR. MUCHO: Mike, let me interrupt you.

What do you mean by plan renewal?

MR. KALICH: Well, a new mine that opens has to submit new plans. When we look at granting plans for new mines we're looking at 1,000 foot spacings and five and 10 parts per million for use of CO sensors.

MR. MUCHO: Okay. I see.

MR. KALICH: Yes. Alert and alarm levels, ambient levels. For belt air, all alert and alarm levels are five and 10 above the ambient unless the district manager deems lower levels are necessary in higher air velocities. The district manager may require lower levels depending upon local mine conditions. Also, use of diesel discriminating sensors will reduce alert and alarms that are caused by diesel equipment.

Time delays are also used to try to eliminate non-fire related alert and alarm signals. Time delays are permitted when a demonstrated need exists and the delay is approved in the mine ventilation plan. Determination of the length of time delay is dependent upon conditions at the mine. In any case, the maximum time delay is not to be more than three minutes.

The mine operator, if they request a time delay, must document what the peak concentrations of

CO are and the duration of any excursions that occur over the alert and alarm levels. A length of time delay is dependent upon the conditions of the mine and determined on a mine-by-mine basis.

AMS sensors, examination testing, calibrations. Some of the requirements of these are they must be visually examined once each shift, a record of hazardous conditions found must be kept, all alarms functionally tested once every seven days.

A functional test requires calibration gas to be applied to activate the alarms. Any other method used must be equally effective. The AMS operator must be notified prior to testing calibration or alarm activation. The AMS operator must also notify miners on any affected sections where the alarms may be going off because of this calibration and testing.

Calibration intervals are not to exceed 31 days. The calibration gas must be traceable to NIST standards. Calibration gas must be within plus or minus two percent of the indicated gas concentration, and calibration gas and testing must be performed by properly trained persons.

Some of the recordkeeping requirements. You have computer printouts. Handwritten notations are

fine also. Some mines use preprinted forms, electronic records. If it's an electronic record it must not be susceptible to alteration. Well, any record must not be susceptible to alteration.

Records must be kept separately from other records and identified as the AMS log and record retention for one year at a surface location at the mine and made available for inspection by miners and authorized representatives of the Secretary.

Actions in response to alarms. The AMS operator must immediately respond to signals and notify appropriate personnel. In addition, in the event of an alarm from a single sensor or an alert from two consecutive sensors the AMS operator must immediately notify appropriate personnel, which may include the responsible person.

Affected underground personnel must be withdrawn to a safe location as identified in the program of instruction required under 75.1501. Actions must be appropriate for the type of signal received.

There are a number of examples contained in the compliance guide. I won't go over them here, but they are in the handout. There's also a question and answer section in that compliance guide with questions

that came in from the field from miners and mine operators.

There's answers for those questions in that compliance guide also, a total of 55 questions with answers in there that I'm not going to go over here, but they are available to you in that compliance guide.

This was just an overview of what's contained in that compliance guide, so if you have any questions I'd be happy to try to answer them.

MR. MUCHO: Mike, could we go back to the point feeding schematic you had up?

MR. KALICH: Sure.

MR. MUCHO: My question really relates to the remote closing capability.

MR. KALICH: Okay.

MR. MUCHO: Where does MSHA view that that would be actuated from, looking at that drawing?

MR. KALICH: Well, it doesn't have to be automatic. What we envisioned was maybe a pulley type of system where if you had to close the door, if you had a fire on the belt or a fire on the intake, but I think it was mainly for a fire on the belt, where you'd have that cable over onto the intake side, and a person could come up that intake entry, release the

cable and close the door.

MR. MUCHO: Aren't there two locations that need to be provided for?

MR. KALICH: Of course, you could have a system also that would be electrically operated, but you'd have to have it where if the mine power went off maybe some type of battery backup where you could activate it remotely even.

There would be some other possibilities where you could do that. The idea was to be able to keep you in fresh air if you had to shut the door.

MR. MUCHO: I thought it was for putting a vent on the intake where the concept was we didn't want to contaminate the beltway as an escape.

If you had a course of fire in the beltway, there's no reason the contaminants, other than leakage potential, shouldn't come through the regulator --

MR. KALICH: Yes.

MR. MUCHO: -- and contaminate the intake.

MR. KALICH: That cabling system should be outbye the regulator there in the belt entry then.

MR. MUCHO: But isn't there another one that needs to be in the belt entry on the outbye side?

MALE VOICE: Yes.

MR. MUCHO: That's correct, correct?

MALE VOICE: Yes. There's actually one on the belt side too.

MR. MUCHO: Right.

MR. KALICH: Yes.

MR. MUCHO: So where you have the two red dots on that --

MR. KALICH: Yes.

MR. MUCHO: -- would be roughly where one would think someone could activate the closing of the door from?

MR. KALICH: Yes, that was the thought.

MR. MUCHO: You know, the other issue is one of the common ways of point feeding would be to have that regulator located say near the mouth of the section just inby the belt usually take-up area and actually fishtailing the air from the intake into the belt entry.

MR. KALICH: Correct.

MR. MUCHO: Okay.

MR. KALICH: In that case I would envision an automatic type of closure that might be electrically operated/battery back-up type of thing where you wouldn't have to be in the contaminated air.

I mean, there would be no possible way you could close it manually and not be in contaminated

air. You're right.

MR. MUCHO: Where would it be located then on that drawing?

MR. KALICH: Well, in that case you'd have to have something over on the intake side if the problem is on the belt. Of course, if the problem is on the intake side, like I said, you'd have to have something that would be automatically activated where you could do it from -- you know, the AMS operator outside could activate the door through the AMS system.

MR. MUCHO: But again you mentioned earlier the issue of if it is electrically operated, you have an event and you lose power --

MR. KALICH: If you have an event, you're most likely going to lose the mine power so you'd have to have some type of battery back-up where it would operate.

Well, you could have something that would be air operated also similar to what we have in the degassification systems where you run the tracer line, something like that that would release the mechanism and close the door.

MR. MUCHO: That's sort of what MSHA would envision as to how it would be addressed by the

operators is through the monitoring system maybe with some cellanoid system?

MR. KALICH: Right. Yes. If they had that dog-leg like you mentioned, yes.

Yes?

DR. BRUNE: A question from my end. As a mine operator, how do I gauge the impact of this air change on a fire that is on the belt or maybe even in another location in the mine?

If I have a fire in the mine and then effect an air change by closing this regulator or this point feed, how do I gauge the impact that that has on the fire and on the fire gasses?

MR. KALICH: Well, what I would envision is some ventilation studies done beforehand possibly to see what type of effects you'd have by closing various doors or effecting changes in the ventilation. You could at least have an idea ahead of time then on what might happen, what you would expect to happen at least.

Of course, in a fire situation you never really know what you're going to get with the heat and the fire gases and things of that nature.

MR. KNEPP: You know, the committee thought that is the last resort effort. It has to be. You

know, I'm not going to make that call. I think the miners are going to have to make that call, the foreman or somebody like that.

You know, if you have smoke blowing in on you coming out of that belt that might help cut off some of that smoke. It would just be for escape purposes to give you more time, buy you more time to get out of there probably. That's how we see that utilized.

MR. KALICH: In the C.F.R., anything over 9,000 cfm is in effect an air change, but in an emergency situation like that I would expect the mine to either be evacuated already or in the process of being evacuated. The power would be removed.

You know, like Bill said, that would just be a last resort type of thing if you had some folks inby that area where you'd need to close that door.

DR. WEEKS: When these systems were first put in there were a number of false alarms that were a chronic problem. Some of those at least were related to diesel equipment.

Could you give a kind of very brief discussion of what's the source of false alarms and what's the solution? Have they been brought under control, or is it still a problem in some fashion?

What's going on?

MR. KALICH: Well, I hate to call them false alarms because they're really CO, but non-fire related false alarms.

DR. WEEKS: Yes. That's what I mean.

MR. KALICH: Yes. That might be a better term.

I think with the progress that we've made, and the folks at the mine are familiar with the systems now and have a better handle on the installation and maintenance. I believe the false alarms or the non-fire related alarms have been mitigated over the years. I don't believe we have that many at the present time.

I mean, we still have them. Of course, cutting and welding is going to result in an alert or an alarm, but in those instances the folks that are doing the maintenance work, the cutting and the welding, are required to call that AMS operator and required to call the section, you know, and let them know that they're out there cutting and welding and to expect an alarm, tell them where they're at, and then when you do get the alarm you still check it out, but you know that it's most likely related to the cutting and welding.

DR. WEEKS: So there still are some of these alarms?

MR. KALICH: Oh, sure.

DR. WEEKS: Yes.

MR. KALICH: Yes.

DR. WEEKS: On the diesel discriminator, what exactly does it detect? What does it look for in addition to the CO from the diesel?

MR. KALICH: The diesel discriminating sensors measure -- I'm not exactly sure what gas it's looking for off that diesel, but what it does is it compares the combustion gases from the diesel to the CO and discounts the gas that would be generated from a diesel engine. That's how it discriminates against an actual fire and the diesel equipment.

DR. WEEKS: You know, Francart is an expert on that.

MR. KALICH: As far as the inner workings of it, I'd defer to someone else.

MR. FRANCART: Yes. The sensor detects both CO and NO, and it determines a basic correlation between those gases for normal operation, and then it does distinguish between that ratio. When it detects CO without NO then it detects a fire. We found that to be very effective.

DR. WEEKS: Okay. And that's a reliable mark of diesel exhaust?

MR. FRANCART: Yes.

MR. MUCHO: Bill, the number of mines using that detector is very limited. Is that right?

MR. FRANCART: Yes. Mainly in the western United States.

DR. WEEKS: Is that required under the regs if you have diesel equipment that you have a diesel discriminator?

MR. KALICH: No, it's not required. Naturally we encourage that to eliminate these non-fire related alarms, but no, it's not a requirement.

DR. WEEKS: I've got another question, and it's out of plain ignorance. I mean, ventilation is really not my area of expertise.

It would seem to me that in one belt entry that has a higher air velocity compared to another there's going to be a greater dilution of CO. You've got the same fire in one entry as you have in another entry, but you get a lower CO reading because of the higher air velocity. It would seem to me it would detect that CO at a later development in the fire.

Is the alert and alarm level adjusted for that in any fashion? I mean, how do you deal with

that problem?

MR. KALICH: You're exactly right with what you're saying. We're looking at velocities over 500 feet per minute that we'll adjust the alert and alarm levels, but for the lower velocities, no. There's really no adjustment for it.

Bill might be able to speak more to that than I, but I know when this testing was done we looked at a certain timeframe that you'd want to catch the fire in its early stages and the amount of time it takes for the CO to reach a sensor.

In a higher velocity, though, the CO is going to get there faster. In a lower velocity, the CO is not going to get there as fast. Of course, in a higher velocity it's going to dilute it also.

DR. WEEKS: Right.

MR. KALICH: At those low levels, at that five and 10 parts per million level, the fire is in such an early stage that we feel that that is a built-in safety factor there.

MR. KNEPP: Yes, I think that's a good answer right there. I think the numbers are low enough that in normal velocities, and, like Mike said, there are some advantages and disadvantages. With more air, the quicker it gets to the sensor.

I think the testing has shown that at that low level, five parts per million, you're going to detect it unless you have just extremely high velocities and quantities. If that's the case, again through the ventilation plan we can do several things as far as dropping the alert and alarm levels and/or sensor spacing, even though that wouldn't be a big advantage in real high velocity.

DR. WEEKS: Real high velocity is? What are we talking about here? Five hundred feet per minute?

MR. KALICH: Over 500, Bill? A thousand at the most?

MR. KNEPP: We don't feel that's a really big issue. I think we feel the sensors have proven they'll work and give you plenty of time to react to a heating before it becomes a real issue.

MR. KALICH: Yes?

DR. BRUNE: One more question. What is the rationale, Bill, behind the requirement of 300 feet per minute measured inside the point feed regulator?

MR. KALICH: The rationale behind that was that we felt that that would be a sufficient air velocity to keep the contaminants from coming out of the belt and getting into the intake.

DR. WEEKS: But you didn't just pluck it out

of thin air.

MR. KALICH: No. There was testing done on that naturally, yes.

DR. WEEKS: You plucked it out of polluted air.

MR. KALICH: Out of polluted air. Various tests were run to see what air velocities would be sufficient to keep contaminants from backing out in a fire condition, and 300 feet per minute was a good number with some built-in safety factor to it.

MR. KNEPP: That's correct. That's not totally guaranteed, of course, obviously. Like I said, in a major fire, you know, who knows from a ventilation standpoint what might occur.

Again, the thinking was it would buy time for your intake escapeway to stay clear and get out of there. Then you have the door option also.

Are you familiar with the specific testing that was done?

MR. FRANCART: There were some studies done by Jay Hadden years ago and the calculations done by Don Mitchell for a smoke rollback that we counted on to develop that 300 feet per minute threshold.

DR. TIEN: Bill and Bill, what's your experience in terms of the average range of air

velocity in belt entries for the mines you have seen?

MR. KNEPP: I'd have to say more like 50 feet to 300 feet a minute.

DR. TIEN: Okay. So for most of the mines around the lower end rather than the higher end?

MR. KNEPP: Yes. Yes.

MR. KALICH: I've done a lot of inspection work in my time with MSHA. You know, I've found probably more problems with lower air velocities than the higher air velocities.

I'd say in mines that are using the belt air at the face probably 100 to 300 feet a minute. Somewhere in that neighborhood would probably be a good ballpark number. I don't see very many that have the extremely high velocities, but there are a few that have that.

MR. KNEPP: I think rarely extremely high velocities occur in restricted areas. In an overcast or something you may have I think there was an issue where there was an extremely high velocity and we were concerned how the fire suppression system and the sensors I think would react.

MR. KALICH: Yes?

DR. WEEKS: Could you say some more about how the ambient CO level is determined? I mean, is

that an average? Is that a shift average, or is it over a shorter time period?

MR. KALICH: What we looked at was our thought was at least five shifts worth of data and look at the ambient CO levels during that five shifts and try to come up with an average level. We wouldn't consider one shift worth of data really valid to base a decision on.

DR. WEEKS: But is it time-weighted?

MR. KALICH: We'd like to see more.

DR. WEEKS: Yes. Is it a time-weighted average over the whole shift, or is it over shorter time intervals?

MR. KALICH: It would be a time-weighted average over the shift.

DR. WEEKS: Because the AMS, I don't know what the time sequence is or what time intervals it looks at.

MR. KALICH: Of course, you wouldn't want to count diesel in short duration excursions caused by diesel equipment into your ambient. You know, you can take care of that with a time delay. You'd want to average it out over a long time period to see what your actual ambient levels are.

I mean, we have mines that have some ambient

levels at 10, 15 parts per million even without diesel equipment being operated. You know, out west I know, Bill, there maybe are even some higher ambients.

DR. WEEKS: What's the source for that?

MR. KALICH: Inherent.

MR. KNEPP: Inherent diesel equipment that's run 24 hours a day lingering there. It gets pretty consistent. You know, you'll get a feel after a week's study. There's a history there for even MSHA. We have our own inspectors. We have a good feel for what it ought to be.

They do track this diesel equipment, and they'll have spikes sometimes. You'll see them right on the sensor. That's where the time delays come in play. They're on top of that, the AMS operator, and they'll notify.

Then you combine that with some of them use the technology of the diesel discriminating sensors where you get the ratio, the NO and CO. That's another means to make sure that it's not masked.

MR. KALICH: Let me add that the vast majority of mines that I've inspected and I look at and that I'm familiar with across the country have either zero or maybe one or two parts per million ambients, so not to lead you to think that there's a

lot of mines out there with high ambient levels. The vast majority of the mines have zero or maybe one or two parts per million at the most.

DR. TIEN: Just a personal curiosity. For the mines you have seen, most of the mines you have seen are the blowing system or exhaust system? I know that's an age-old question.

MR. KALICH: Both. I mean, a lot of the mines that are going in lately at least in my estimation have been more toward the blowing ventilation systems.

Of course, throughout my career I'm more familiar with the exhausting ventilation systems. The mines that I've worked in and the larger mines that I've inspected in northern West Virginia were all exhaust system mines.

Lately there's been more of a trend toward a blowing system. As far as percentage, I wouldn't want to hazard a guess just off the top of my head of which is more prevalent.

DR. TIEN: Do you have any personal preference? I don't mean to put you on the spot.

MR. KALICH: Seeing as how most of my career was with exhausting, I'll say exhausting.

DR. TIEN: Okay.

DR. WEEKS: The AMS operator has the responsibility for the recordkeeping? That's right?

MR. KALICH: Well, the operator of the mine ultimately has the responsibility for all the recordkeeping.

DR. WEEKS: Right. Are those records kept at the mine, or do they report it to the MSHA district office or to Arlington?

MR. KALICH: No. They're kept at the mine.

DR. WEEKS: At the mine. So if we wanted to look at them we'd have to get them from the mine?

MR. KALICH: Yes.

DR. WEEKS: Okay. I think it would be useful to look at them. I don't know how to get a hold of them.

MALE VOICE: We can help you.

MS. ZEILER: We can try to get that for you.

Any other questions for Mike?

(No response.)

MS. ZEILER: Okay. Thanks, Mike.

We're going to make a minor adjustment to the agenda in order to complete the topic of belt air issues and ask Mark Schultz to come up. He's a Supervisory Mining Engineer in Tech Support, and he's going to cover the health aspects of the use of belt

air.

I also want to remind everybody to please sign in in the back if you haven't already. Thanks.

MR. SCHULTZ: Good morning, everybody. Again, my name is Mark Schultz, and my technical title is Chief of the Environmental Assessment and Contaminant Control Branch, which is part of the Dust Division, which is part of Tech Support, Pittsburgh Safety and Health Technology Center. As everybody knows, we're located outside of Pittsburgh, Pennsylvania.

I've got a fancy title name there, but everybody knows me as the chief of the branch for the field group. Basically as the field group we'll go out and help Enforcement if they have any problems with compliance. We'll go to the mines, take a look at the dust control problems that they have, the controls that they're using, and we'll make recommendations on what they can do to try to get into compliance.

We'll also go out and take a look at new technologies being used in the mines, and we'll try and disseminate that information to the other mines if we think that information can help them reduce their dust concentrations.

I've been asked to come and talk about the health effects of utilizing belt air in underground coal mines and, more specifically, what are the effects of dust concentrations when utilizing belt air to ventilate the working face.

The current dust standard is 71.100, and it states that each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere in each shift to which each miner in the active workings is exposed at or below the 2.0 milligram standard.

Now, these next couple slides are real basic. Part of my job in the Dust Division, I go out and give some workshops on dust control to basically the mine operators and the miners themselves. These are a couple of the slides from there. They're very basic, but they do have a very good point to them so that's why I want to go over those.

Mine ventilation is used to dilute and render harmless. Everybody realizes it's used to dilute and render harmless all noxious gases. Everybody knows that it dilutes your methane for you, but everybody kind of forgets it's also used to dilute and render harmless all mine dusts.

Dust concentrations are inversely

proportional to your air quantity. If you double your air quantity, your concentration is cut in half. N times your air quantity gives you 1/N, gives you half your concentration. That's the formula for it. There if you plug into that formula N is equal to, you double your quantity and you cut your concentration. It's now one-half. The purpose of those slides is to reemphasize that dilution is a very powerful tool used in dust control.

I've been asked to give a little bit of background history of what the Advisory Committee did before. I wasn't around. Basically in the early 1990s I was still working for Consolidation Coal Company, but back then the Advisory Committee was asked to look at belt air. They were looking at the health effects, and they came up with three major concerns of using belt air at the face. These were health related concerns.

Now, to address those concerns they brought them up to MSHA, and Bob Haney basically went out and they started a spot inspection program. They went out throughout the mines to try to get some data to try to help answer those questions.

In the early 1990s -- I think it was 1991 -- Bob Haney gave a presentation similar to this one to

the Belt Air Advisory Committee, and he gave the results of those studies. We'll go over that study here in a second.

He issued a paper, and the paper was titled The Effect of Belt Air on Dust Levels in Underground Coal Mines. Basically in that paper he goes over the spot inspection program they did, the data they had, and he also gave some of the conclusions to the Belt Air Advisory Committee that they had on the health effects of using the belt air at the face.

In this paper Mr. Haney stated that the Belt Air Advisory Committee concluded that the use of belt air could increase or decrease dust levels. However, the change would not have a significant impact on face worker dust exposures.

The committee further recommended that a designated area with a 1.0 mg/m_3 standard be established when belt air is to be used at the face. Basically we have that in the current standard. I think it's 75.371 where we have that standard in there right now. This designated area would be in the belt area; just outbye the section tailpiece.

The reason why they had to add this is that we did have for intake air at 7100(b) which states that each operator shall continuously maintain the

average concentration of respirable dust within 200 feet outbye the working faces of each section in the intake airways at or below 1.0 mg/m_3.

Now, that is pretty specific. It's saying 200 feet outbye. When you get to section tailpieces they can be 400, 500, 600 feet outbye, so we wouldn't be able to apply 7100 so that's why they had to mandate a designated area just outbye the section tailpiece.

Like I mentioned before, the Advisory Committee addressed three specific health-related concerns as far as using belt air at the face. These were the concerns:

The first one was the effect on the intake dust levels when belt air was used at the face, the second concern was the effect on worker exposure when belt air is used at the face, and the third concern was the potential entrainment of dust in the belt entry.

Again, as I said, MSHA conducted this spot inspection program. It was conducted from August through September 1991, and the purpose of the spot inspection program was to assess actual dust levels and extended dust controls that were being used in the mining industry.

Let's get to each one of these major concerns and what kind of information we got from the spot inspection program. The first concern was what effect does belt air have on the intake dust levels when belt air is used to ventilate the face.

Looking at the results of the spot inspection program, they looked at the intake dust concentrations and they found that when belt air was being used at the face the intake dust concentrations were 0.18 mg/m_3 higher on continuous mine sections.

When they looked at that same data for the longwall sections they found that the intake dust concentrations were 0.12 mg/m_3 higher on the longwall sections, and that's a combined intake.

During the spot inspection program they wanted to further look at the longwalls, so at the longwalls they surveyed six longwalls. All of these longwalls used belt air to ventilate the face.

One of the reasons why they wanted to look at the longwalls, they figured if any belt has more dust on it it's going to be the longwall belt because you have more tonnage there. It's a worst case scenario.

When they looked at these six longwalls, the intake dust concentrations ranged from 0.1 to 0.4

mg/m_3. The belt intake air had concentrations, and they ranged from 0.4 to 1.2 mg/m_3. Combining the two intakes, the belt and the regular intake, you had a combined intake concentration that ranged from 0.1 to 0.5 mg/m_3, and that's a weighted average to come up with those numbers.

Yes, sir?

DR. MUTMANSKY: Yes, Mark. Would you go back to the last slide? I just wanted to ask a question about the last slide.

In this particular case where you were looking at these dust concentrations did the data take into account any other variables? Just because the dust concentrations, for example, are 0.18 milligrams higher on continuous miner sections, those may have been dustier mines.

Did the data take into account that kind of a situation?

MR. SCHULTZ: No, I don't think it really took that into account. It just did a survey of some mines, and this is the data that came from them.

DR. MUTMANSKY: Yes, sir. Good. Thank you.

MR. SCHULTZ: Yes?

DR. WEEKS: I've got a question on that slide also. It's not clear to me. When you talk

about higher, higher than what?

MR. SCHULTZ: Basically if you took an average of what the intakes were at the mines that use belt air and you compare that to the mine that didn't use belt air at the face, the intakes we were averaging were that much higher. That's just like an average of all the mines that were surveyed.

I'm not sure what the number was in that. Basically this work was all done in 1991, and I wasn't around at that time. Trying to look for all that data we found some graphs and that, but I can't find much of it.

DR. WEEKS: Haney is still around.

MR. SCHULTZ: Yes, but he's retired.

DR. WEEKS: I know.

MR. SCHULTZ: We do know Bob. If we need to we can try to get more information from Bob and talk to him about that.

DR. WEEKS: Okay. Thanks, Mark. These are section intakes, right?

MR. SCHULTZ: Yes.

DR. WEEKS: And that's right as he's going to the face.

MR. SCHULTZ: Right. The intakes would be taken 200 feet outbye, like I said, just like we would

for enforcement. That's where we measured that.

Like I said, for the belt air coming up the face we would measure that just outbye the section tailpiece or the stage loader. It basically depends on where we would take it in the block outbye the last open crosscut, and the stage loader is approaching the last open crosscut.

DR. WEEKS: Thanks, Mark.

MR. SCHULTZ: Yes.

MR. MUCHO: But in this case this is the total intake mixing if belt air is being used, correct?

MR. SCHULTZ: Right.

MR. MUCHO: Because, I mean, there's no reason for the intakes to be higher if that was not the case.

MR. SCHULTZ: Right. The reason why it's increasing is because of that mixture.

MR. MUCHO: Right.

MR. SCHULTZ: Again, like I said, we looked at six longwalls. The intake dust concentration ranged. It started at .1 to .4 mg/m^3. The belt intake had concentrations. They ranged from .4 to 1.2 mg/m^3, so the one mine actually was out of compliance with what we measured there.

The combined intake concentrations, like I said, the weighted average ranged from 0.1 to 0.5 mg/m^3. When you look at these concentrations, the belt concentrations, what they were contributing to the face exposures, you do the math there. It comes that they were contributing .1 to .3 mg/m^3 of face dust levels to the face dust levels.

We further looked at these longwalls, and they wanted to know where were the dust sources for these longwalls. Again, like I said, the intake air was contributing the .1 to .4 milligrams. The belt air, because of its lower air quantity, was only delivering .1 to .3 mg/m^3 to the face dust levels. The combined intake again was given .1 to .5 mg/m^3 to the face dust levels.

They put pumps inby and outbye the crusher, the stage loader crusher or stage loader in this case, and what they found was that it was contributing 0.5 to 1.3 mg/m^3 of dust.

They also looked at I think it was the No. 10 shield down to the tailwind and compared the dust concentration there. They found the face was contributing 1.8 to 11.3 mg/m^3. That dust would have been from the shearer cutting the coal, from moving the shields, from movement of the shields, from

movement of the coal in the pan line and other sources such as that.

The committee's conclusion after looking at that was that belt air was not a significant dust source on the longwall compared to other face dust sources.

There's a recent NIOSH publication, and it's titled Dust Control on Longwalls - Assessment of the State-of-the-Art. I think they talked about it a little bit yesterday. It's by J.P. Rider and J.F. Colinet, and it did a similar study. It studied eight longwalls.

Four of these used belt air as intake air and four ventilated the belt air to the return. This survey showed that the intake air, when belt air was being used at the face, averaged .18 mg/m^3. The belt air was averaging 0.4 mg/m^3. They didn't give a weighted average on that.

They compared that to when the belt was being used as a return air, and they gave the highest number that they found on the intake at that time was a .34 milligram, but most of the mines, I guess the other three, were below .20 mg/m^3.

This paper concluded that although the average dust levels in the belt entry are relatively

low, the belt entry has the potential to add to face dust levels. However, according to past research studies, and that was Potts and Jankowski in 1992, the potential increase in the face dust levels seemed to be negated by the potential for the increased dilution with the additional air reaching the face.

Now we'll go to the second concern that they had. The second concern was the effect on worker dust exposure when belt air is used to ventilate the face. With a spot inspection program this is pretty simple. All they want to do is look at the designated occupations on the section. They're supposed to be the high risk people, the highest dust concentrations on the section.

They sampled these people and tried to determine whether they had higher concentrations or not when belt air was used at the face. The results of this showed that the designated occupation dust concentrations on the continuous miner sections were 0.64 mg/m^3 lower on the continuous miner sections.

The designated occupation concentration on the longwall sections were 0.33 mg/m^3 lower. Although the intake dust concentrations increased when using air to ventilate the faces, the additional air helped to dilute the designated operators' dust exposures.

DR. WEEKS: Not to belabor the question, but again lower than what?

MR. SCHULTZ: Comparing --

DR. WEEKS: The belt air to non-belt air?

MR. SCHULTZ: To non-belt air.

DR. WEEKS: Sorry.

MR. SCHULTZ: This was just an average comparing the two.

DR. WEEKS: One set of mines to another?

MR. SCHULTZ: Yes, sir. Like I said, I don't know the database, how many mines this was or whatever. It's basically the data that they used at the previous Belt Air Advisory Committee.

DR. WEEKS: Well, there's just a high variation between mines anyway.

MR. SCHULTZ: Right. Everything is site specific. You can go to every section. Those sections relate.

The third question they looked at was the entrainment and re-entrainment of dust in the belt entries. Of course, the entrainment of dust occurs during the cutting, crushing and breaking of material. Re-entrainment occurs when dust that has been initially suspended settles and then become airborne dust again.

Again, a longwall belt was chosen to look at this because it represented a worst case scenario. They had the higher tonnages and the higher belt speeds. For this study they looked at two longwall belts. Each longwall belt was approximately 2,000 feet long. They looked at the inby and outbye dust concentrations along the belt line.

They had relative velocities of 750 to 900 feet per minute. The belt speed, I made a mistake there. That's 625 feet per minute, not 825. Basically the relative speeds were the 750 to 940. Air velocities were 127 and 317 feet per minute in these studies.

The results of these studies concluded that they were getting about a .1 to .2 milligram increase in that 2,000 foot belt. They also looked at dust levels on the outbye sources of these belts, and what they found with this was that the outbye dust sources were much higher contributors to the dust. They were getting 0.8 to 1.0 milligrams. These typically were coming from belt transfers, and I should also have had box checks in there.

What they said is whenever you go through any type of air lock or box checks on the belts you're creating your high velocities, and you're creating a

lot of dust there. These studies indicated that the belt air dust sources were primarily due to outbye transfer points. Re-entrainment was not a significant dust source.

After the Advisory Committee looked at these data and that they came to four conclusions. These are the four conclusions that they came to. The first one is the use of belt air will generally cause the combined intake dust level to increase. If the belt air concentration is greater than the intake air concentration, the combined intake will increase. This increase, however, should not have a significant impact on the mine's ability to meet the 1.0 mg/m^3 dust intake standard.

The second finding was that the use of belt air could increase or decrease exposure at the face depending on the specific section's dust control and ventilation configuration. Any increase would not exceed the increase in the combined intake dust concentration.

What they're saying there is when you looked at your combined intake, if your regular intake came in at a .1 and your belt had a .5 milligram on it and the combined came in at a .2 that that increase of the combined over the intake, that .2 minus .1, is a .1

increase. They're saying that they don't think that the face levels should exceed the increase by any more than that .1, what the increase in the combined intake is.

Yes, Jan?

DR. MUTMANSKY: Mark, in this Advisory summary they're comparing belt air concentration with the intake air concentration. It really should be compared with what you would normally see on the face because the conclusion that they come to is true, but it is more important to consider whether or not it would increase the concentration at the working face.

Do they have an auxiliary summary that makes a conclusion about that?

MR. SCHULTZ: No. I agree with what you're saying really. I don't know if I completely agree with this finding here because I think the way various sections are, I mean, at the working face you could actually get more of that air to ventilate at a specific time.

I can't say that the combined intake is what the average is going to be up there all the time because I know a lot of situations, especially in three entry and stuff like that, you may be getting more of that belt air to ventilate that working face

if they're mining right up there.

As far as any data there, I don't have any more.

DR. MUTMANSKY: Okay. Thank you.

MR. SCHULTZ: I think -- is this the third or fourth one -- either the third or the final conclusion is that the air velocities that result when belt air is used to ventilate the face will typically not be high enough to cause entrainment of dust in the belt entry.

Additionally, the removal of box checks would remove restrictions that cause localized high velocities. This should reduce the amount of dust entrainment taking place in the belt entry.

Yes, Jurgen?

DR. BRUNE: How can you ventilate the belt I guess away from the face? I guess to the face you won't need a box check, but away from the face you will need a box check.

MR. SCHULTZ: Typically you're regulating that air, the force across the face, so you regulate the box check that way.

DR. BRUNE: So you could not normally remove a box check without checking the air direction on the belt?

MR. SCHULTZ: Yes. Basically you need the box checks when you ventilate to return air to restrict that.

DR. BRUNE: Right. The point I'm making is removal of a box check is not generally an option.

MR. SCHULTZ: Right. Yes, unless you're using belt air at the face because then you won't need it.

Okay. The last finding it had, if an increased entry air velocity is caused by restriction dust levels as a result of the entrainment can increase. If increased entry velocity results from an increase in the air quantity, the dilution compensates for the entrainment and dust levels would not significantly change. The added airflow could then provide additional dilution of dust generated in the face areas.

These findings, these were basically their findings back in 1991-1992, whenever that came out. Are there any changes now? If you look at our belt lines today, the belts, they're definitely handling a lot more coal. The belt speeds are probably increasing. Belt lines are longer. The belts are wider.

We probably have a little bit higher air

quantities in the belts right now, and that's probably due because we have increased panel lengths, and we also probably need more airflow to control methane in some locations of these mines.

As part of the field group, I was only given a few days to try to prepare for this. I was trying to think what kind of data do we have to tell us whether belt air is good or bad for us so far? I really couldn't think of too much, but the main thing I could do is take a look at our last field studies that we've done.

I looked at our last reports that we've had over the last few years. We've had 22 reports that were issued, and one thing I'd like to say is when we go out to mines typically we're going out to a mine that is having trouble maintaining compliance, so it's normally more of a problem mine. If there were intake problems and stuff like that, dust concentrations, we would probably see it because we'd probably get called in to see it.

We looked at these 22 studies that we did, and of these 22 studies only two mines were using belt air at the face. The other 20 were using belt air as return air. I looked at the averages on the 20 mines that used belt air as return air. The average

designated occupation on those mines was 1.08 mg/m^3, and the average intake concentration was 0.08 mg/m^3.

One thing I'd like to point out too here is that when we go to the mines we're MSHA coming in. We're coming in because we know they have a problem and so they normally try to clean things up when we're there also.

Again, we looked at two mines used belt air at the face. One was a longwall, and one was a continuous miner section. On this longwall our concentrations, the designated occupation concentration, was a 1.92 mg/m^3.

The longwall intake had a 0.03 mg/m^3, and the longwall belt had an intake concentration of 0.14 mg/m^3, so both of them were relatively clean air coming up there. The combined intake was a 0.06 mg/m^3.

The continuous miner section that we looked at, it was not a problem mine. It was actually a new technology mine. They were trying to use what we call a reverse scrubber, actually directing the scrubber air to the face and recirculating that air.

The continuous miner had a designated occupation concentration of 1.31 mg/m^3. The intake concentration was a 0.63 mg/m^3. If you look at the belt intake concentration it was almost identical to

the intake. Again, it was 0.65 milligrams, and the combined intake was a 0.63.

Typically when we look at those, as far as my group we would say that you have to take a look at both that intake and the belt and lower those concentrations. Typically if we're above a .5 we're looking for dust sources in there. Even though the standard is 1.0, we say if it's above a .5 they have some problems in there.

Basically when we look at our data we can't find any problems at least with what we had there with using belt air at the face where it's causing any exposure problems.

In summary, I think we still agree with the previous Advisory Committee's finding. Belt dust control technology exists that can control and reduce the dust concentrations in the belt entries.

Additional air to the working face can help to dilute dust that is generated and to lower the personal dust exposures, and the designated area which is mandated helps assure the belt line dust concentrations are being controlled.

Yes, Tom?

MR. MUCHO: A couple of things, Mark.

MR. SCHULTZ: Sure.

MR. MUCHO: When you went through the changes since 1992 and the higher tonnages and so forth and so on, and your last slide kind of indicates this a little bit.

It's my observation that one of the more major, significant advances in technologies has been belt line dust control in the last 15 years since they did this. Belt wipers, controls of sprays, controls of transfer points, enclosing of those kinds of areas and so forth has been a rather major advancement since my days back before that.

Does MSHA sort of agree with that, or do you want to comment on that?

MR. SCHULTZ: Yes.

MR. MUCHO: Does MSHA see that there have been major advancements in the dust control problem?

MR. SCHULTZ: Yes. Without a doubt there has been improvement all over in dust control.

The problem we have is we also have the increased tonnages too, and normally dust concentrations are also proportional to the tonnages. You increase that tonnage, and you're getting higher dust concentrations.

There has been a lot of improvement. I know from when I worked in the mines to what they're doing

now there's a world of improvement.

MR. MUCHO: That's the tonnages that provides the motivation for those technological improvements.

MR. SCHULTZ: Right.

MR. MUCHO: Okay. The other point is when we look at these things and talk about mixing these belt airs and intake airs and so forth, the whole thing really comes down to a mixing problem, and it's based on the ratio of the intake air to the belt air.

The contaminants actually applies to dust or applies to methane or whatever contaminants you want to look at. It's strictly a ratio problem of what's the percentage of contaminants in the intake, what's the percentage of contaminants in the belt entry and what is my ratio between belt air and that other intake air.

MR. SCHULTZ: Right.

MR. MUCHO: What I get is a result of that ratio. The answer I get in terms of whether it's helping me or hurting me is based on that ratio, yet we see nothing in the belt air rule that seems to be looking at that what I would consider to be a fairly critical parameter other than we have the 50 percent maximum on the belt line, which is really more aimed

at the pressurization issue so that the belt is the more pressurized airway.

Was there any consideration given to that that you know of as to trying to look at that and controlling it from that aspect?

MR. SCHULTZ: I don't think we ever looked at the ratio itself. One thing that goes with that, though, is the quantity of air too. Like I said, if you had an intake coming up there at 1.5 milligrams and you had enough air, you would dilute that because you have a dilution capacity.

MR. MUCHO: That's what I'm saying. It's those quantities, and the ratio of those quantities results in the answer.

MR. SCHULTZ: Right. Like I said, I think the quantity is just as important with that too as the amount of air going up air.

DR. WEEKS: I also have some questions on dust control on belts. I was surprised when you and others have talked about the principal source of dust on belt entries. There are specific dust sources -- transfer points, for example -- but when you look at the data I don't see that that's measured in any way.

You know, you could get a lower dust concentration on a belt line because there's better

control of the principal dust sources on the belt, and you need to look at that. I guess what I would like to see is some real observation and consideration of dust control sources on belt lines. What are they? How do they work? How effective are they? So on and so forth.

Even though you do get a lot of air or have the potential to get a lot of air off of the belt entry, you can get a lot of air off of other entries as well. It doesn't have to be a belt entry. You know, obviously air dilutes. Belt entries in general have higher dust levels, and it would make sense to me to look at those dust sources and the controls that are being used on them.

You know, you talked about changes that have taken place since 1992. This is just a question. With longer belts, do you get more sources? Are there more transfer points, for example, or are there fewer? Are they better controlled or worse controlled?

I'm sorry to ramble like this, but I just think it would be useful to look specifically at those sources, consider them, evaluate the controls and see what you get out of it.

MR. SCHULTZ: Okay. If there's anything specifically you'd like us to go and look at, like I

said, we can go out and do another study at your request.

DR. WEEKS: Well, when you're looking at a belt entry and looking at dust on the belt entry, when you take your measurements it would be important to look at the sources of dust, the specific sources.

MR. SCHULTZ: Right.

DR. WEEKS: I think an entrainment is not a big deal, but transfer points are.

MR. SCHULTZ: Right. I didn't have the data from what Bob Haney did. Basically he was saying that the biggest dust source was the transfer point, so I think they did have dust pumps inby and outbye the dumping point there.

DR. WEEKS: Yes. I saw Haney's paper. I didn't see any specific -- I mean, I saw him saying it was transfer points, but I didn't see any data to support that.

MR. SCHULTZ: And that's what I was going by. I mean, I was reading through that, and I didn't see the data either. It kind of implies that the data is there because he came with that .8 to 1.0 milligrams. He had to measure that to come up with that number.

MS. ZEILER: We will get in touch with Bob

Haney to see if he has additional data that he can provide.

MR. SCHULTZ: We tried to do some searches on Google and tried to find these. We had some trouble finding even some of the graphs and that.

DR. WEEKS: Right.

MR. SCHULTZ: Like I said, this is 15 years old, so it's kind of hard to find some of that.

DR. WEEKS: I've got another question which you're probably not in a position to answer, but that hasn't stopped me in the past.

You know, NIOSH has recommended a lower dust level of one milligram, and so far the Agency has decided not to do anything about that in terms of setting an exposure limit or revising the exposure limit, but there are other things that could be done in response to that, in recognition that the two milligram limit is not adequate for protecting people against black lung.

For example, if you've got one policy that will result in one dust level and another in another dust level, you could recommend the other if it's a lower dust level. You know, you don't have to go through a rulemaking, but you can say well, we think this policy is better because it results in a lower

dust level.

That's just an example, but there are other ways that you could take account of that recommendation without going through the whole standard setting business.

MR. SCHULTZ: The one thing with MSHA, we can't tell the mine what to do. We can only tell them you're out of compliance. You have to fix the problem and get into compliance.

It's not our job to come in there and tell them to do that you have to do this, this and that. It's up to them. We can make recommendations to them that we think you need to do these things to get in compliance, but we can't tell them how to get in compliance.

DR. WEEKS: Well, that's what I mean in terms of recommendations. You can give a professional opinion.

MR. SCHULTZ: Yes.

DR. WEEKS: You can say well, NIOSH recommends one. We're enforcing two. If you do it this way you'll get a lower dust level. If you do it that way it'll be a higher dust level. The choice is up to you, but these are the consequences.

MR. SCHULTZ: And we do do that. When we do

our surveys, like I said, we'll give them a ton of information, but we can't force them to follow those recommendations.

DR. WEEKS: Unless you've got a rule.

MR. SCHULTZ: Unless they're under citation too. Once they're under citation then we actually now have a little bit of a hammer where we can force companies to make some changes that we deem necessary.

DR. MUTMANSKY: Mark, somebody said yesterday that there have been mines that voluntarily reverse the air on their belts when they started to have dust problems at the working face.

Is it standard policy for you in your recommendations? Perhaps you can't answer this, but perhaps somebody else could. Is it standard practice for MSHA to recommend to the mine operator that air be reversed on the belts if dust is a problem on the belts?

MR. SCHULTZ: Basically I would make that recommendation. If I was looking at a longwall or section and they had high belt air concentration like a 1.0 coming up there and they were having trouble keeping those people in compliance on the section then I would recommend that they reverse it then.

DR. MUTMANSKY: Okay.

DR. TIEN: Mark, this is a pretty helpful results summary, the summary of what happened in the past 15 years or so, but I do have one question.

I don't know if you can find it, but maybe somewhere halfway, the concluding slide from J. Rider's publication on the Dust Control on Longwalls - Assessment of the State-of-the-Art. Yes, the third one from there going backwards, the conclusion of that. Keep on going.

MR. SCHULTZ: I'm sorry.

DR. TIEN: Yes. Now, would you explain to me the second sentence? "According to the result, potential increase in the face dust levels seems to be negated by the potential for increased dilution."

Now, if you have increased dilution the dust level would be lower, wouldn't it, in the face area?

MR. SCHULTZ: What they're saying here is your intake dust levels, when you combined the intake, your dust levels are actually increasing.

If you had a normal intake it's .1. Now the combined is a .2, so your intake dust concentrations are actually increasing a little bit, but your dust levels that the people are experiencing at the face, because of that additional air coming up the belt entry, the culmination is actually lower in the

concentration at the face.

DR. TIEN: Okay. Now to come back to your question, you're comparing it to the intake and not at the face area.

MR. SCHULTZ: Yes.

DR. TIEN: Okay. Gotcha. I'm sorry. Thank you.

DR. CALIZAYA: I have one question.

MR. SCHULTZ: Yes, sir?

DR. CALIZAYA: This one has to do with the particle size. I think most of the reports that you mentioned here, they are dealing with velocities on the order of 400 or less.

In that case, I think particle size is not really a major issue, especially when we are talking about respirable dust, but when you mentioned two cases where the velocity was on the order of 900 feet per minute and the results that you reported here, they are mainly for respirable dust.

Do you have any information on coarse, thick dust?

MR. SCHULTZ: No. Basically we only measure respirable dust.

Now, the reason why those relative velocities were so high, that took into account that

belt speed of 625 feet per minute, so the air velocity is only 125 and 325 feet per minute during that time, but, like I said, the relative velocity was the 740 to 940 because of the belt speed.

So really your air velocities were down below 400 in both those cases, the actual air velocity. It's just the relative speed of the coal moving off the belt at 625 with the air velocity going the opposite direction.

Like I said, really we just look at the respirable. We're not looking at the particle size. We enforce the standard for respirable dust, coal mine dust, and so we just did the respirable dust.

DR. CALIZAYA: So the air velocity was 400 or in that range?

MR. SCHULTZ: Below 400, yes. It was below that.

DR. CALIZAYA: Thank you.

MR. SCHULTZ: Anything else?

(No response.)

MR. SCHULTZ: Good.

MS. ZEILER: Thank you very much, Mark.

DR. TIEN: I'm sorry. Not so fast. The same question now.

Wouldn't that first sentence kind of give

people the impression belt air is bad? You are actually comparing the dust concentration in the belt entry versus the intake, not the face.

MR. SCHULTZ: Yes, that's what they're saying there. I mean, you are getting an actual increase in your dust levels when using belt air at the face. It does have a slight increase. At least here it had a slight increase in the dust levels.

They're saying that's offset by the additional dilution capacity that you're getting with that additional air coming up the belt entry.

DR. WEEKS: Another way to possibly put that is if you got air from another entry that was a lower dust concentration than the belt entry you'd have better control over dust that way than if you had it off the belt entry.

MR. SCHULTZ: Correct.

DR. WEEKS: One of the consequences of using belt air often is the reduction in the number of entries, which has consequences in addition to dust, so if you reduce the number of entries it's going to reduce the amount of control that you have over dust at the face.

MR. SCHULTZ: Yes. Basically that report, when I go and do the workshops, part of that is the

power of multiple entries, like I said.

DR. WEEKS: Yes. I mean, part of the reason I kept asking the questions lower or higher than what is that very few of the comparisons you made were looking at air from the belt entry versus air from an intake entry with lower dust levels.

In fact, I don't see anywhere they've made that comparison and so the answer is sort of foregone by the way the question is framed.

MR. SCHULTZ: Right. See, if that was completely clean intake air it definitely would be better --

DR. WEEKS: Right.

MR. SCHULTZ: -- than having slightly dirty, dustier air coming up the belt line.

MR. MUCHO: I'd like to comment. You know, one easy way I think to look at it is if I have 50,000 cubic feet on the face at .2 mg/m^3 but, on the other hand, I might have 70,000 at .3 mg/m^3, I'm actually better off with the 70,000 at .3 because then I'm going to dilute the pan line, the shield sources and the shearer sources with more air.

MR. SCHULTZ: Yes.

MR. MUCHO: So then my bottom answer is actually better, and that's what is meant by dilution.

If I can have 70,000 by using belt air as opposed to 50,000 by not, I'm better off by using the 70,000.

MR. SCHULTZ: Yes, sir. Okay. I'll try it again.

MS. ZEILER: Thank you, Mark.

With the chair's concurrence, I'd suggest that we take a 15 minute break.

DR. MUTMANSKY: Yes.

MR. SCHULTZ: Thank you.

(Whereupon, a short recess was taken.)

MS. ZEILER: Okay. I think we're ready to start back.

Before we move into the belt flammability issue, Jeff Kohler would like to direct the panel's attention to some of the information that NIOSH has already provided to you that might shed some light on some of the questions that were asked during Mark Schultz's presentation.

DR. KOHLER: During the break that we just had, I had the chance to comment to Linda that a number of the questions that were asked this morning relative to things like the discriminating smoke sensors and dust levels and so forth and so on were really good questions, and there was an obvious need for additional information or maybe even more studies.

But I mentioned to her that in fact a number of the papers that are included on the CD or the USB stick that we gave to you yesterday as part of the NIOSH package in fact do address some of those things, so I wanted to encourage you to scan through those, not only the ones that I called out yesterday, but maybe just scan through a number of them. You may be surprised at some of the specific data that is shown and the specific things that have been addressed.

In particular, Bob Timko and I were talking about some of the dust questions, and he suggested the paper, Effective Belt Air on Dust Levels in Underground Coal Mines, Longwall Dust Control Practices and Use of Air in the Belt Entry to Ventilate Underground Coal Mines would shed some additional light on those things.

Likewise, some of the questions relating to discriminating smoke detectors. There are a number of papers in your package which do that, and I would encourage you to look at that. That's been a very active area of research for some number of years.

Then after you've done that if you find that there's still some gaps or specific things that you need, if between NIOSH and MSHA we don't already have that data we may be able to find a way to get it or

redo an analysis to more specifically answer your questions.

Thank you.

MS. ZEILER: Yes. Thank you.

All right. Now Harry Verakis, Senior Project Engineer with Tech Support in MSHA, will give a presentation on conveyor belt flammability.

MR. VERAKIS: Good morning. Can you all hear me in the back?

We're going to switch gears and talk about conveyor belt flammability, which I call a burning issue.

MALE VOICE: No pun intended.

MR. VERAKIS: To give you a little background on my work, I started with the Bureau of Mines as a research chemist working on dust explosions and fires. Working along in that work, of course what happened was Farmington, and then subsequent to Farmington was the '69 Act.

Then the work was directed towards underground coal mining and of course fire and explosion control, and I spent a good bit of time working in that area on fire and explosion control for underground coal mines.

Then what happened subsequent to that?

Maybe some of you remember the Sunshine silver mine fire in 1972. The direction got changed again, and I began working with metal/non-metal, on fire protection for metal/non-metal underground mines. I spent a lot of time working in that area, of course, on regulatory issues working with the Secretary's Advisory Committee at that time that was set up as a result of the Sunshine mine fire.

Following that, of course, I continued working with MSHA in fire and flammability and approval of fire resistant materials. I continued that work for quite some time, again doing regulatory work, coming up with new and improved fire resistant materials and new and improved tests for fire resistant materials.

Presently I'm working at the Approval and Certification Center, which is near Wheeling, West Virginia, and working on special projects like this one.

What I'm going to do is I'm going to give you an overview of conveyor belt flammability, and I'm going to compress about 50 years of work in something under an hour. Much of the work that has been done as far as our work goes has been with of course MSHA and the Bureau of Mines and now NIOSH. A lot of the work

that I'll be talking about we worked on jointly.

I'll talk about the early history of flame resistant conveyor belts to give you some idea of what was going on, what happened. What kind of flame test was specified? What did the '69 Act say in terms of flame resistant conveyor belts? What's presently required? What are we doing about flame resistant belts at the present time?

I'll talk some about programs that we had undertaken to improve belt fire safety and some of the reasons why. I'll talk about studies on a large scale belt fire test that we did. This was a large scale study that was done in conjunction of course with the Bureau of Mines and MSHA.

From that study I'm going to talk about the development of a new laboratory scale belt flammability test, what came about from that large scale study and what did we come up with and then a voluntary test program where we use the laboratory scale flammability test.

I'll talk about proposed rulemaking. When we came up with the new belt test, what did we do in terms of rulemaking? Then I'm going to talk about what happened subsequent to that, withdrawal of the rule.

Early history. It started back in the 1950s, research work for the Bureau of Mines. Why? Naturally because there were a lot of conveyor belt fires. One of the bigger things I think was there was a fire in Great Britain, the Creswell fire in 1952, and it killed 80 miners.

It had to do with conveyor belts and so the English started working on something, coming up with something better than what had happened with the belting that they had at that time. Also, the Bureau of Mines began working on some kind of a test to come up with a better belt.

There was a development that did occur during that period of time. The British came up with a development, a small scale test, and so did the Bureau of Mines, but there was no regulation, no regulation in this country that required flame resistant conveyor belting.

A testing schedule was developed, and that testing schedule was called Schedule 28. As a matter of fact, to this day if you look at a conveyor belt and you look for markings on the conveyor belt they're assigned by MSHA. You'll see the number starts out with 28. That's a result of the Schedule 28. That was promulgated back in 1955.

I just want to make a point here. Subsequently there was another schedule promulgated, Schedule 2G, in 1968 which continued the flame test for flame resistant conveyor belt, and basically Schedule 2G covered electrical equipment, but conveyor belting was placed into Schedule 2G and Schedule 28 went away.

So now we have Schedule 2G, which is a formal belt flame test program, and acceptances are issued by the Bureau of Mines. Of course, they were issued under Section 28 also. The Bureau ran the test, a small scale test under Section 28. They also continued to run the small scale test under Section 2G. However, Schedule 2G did not require for underground coal mines the use of flame resistant conveyor belt.

What happened? 1969. Section 311 of the Act mandated that all conveyor belts acquired for use underground meet the requirements to be established by the Secretary for flame resistant conveyor belts. This is where you come in with the first mandate on fire resistant conveyor belts is the 1969 Act.

Pursuant to the 1969 Act, Part 75, Section 75.1108, was promulgated, and it mandated that on and after March 30, 1970, all conveyor belts acquired for

use underground should meet the requirements to be established by the Secretary for flame resistant conveyor belts.

Section 1108-1 specified conveyor belts which have been approved as flame resistant by the Bureau of Mines under Part 18 of this chapter, which was Bureau of Mines Schedule 2G, meet the requirements of 75.1108.

What does this mean? What it meant was the work was done under Schedule 28 and the work that was done under Schedule 2G, those belts that met those requirements, they met the requirements that were required under the '69 Act and basically promulgated under Section 75.1108.

I'll talk a little bit about Part 18, Section 18.65. It incorporated Schedule 2G, so now we have another part. You take Schedule 2G for the flame test. We put it in Part 18. This was done in 1977. The flame resistant conveyor belt test now is designated as Part 18, Section 18.65, which we'll call the 1865 test.

The continuity over this time period of 20 some years is still maintained on testing and acceptance of flame resistant conveyor belts from 1955 on through 1977.

Present regulation. The '69 Act specified flame resistant conveyor belts. 75.1108 mandated flame resistant conveyor belts. When the '77 Act came through there wasn't any changes on that language. It continued, so the requirement now in 30 C.F.R. is Part 18.65. That's what MSHA uses in terms of flame resistant conveyor belt testing.

MSHA conducts the flame resistant tests and issues the acceptances. We do that at the Approval and Certification Center near Wheeling. There's been quite a large number of conveyor belt constructions that have been accepted, a large variety of different types of belts. These acceptances are listed on MSHA's home page. If you want to know what conveyor belts have been accepted, you can go to MSHA's home page. You can get that listing.

I want to talk about the 1865 test apparatus to give you an idea. I'm going to get a little bit technical now. I'll give you an idea of what this test involves. What is the apparatus? What's the procedure? What's the requirements for meeting the test? I'll talk about the test criteria for flame resistance and some about the acceptance and belt marking requirement.

Now, this is the test apparatus. If you're

looking at this, this is basically a metal box, a cube, 18 inches square on each side. It has an air inlet on the right side, an exhaust fan on the left side. You take a small sample of conveyor belting. You place it inside the cabinet. You have a Bunsen burner inside the cabinet. You light the Bunsen burner. You pull air across the sample, and you watch how the conveyor belt burns.

This gives you an idea of what sample was used in the test. It's really like a pencil size piece of conveyor belt six inches long, half inch wide by whatever the thickness of the belting is.

Test details. We test four belt samples six inches long, as I mentioned, half inch wide by their thickness. We use a Bunsen burner, a three inch blue flame used to ignite the sample. The burner flame is applied to the end of the belt sample for a minute and then it's retracted, so that serves as the ignition source. The electric fan, as I mentioned a little earlier, is turned on to produce an airflow of 300 feet per minute over the belt sample.

Now, the duration of flaming, how long the belt flames, including any glow, is timed for each of the four tested samples. We're collecting data. Then we take from those four samples the flaming time and

the glowing time, and we average that.

The criteria for passing a flame test is each set of four samples must not result in a duration of flame exceeding an average of one minute, so an average of one minute out of those four samples. If you exceed one minute then you fail the test. If you have glow that's exceeding three minutes on the average you'll fail the test.

Types of accepted belts meeting 1865. Rubber belts like SBR, butyl and neoprene, one to eight plys, SBR meaning chemically styrene-butadiene rubber, PVC or polyvinyl chloride, solid woven and coated, composites such as a rubber cover and a PVC carcass, steel cord belts.

Steel cord belts is more or less a later addition to the different types of belts that we've been evaluating, the rubber belts with various diameter steel cords. Of course, if you meet the 1865 test then MSHA issues an acceptance marking that's placed on the conveyor belt.

Any questions on the 1865 test?

(No response.)

MR. VERAKIS: Okay. I'm going to talk about the conveyor belt fire test program. We initiated this program in 1985, and one of the reasons was there

was an increase in conveyor belt fires during the 1980s. Actually from 1980 through 1988 I believe there were 28 conveyor belt fires.

About 30 percent of these fires involved conveyor belt fire traveling hundreds of feet. Now, remember these are belts that have been accepted under 1865, accepted as flame resistant. Of course, during that time we had the issue of belt air so we needed to make some kind of evaluation on belt flammability with the effect of different air velocities on that belt flammability.

I'll talk about the fire test program objectives. Of course, one of the things was to evaluate the conveyor belt flammability from low to high airflow. The large scale belt tests, as I mentioned earlier, were performed by the Bureau of Mines in cooperation with MSHA.

We obtained this flammability data on conveyor belts from small scale tests, and we used the data that we got to develop and improve small scale tests for belt flame resistance and approval.

Large scale fire tests. They were conducted in a surface fire tunnel that was constructed by the Bureau of Mines at their Lake Lynn Lab, which is near Fairchance, Pennsylvania, not too far from Morgantown.

The tunnel is about 90 feet long, connected to an axial vane fan, its floor with a width of about 12 and a half feet, and the height to the center of the arch is about eight feet and the cross sectional area is around 80 or 81 square feet.

This gives you a picture of the tunnel itself. You get an idea of the open area of the tunnel. We're looking at the open end of the tunnel opposite the fan.

We conducted fire tests on conveyor belts that ranged from 30 to 50 feet long and about 40 to 42 inches wide. We tested different kinds of belts -- belts with SBR or the styrene-butadiene rubber type belts, neoprene belts, PVC belts -- that met the MSHA required 1865 flame test. Some of the belts also met higher flammability standards of other countries like Great Britain and Canada.

The fire test permitted airflows from about 150 feet per minute up to 800 feet per minute. Actually we ran a couple of tests at I believe we were up around 1,200 feet per minute airflow.

This is what the belt test setup looked like, just the placement of a single strand of the conveyor belt on the conveyor roller structure. The end closest to you was where we ignited the belt. Of

course, we had a lot of data collection, and thermocouples were used to measure flame spread along the belt length. It was stationary. It was not a moving setup.

This gives you an idea. One of the tests for the belt is actually under fire. This is the kind of smoke you get from belt fire. It gives you an idea of what's produced.

With the results of the belt fire tests we did do some double strand tests and we did do a few tests with coal on the belt, but the majority of the testing was done with a single strand.

What were the results? Well, strangely or not so strangely, it showed that an airflow of 300 foot per minute was optimum for flame spread. Is that coincidental with the 1865 test? The 1865 test is set for an airflow of 300 feet per minute.

We observed several different types of flammability behavior: One, rapid flame spread greater than about 13 feet a minute and burning the entire belt; you get rapid flame spread where it just chars the entire top surface, but the bottom of the belt is undamaged; slowly propagating flame from anywhere from about one to about four and a half feet per minute the belt consumed; no flame propagation

over the entire length of the belt except for the ignition zone area.

DR. BRUNE: One question. Can you clarify? All these belts did pass the 1865 standard test?

MR. VERAKIS: Yes.

DR. BRUNE: Is that correct?

MR. VERAKIS: Yes. Actually, before we ran the large scale test we conducted the 1865 test on those belts.

There's a lot of data from the large scale tests, and we don't have the opportunity to go through all of that at this point in time. There were papers written on it by the Bureau of Mines and of course MSHA, and you can get the data from those papers, more specific data from the papers. Jeff Kohler had also given you a listing of papers. Those papers will detail the results of the large scale tests.

Now, having this data we decided what we were going to do, and I'll go back. I'll take a step back. We went to large scale for a couple of reasons. One of them was because of the belt air issue. You know, what happens with airflow low to high?

The other thing is okay, we want to try to improve things on belt flammability, and how are we going to go about doing this? We need some kind of

data. We've got belt data from the MSHA 1865 test, you know, and now we have data from the large scale test. We're showing we've got belts that aren't flame resistant.

The other thing is we went back and we looked at what happened in other countries. What did other countries do as far as this kind of conveyor belt flammability issue? We were looking for data from other countries.

The problem with data from the other countries, they didn't go high enough in the airflows, different configurations, and there just wasn't a whole lot of good background on large scale testing so we really said we need to start at step one, and we need to get data from large scale tests, something that's more reasonable like a mine entry.

That's why we set up the large scale fire testing at Lake Lynn. That did give us quite a bit of data. We take this data from the large scale fire test, and now we want to develop a smaller scale test because working with a large scale fire test takes a lot of resources, a lot of time. It's just not the tool for some kind of approval or acceptance test.

We took that data, and we used the data to develop a laboratory scale test. Now, what we did was

we had to develop some kind of criteria on the large scale test for pass/fail, so what we said is a belt passes if the fire damage did not extend to the end of the 30-foot long test sample.

If it didn't burn all the way to the 30-foot sample then you would pass. Also, a portion of the test sample was undamaged across the width of that belt. If you went 29 feet and you had a foot left across the width of the belt, you passed the test. This was the large scale criteria. This is what we used for the large scale test.

Of the belts that we tested under the program, 17 different types of belts, six passed the criteria. So now we have something to work with. We're going to develop this laboratory scale test now using the data from the large scale test.

We've got things like airflow that we have to deal with, a test sample width and length, the ignition source, the duration of the ignition source. These are all parameters in trying to develop a test that is going to give some kind of reasonable results based on a large scale test.

The test that the Bureau of Mines came up with was about six foot long and about a one and a half foot square tunnel connected to an exhaust fan

again. We used the natural gas jet burner for the ignition source. This is what the laboratory test looked like. It was just a tunnel, six feet long. In the front you can see the jet burner and then the exhaust system in the back with a hood in the front in case there is any combustion product escaping to draw those off.

Now, in the tunnel we used a steel rack to hold the test sample. It was actually flat. This test sample was nine inches wide now by five feet long. Remember, in 1865 we're dealing with a half inch wide and six inches long. Now we're dealing with a much larger sample.

The airflow through the tunnel now is 200 feet per minute. We used this natural gas burner for ignition, and we held it on the belt for five minutes. This is what it looks like when you have a belt sample set up in the tunnel, and this kind of gives you an overall schematic of the tunnel test itself, and then of course an example of a belt fire test in that tunnel.

Now we have to develop criteria for pass/fail on this test. The criteria that was developed was the belt passes if in three test trials there remains a portion of the five foot sample length that

is undamaged across its width.

Similar to the large scale test, now you have a five foot piece of sample. If you burn the whole five foot piece of sample, you fail. We do that three times. You fail a test in any of the three test trials if fire damage extends to the end of the five foot sample length.

What we found was the comparison between large scale test data with the lab scale tests were in pretty good agreement. One of the things that is difficult in flammability testing is trying to come up with a laboratory or a small scale test that meets precisely what you would get in a large scale fire. It's a very difficult thing.

I don't know at this point of any flammability tests in the industry -- not only for conveyor belts, but for other materials -- where you get perfect agreement with a small scale test based upon large scale data. There are differences, but what was developed here was in pretty good agreement. Again, to get more data on the lab scale fire test there's Bureau of Mines and MSHA papers on that.

Now we have a laboratory scale test. What do we do? We hold a public meeting in January of 1989 to discuss where we're going to take this laboratory

scale test. We're going to come up with a voluntary program to make some evaluations on it to get a better feel for using the test. At the same time we say we're going to propose rulemaking to replace the 1865 test with this new lab scale test.

We had 21 companies that participated in the MSHA voluntary belt test evaluation program. There was no charge. These companies would come in free of charge. Whatever belt samples they had, we would make evaluations on them using this laboratory scale test.

We did almost 700 individual flammability tests on the conveyor belt samples from these companies. There are 112 different constructions and formulations of belts that passed this new lab test, which we designated as BELT.

Now we're into rulemaking. We initiated the rulemaking in 1989. We were going to replace the 1865 test. We proposed a rule for testing and approval of flame resistant conveyor belts with this new laboratory scale test. It was published in the *Federal Register* the day before Christmas 1992. We also modified 75.1108 to require acquisition of conveyor belts meeting the new test.

We held a public meeting in 1995 on this rulemaking. The belt test rule was open for public

comment several times following the proposed rule and the public hearing.

Now, what happened? On July 15, 2002, it was announced in the *Federal Register* they were going to withdraw the proposed rule for the new conveyor belt test. The reasons for their withdrawal were indicated in the *Federal Register* notice.

We've now had a significant decline in conveyor belt fires from 1993 to 2002. There's improvements in belt monitoring. I mean, you've heard quite a bit of that over the past day or so. There's technology advancements to minimize friction on the belt because that's a primary concern as far as fires is friction, roller and bearing improvements.

So where are we at this stage? Well, the 1865 test was approved as the schedule back in 1955, so this past November it's now 51 years old.

Any questions?

MALE VOICE: That's it?

MR. VERAKIS: That's it.

MR. MUCHO: Your ending is different here.

MR. VERAKIS: Thank you.

MR. MUCHO: No. It's not that easy. You know, one of the things I don't see any evidence of in the U.S. is consideration or looking at friction drum

tests.

Do you know? Was there ever any consideration given to friction drum testing at conveyor belts?

MR. VERAKIS: Yes, there was consideration given on friction drum testing. As a matter of fact, in Section 28 there was a drum friction test.

I believe what happened as time went on, in 1969 of course you had changes in regulations with the '69 Act. You had things like slippage switches and so forth. What occurred then in effect is the drum friction test was dropped and all we have is the flame test.

MR. MUCHO: Do you have any idea as to what the thinking was as to dropping that?

MR. VERAKIS: I believe it was because of other controls in the '69 Act such as the slippage switches and fire protection in the belt entry.

MR. MUCHO: Another question. I looked over the number of approvals of conveyor belts, and the list is surprising lengthy in terms of the number of belts that have been approved.

MR. VERAKIS: Yes.

MR. MUCHO: In looking at the list, I couldn't get an indication of time period as to when

these belts had been approved. Has there been activity in that area recently?

MR. VERAKIS: Yes.

MR. MUCHO: Okay. I notice there seemed to be a lot of what I'd call foreign belt manufacturers more recently. Is that a trend that you've been seeing?

MR. VERAKIS: That's been a trend over the past 10 years or so. It's been a trend for more foreign belt manufacturers.

The other trend is of course the reorganization and combining of belt companies so that the listing that you see on the website, there can be a number of those companies that really aren't producing belts.

I think actively there is probably on the order of maybe a half a dozen or so that are producing belts. I mean, I don't have an exact count. Some of the companies will go out of business and we're not notified of that, that they've gone out of business, or else they have acceptances or documentation from us and they're not producing the belt and they haven't produced the belts that they got accepted from us for quite some time.

MR. MUCHO: Okay. Of the recent activity

over the last 10 years that people have been submitting these belts for approval, do you have a feel for say percentage-wise how many of them would have passed the proposed test, or don't you have any way of knowing?

MR. VERAKIS: With 1865, you cannot use that information to tell you. You can't take the 1865 data and be able to tell that.

I mean, in 1865, because you had the one minute time criteria, you know, maybe a belt will only flame for 10 seconds. We don't know by that 10 second value whether or not it would meet the new lab scale test. There's not a correlation --

MR. MUCHO: Right.

MR. VERAKIS: -- between that data of what you would get in the new lab scale test. I mean, if there was we certainly would have been using it because that way then we would make even smaller that lab scale test.

MR. MUCHO: Is there any sense from your vantage point in testing these belts recently whether there have been a number of belts -- well, let me back up one second.

We know there are international standards that vary around the world, and we know that a lot of

the coal producing standards, fireproof resistance requirements -- fire resistance requirements rather -- of conveyor belts internationally are I'll call them somewhat higher than the U.S. standard.

Have a lot of those kinds of belts been presented to MSHA for approval in the recent 10 years or so?

MR. VERAKIS: Yes, there have been belts that have met other countries' standards that have been submitted to us and passed our testing. Yes.

MR. MUCHO: Okay.

MR. VERAKIS: You know, as far as the 1865 test, if you try to make a comparison between the 1865 test and worldwide standards, worldwide standards, just as some examples, the Australians, the British and the Canadians are much more stringent than 1865. Even the German testing is much more stringent than the 1865 testing.

Now, the new laboratory scale test, the BELT test, from the limited information that we have it matches up pretty well with those other tests. As a matter of fact, it may even be better in terms of fire resistance than the British or the Canadian or the Australian.

What had happened, at the time that we were

developing the laboratory scale test, the Canadians naturally were interested in the work. Of course, so were the British and the Australians. They were interested in the work that we were doing, but the Canadians had what I'll call a midsize scale test that's basically called a propane burner test. They're running it up in Canada.

It's cold in Canada, and they were running this test. They had a lot of problems in running the test. They looked at our lab scale test and said maybe this is the kind of tool we can use to replace what we've got. In fact, that's basically what happened. My understanding too is that they were using this laboratory scale test in Great Britain.

One of the things that we tried to do with the laboratory scale test, and very quickly you can get to be expensive with this testing. You can get to be complicated with the testing. Procedures become complicated, a lot of steps to follow.

We try to simplify all that, come up with an apparatus that you could run in a laboratory, you know. It's not going to take a whole lot of equipment. It's not going to be real expensive to do it.

It's going to be easy to run it, easy to

clean, easy to work with, and yet is going to give you results that you have a pretty good reliance on, and you're going to have a good fire resistant belt. That was part of the overall objective.

MR. MUCHO: Does MSHA have any feel for some rough percentage of conveyor belts run or that have been run that would meet the belt fire standards?

MR. VERAKIS: About 10 to 12 years ago I had that kind of information when we were doing the laboratory scale test that there were some companies that actually produced belt that met that test, and they actually sold that belting to several underground mines. My understanding was that it worked out pretty well.

How many? Like I say, the information I had was several.

Yes, Jurgen?

DR. BRUNE: Based on your experience, would you say that the BELT test is an adequate test to characterize belt as flame resistant or flame retardant for coal mine use?

MR. VERAKIS: Based on my experience and based on the work that we've done over the past 30 some years, it's a definite improvement over 1865. Definitely an improvement, yes.

It's a pretty good test. You're going to get a pretty good fire resistant belt, you know. A lot of these tests, you have to look at the test and say you have this five foot sample, and you're putting a gas jet burner on the end of that sample and igniting it for five minutes. That's a fairly long time, pretty stringent.

It's designed to meet what you've got on a large scale. That's one of the things so that there is some comparison there rather than just pulling something out of the air. My personal feeling is it is a pretty good test.

DR. BRUNE: Let me ask you the other question. Are you aware of any tests that other countries use that would better represent that characteristic?

MR. VERAKIS: Not really. You know, when we made a comparison some time ago with the limited data that we had, if you take the British like the propane gallery test, what's called a high energy propane gallery test, the comparison there was they were pretty much equal.

As a matter of fact, as I could best remember I think that the BELT test, the B-E-L-T test, was a little more stringent.

DR. BRUNE: Thanks.

MR. MUCHO: Harry, some countries require an electrostatic test of conveyor belting as well. Has MSHA looked at that over the years? Obviously there's not a test for it, but if they rejected it what was the rationale?

MR. VERAKIS: Yes, we did look at electrostatics. Of course, like the British, they have electrostatic test requirements.

We did look at electrostatics, but one of the things that we felt in this whole belt flammability issue was flame propagation. That's our main concern. We've got these fires that were going on with belting that met the 1865 tests. We needed to do something about flame propagation.

Yes, we looked at electrostatics, but the other consideration about electrostatics is you've got the belt on a metal structure, and the metal structure should be grounded, you know, so is there real significance in the practical world with electrostatic tests on conveyor belts?

MR. MUCHO: Do you have any idea what some of these countries' experience is with that test? Do they get belts that don't pass the electrostatic part of it and seem problematic?

I haven't been able to understand the electrostatic push either for the same reason. It doesn't seem to make sense, but since there are a number of countries that do that do you think they did it for a reason? I'm just wondering why they're continuing to do it.

MR. VERAKIS: Yes, and I don't have a good answer for that. I don't have the data to look at and say well, this is what they did and why they did it. Again, our primary objective was the flame propagation end.

I think one of the things considered too in all of this is that the first line of defense is to have a belt that's not going to be burning hundreds of feet. That's the first line of defense.

You know, regardless of the airflow and regardless of these other things, if you have a conveyor belt that is not going to be burning then you don't have to worry about things that are going to be malfunctioning, that may not work; you may think do work and they don't work. We've had instances of those in some of the accident investigations.

DR. MUTMANSKY: Harry, when Tom brought up this issue of the electrostatic tests, can you tell us what incidence instigated the electrostatic test? Is

there some sort of evidence that these countries had that required them to take a look at this?

MR. VERAKIS: My personal feeling is there may have been some issue about methane coming off the coal layering in the conveyor belt roof area and maybe electrostatics played some role in that, but I don't have any data. I don't have the data. That is just a personal thought.

DR. TIEN: Harry, if I remember correctly, you're talking about the large scale belt test is stationary? The belt was stationary?

MR. VERAKIS: Yes, the belt was stationary.

DR. TIEN: Do you have any feel for or theoretical speculation that there is any difference in terms of when the belt is moving against the airflow on the impact of the flame propagation?

MR. VERAKIS: If the belt is moving and you've got fire on the belt, it is a very complicated situation of what's going to happen. I mean, we have enough difficulty with the belt being stationary and collecting data off of it. I mean, that's like a foundational thing, you know.

If you start moving the belt now, and one of the things is trying to get that belt on fire when it's moving. If you do get that belt on fire when

it's moving, what's going to happen? It's a very complication situation, and we did not go that route.

The idea again was we wanted to see when you get that conveyor belt ignited what's going to happen to it. A lot of times, as you probably know, if you have a fire on the belt area the belt gets shut down hopefully.

DR. TIEN: Thank you.

MR. MUCHO: Just one point, Harry. Part of that reason is the stationary belt is sort of a worst case.

MR. VERAKIS: Yes.

MR. MUCHO: Like you said, the gap between igniting a stationary belt, which is when it generally might when they're stopped, compared to a moving belt is just a major gap in that whole thing, so really when you're looking at stationary you're looking at what most people would call worst case.

MR. VERAKIS: Yes. It's really fundamental.

DR. TIEN: Thank you.

MR. VERAKIS: Any other questions?

(No response.)

MR. VERAKIS: Thank you.

MS. ZEILER: Thank you, Harry.

I think we've reached lunchtime. We can

break for lunch. The chair would like us to return when?

DR. MUTMANSKY: Let me look at the schedule and check.

MS. ZEILER: Okay. We'll have the open panel discussion this afternoon.

DR. MUTMANSKY: We're scheduled for 1:00. I don't see any reason why we can't beat that 1:00.

MS. ZEILER: Okay.

DR. MUTMANSKY: Let's go for 1:00.

MS. ZEILER: Let's reconvene at 1:00.

(Whereupon, at 12:01 p.m., the briefing in the above-entitled matter was recessed, to reconvene at 1:00 p.m. this same day, Wednesday, January 10, 2007.)

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A F T E R N O O N S E S S I O N

(1:07 p.m.)

MS. ZEILER: Okay. The chair has given me the green light to restart the meeting this afternoon.

I just wanted to say that on the agenda we're now going to proceed with the open panel discussion, which kind of is an outline of what the panel would like to discuss particularly at the next meeting and any additional future plans you'd like to make today.

Dr. Mutmansky had given me what they're tentatively agreeing on, which would be a meeting in Pittsburgh in mid March as the next meeting and some topics that might be considered for that meeting, which would last two and a half days.

I guess I'll turn it over to the panel if you'd like to discuss.

DR. MUTMANSKY: Thank you, Linda.

I've had a very interesting day and a half interacting with the other members of the panel, and I'd like to thank the panel for being so cooperative and the MSHA people for being so supportive of our efforts.

First, we tried to formulate a plan for our next meeting. We discussed the possibility of meeting

in conjunction with the SME meeting in Denver and then decided that it was too complicated and that rooms might be difficult to obtain so we decided instead to tentatively hold our next meeting March 14 through 16 in the Pittsburgh area.

Some suggestions have been made already about where we would hold this meeting, and the only thing we can say at this point in time is that the availability of meeting sites will be a big factor in this issue.

Now, if you would like to get an idea of what we're going to be discussing, we have several major topics we'd like to get as much information on as possible. Belt flammability and materials is one topic, and we certainly would want to hear from some of the industry people here.

We might like to have comments by representatives of the National Mining Association and UMWA perhaps, but we would like to get as much real data as possible on that particular topic, and we would like to invite those of you who have ideas about who should be speaking at this meeting to contact Linda or myself with your basic ideas.

We've already been in contact with a couple of the belt manufacturers who are here today, and I

think it would be worthwhile for us to widen our thinking as to who else should be speaking on the belt flammability issues.

Now, we also would like to have representatives of monitoring systems talk about some of the capabilities and the issues that relate to belt air usage in the underground and so we will have to develop contacts with those people. If you have ideas as to who we should contact, please let us know. Again, we would like to have comments and speakers from both industry and UMWA if appropriate.

Then there are two other issues. Lifelines, escape and rescue issues might be one we'd like to also address in this meeting, and I think we're going to take the third and fourth topics and perhaps do a little less time on those two topics, but it is important to discuss some of these issues, lifelines, escape and rescue issues and dust issues.

I would like to perhaps invite some appropriate person from NIOSH to talk on the dust issues, and we may be able to get Jeff Kohler to have one of his people discuss those issues with relationship to belt air.

At this particular point in time we would like to have anybody here who's interested in

contributing to our thought process here to give us their ideas as to how we should develop this meeting.

We have tentatively scheduled it as two and a half days, Wednesday, Thursday, Friday morning, and the only reason we can't be more definitive is that we don't even have a meeting site yet. This is still very tentative.

First before we go to the audience here, would anybody on the panel like to make comments to supplement what I've already said?

MS. ZEILER: Can I interrupt just for one second? The *Federal Register* notice said that today's meeting would not allow for public comment.

DR. MUTMANSKY: Okay.

MS. ZEILER: We actually can't do that today.

DR. MUTMANSKY: All right.

MS. ZEILER: So you're talking about the future meeting actually in that regard.

DR. MUTMANSKY: Okay. All right. Other members of the panel?

DR. WEEKS: You gave us a list of documents that were available. There's several of those that I'd like to get plus others that were not on the list. How do I make that request?

MS. ZEILER: That can come through me.

DR. WEEKS: Okay.

MS. ZEILER: Or give it to Jan. These are documents that are not either on our list or on the NIOSH disk?

DR. WEEKS: Well, I don't know whether they're on the NIOSH list. I don't think they are.

MS. ZEILER: Okay. If they're not on either one just let me know.

DR. WEEKS: All right.

DR. TIEN: Jan, I am just wondering. Is it possible to put your address on the screen?

DR. MUTMANSKY: Email?

MS. ZEILER: We've got those lists for you.

DR. TIEN: Okay.

MS. ZEILER: We made those up for you. Hazel made that up for you yesterday. I just haven't passed it out yet. You'll get the contact list. In fact, we'll do that now.

DR. MUTMANSKY: Linda, would it be okay for us to give our email addresses to the audience in general here for contact?

MS. ZEILER: I'm looking at the solicitors to make sure I'm okay.

DR. MUTMANSKY: Okay.

MS. ZEILER: I think the advice I'm being given is probably good, which is most requests like that should come through me initially because we'll have to get some grasp on how much input we're getting and how to frame that for future meetings, so I think it should all be funneled through my email address, which Hazel is going to put up on the screen.

DR. MUTMANSKY: Good. Good. Thank you. I'm happy with that. There may indeed be good reasons for doing that.

MS. ZEILER: Yes.

DR. MUTMANSKY: Okay.

MS. ZEILER: Do you know of any specifics on any of these topics offhand other than what you've said, or would you like --

DR. MUTMANSKY: Yes. Well, let me put some thoughts out there that have been passed on to me by panel members.

MS. ZEILER: Okay.

DR. MUTMANSKY: The kinds of questions that come into our mind I think are the following: First, in terms of belt flammability we really would like to know what's going on in other countries and how it compares to our own country.

We also would like to get as much

information as possible about all aspects of belt materials that would pertain to this problem.

Some of the issues that have been addressed or, excuse me, some of the issues that have been discussed also with regard to monitoring systems is whether or not monitoring systems can play a bigger part in mine safety in a mining system where belt air is being used at the face, and we're asking this as a question, and I think several people have said shouldn't we be looking at that very carefully.

The additional topics that you see outlined here have been suggested this morning as supplemental topics, and one of the things we wanted to try to do at this next meeting is get deep into several of these topics, and we felt that the escape issue and rescue issues are important, and we also felt that the topic that we've discussed this morning, dust issues, is also important, and we feel we need more information on dust issues at this next meeting.

Jim, why don't we take turns? Why don't we take turns here, Jim? Why don't you make any comments you would like concerning the things we would like to accomplish at our next meeting?

You may have some thoughts that I've not been expressing, and I'd appreciate it if you would.

We'll do this in turns.

DR. WEEKS: Well, let's see. I turned the mic so that I could be silent. You caught me sort of off guard here.

DR. MUTMANSKY: Yes, I did.

DR. WEEKS: Yes. I was very happy that Florida beat Ohio State.

Well, there are issues that have not been addressed at all, and one of them is fire prevention. We've talked about fire detection and suppression, but we haven't said anything about preventing fires on belt entries and controlling the conditions that lead to those fires and trying to get a better understanding of what those are and so on.

One of the requests that I'm going to make, Linda, is to get an accounting from MSHA of violations on belt entries, particularly those that are used for ventilation, looking at things like what is the frequency of say broken rollers or accumulation of combustible materials or whether or not dust controls are functional and so on.

You know, a better line of defense is if we can prevent fires then we don't have to worry about atmospheric monitoring systems or things of that sort functioning. That would be a better way to get safer

mines is to take a look at the prevention side of things.

Another issue that hasn't been discussed much is that implied in the use of belt air for ventilation -- and more than implied; it was stated here yesterday and today -- is that there would be a reduction in the number of intake entries and generally supported because it would improve ground control and make ventilation more efficient and so on.

At the same time, if you reduce the number of intake entries you reduce the number of escapeways, and that is inherently a decline in safety. I'd like to get a better understanding of what the implications are of fewer entries. I don't know who might address that.

A third issue, more procedural, we've heard a lot from the folks at MSHA, particularly in Tech Support. It's been very enlightening and I appreciate the time and effort they've put into that, but NIOSH has a lot of expertise in this area. They've look at it also. I'd like a list of names and contacts and topic areas of NIOSH people that can speak to this issue as well.

You know, Jeff Kohler gave us this memory stick with a lot of documents on it, which I

appreciate, but I'd like to attach some names to that too because I want to follow up on some of these things.

MS. ZEILER: Okay. I'll just mention one thing. We do have Robert Timko from NIOSH who's on our staff.

DR. WEEKS: I understand.

MS. ZEILER: Those kind of questions could also go through him, but we'll address what you've asked for.

DR. MUTMANSKY: Thanks, Jim. I appreciate it.

Now, the next guy I have never known to be caught off guard so, Jurgen, what would you like to say?

DR. BRUNE: I had a couple minutes here to prepare my thoughts, but what I would like to address and have addressed and really this committee and the public to understand is that there are some fundamental issues -- physics -- about mine ventilation that I would like to better understand and shine the light on to make sure that we understand.

For instance, things about pressuring the track or intake air of the belt to make sure that any smoke that happens to be in the belt entry is

contained in that belt entry and does not migrate through stoppings and leakage into the intake or track escapeways.

One other thing that has not been discussed here, and I'm not sure if it's still the case today, but there may be mines still that have common entries where belt and track is carried in common entries. Is that still the case?

MR. KNEPP: That's very rare I think anymore.

DR. BRUNE: Yes. I mean, especially in those cases where the track then is potentially used as an escapeway, that would make an issue if you have a belt fire. Then you're automatically in the smoke and can no longer use that track as an escapeway.

Those are some of the issues that I would like to have addressed in connection perhaps with the function and the capabilities of the atmospheric monitoring system because that becomes a much more critical element in situations of this nature where you cannot guarantee that the belt air is going to contain the smoke away from travelways that are potentially used in escape.

DR. MUTMANSKY: Jurgen, is that all you have to say?

DR. BRUNE: Yes, for now that's all.

DR. MUTMANSKY: Thank you.

Jerry, how about yourself?

DR. TIEN: Well, between the chairman and the other members I think you have covered most of the issues I'm interested in for now, but I am interested in one of the things we'll be addressing in further detail, and that is the second one, AMS capabilities and issues.

I spoke to Bill yesterday, and Bill and his colleagues have done certain surveys back in the past, three times, as far as the application of these AMS systems. I'm just curious about the latest and the level of sophistication, the level of usage in the field, the background information.

If you could provide such data, that would be quite helpful to me. Thank you.

DR. MUTMANSKY: And now, Felipe, if you'd also give us your thoughts?

Thank you, Jerry.

DR. CALIZAYA: Okay. I have a couple of comments to make. One is regarding the number of mines that are involved with this belt entry.

In other words, I'm sure MSHA has a list of mines that are using this system, and some of them are

used for intake. In other cases they're used for return. It would be helpful for us to have those statistics.

DR. MUTMANSKY: Yes. Linda, I was going to ask you for that later, but maybe it can be done at this particular point in time.

Last night we were discussing the issues of how many mines are currently using belt air at the face, how many mines are using systems that reverse the air on the belt and how many mines used to use belt air at the face but have reversed it voluntarily to improve dust or other conditions.

If those statistics are available to the committee, it would be very helpful.

DR. WEEKS: Somewhat along those same lines, it would be helpful to have an up-to-date list of the number of mine fires or belt fires.

MR. MUCHO: In addition with that list of the mines using belt air, I would actually like to know what the actual mines are.

We suspect we know the general outline of who they are and so forth, but would like to see that especially post 75.350 as to what kind of mines are we really dealing with.

DR. MUTMANSKY: Yes. Linda, when doing that

it would be helpful to us also to know how many of the mines are longwalls with two entry systems and three entry systems and so forth. I think that becomes a very important issue when you deal with two entry mines.

Jerry?

DR. TIEN: Yes. I'm pretty sure that this is redundant. I just want to make sure.

On the list in addition to the name of the mines and any other relevant ventilation related issues, the quantities, the velocities, all the things that will help us understand more. That would be helpful.

MS. ZEILER: Okay. I'll of course need to get with staff and the solicitors. Anything we can give you along these lines that's publicly available we will provide.

DR. MUTMANSKY: One of the things is we have not read everything you've given us yet.

MS. ZEILER: Right.

DR. MUTMANSKY: So there may be some of that information in there. If so, just point it out to us because we haven't had time yet to read the material that you have already sent.

Felipe, do you have any other comments that

you'd like to make?

DR. CALIZAYA: No.

DR. MUTMANSKY: Thomas?

MR. MUCHO: Just quickly on the belt flammability materials issue, one of the main areas of interest there is that since the belt air rules were first proposed sometime ago in 1991, belt flammability rather rules proposed, we've kind of been in a vacuum in terms of what's happened in the world in that area so we're really interested in an update as to what's happened in terms of belts, how they're now produced, the compounds that are being used today, what the experience is either in the U.S. if people are running those kinds of belts or internationally with the latest and greatest in fire resistant belts.

That's the kind of slant we'd really like to know. What's the situation today? That's it.

DR. MUTMANSKY: Okay. Well, here we are. We're sitting here now, and we've given you a lot of our thoughts. I didn't realize that we weren't going to take any comments this afternoon. I apparently either didn't pay attention or in some other way missed out on that particular information, so I'll apologize for the fact that we don't have a lot to say.

I think it's very important for us to say that this committee is intensely interested in being educated on all the issues. When we go to Pittsburgh we hope to spend two and a half days on all aspects of the topics that you see here, and then at that particular point in time we hope to have another meeting scheduled in subsequent months.

We have only tentatively said that maybe mid May would be the right time for that meeting. We have no location decided. We're trying to schedule these meetings. Initially we'll be educating this committee on every aspect of the belt air problem.

Ideas that you might have would be welcome. At this point in time we won't be taking them, but Linda will be happy to take the comments that you might have, and in the future meetings there will be time for public comment. At that particular point in time the committee would certainly encourage anybody with something to say to get up and say it.

There would be a limited amount of time at the two and a half day meeting to do that, so we would suggest that you organize your thoughts either through an organization or through the union or through other organizations and at that particular point in time hopefully present the message in a unified manner. It

will help the committee if you can do it in that manner.

Are we going to take questions?

MS. ZEILER: No. We can't do that either.

DR. MUTMANSKY: The answer is no.

MS. ZEILER: Right.

DR. MUTMANSKY: How many solicitors do we have here? More than enough. Is that it? More than enough. The answer is more than enough.

MS. ZEILER: No. I think you've done a really good job of capturing a lot of information gathering that we can do for you as the committee.

You've been at a disadvantage here at your first meeting in being dumped on with a lot of data you haven't had a chance to look at, so I think this is a really good start. We know when you'd like to have the next meeting. I'll be accepting the input from the people you've requested send me ideas that they think the committee should pursue.

I will be sharing that of course with you, and that will help us frame what the content of the next agenda will be, so I think we've made a good start.

DR. MUTMANSKY: Okay. Thank you, Linda.

Any more comments?

DR. WEEKS: Is there any way to get some AMS logs? I mean, I'm sure there is. They exist. Can we get our hands on it? I just need to get --

MALE VOICE: Is somebody saying yes over here?

MS. ZEILER: Bill is nodding yes. We'll add that to the list.

Yes?

DR. BRUNE: One more thing that came to my mind that I was thinking about the past two days.

One thing from an operator standpoint. I've been in mining operations, and I've dealt with both having belt air to the face and then having belt air away from the face.

One difficulty in coursing belt air to the face is that the task of rock dusting on the belt to cut down the possibility of having the coal dust explosion on the belt line is made very difficult because that rock dust naturally travels to the face, which keeps the face crew and any maintenance crews from working there.

What you have to do, the mine operators will have to do, is rock dust during off shifts when there is nobody on the face that would be affected by this rock dust.

I would like to understand if that is a true issue in managing the rock dusting in the mine and on the belts, if belt air to the face or away from the face has an impact on the quality of explosion proofing your belt line by rock dust.

DR. MUTMANSKY: Any other comments by members of the panel?

(No response.)

DR. MUTMANSKY: Ms. Zeiler, I think we ought to call the meeting to a close.

MS. ZEILER: That's certainly your job as the chair.

DR. MUTMANSKY: Okay. I hope to see more of you in upcoming meetings, and we will welcome your comments at that time. Thank you for coming.

(Whereupon, at 1:35 p.m. the briefing in the above-entitled matter was concluded.)

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REPORTER'S CERTIFICATE

DOCKET NO.: --

CASE TITLE: TECHNICAL STUDY PANEL ON THE UTILIZATION OF BELT AIR AND THE COMPOSITION AND FIRE RETARDANT PROPERTIES OF BELT MATERIALS IN UNDERGROUND COAL MINING

HEARING DATE: January 10, 2007

LOCATION: Washington, D.C.

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the hearing in the above case before the United States Department of Labor, Mine Safety and Health Administration.

Date: January 10, 2007

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