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CURRENT MINE SAFETY DISASTERS: ISSUES AND CHALLENGES

HEARING

OF THE

COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS

UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

ON

EXAMINING ISSUES AND CHALLENGES FACING CURRENT MINE SAFETY

OCTOBER 2, 2007

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CURRENT MINE SAFETY DISASTERS: ISSUES AND CHALLENGES

TUESDAY, OCTOBER 2, 2007

U.S. SENATE,
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS,
Washington, DC.

The committee met, pursuant to notice, at 10 a.m., in SD–430, Dirksen Senate Office Building, Hon. Edward M. Kennedy, chairman of the committee, presiding.

Present: Senators Kennedy, Murray, Brown, Enzi, Hatch, and Allard.

OPENING STATEMENT OF SENATOR KENNEDY

The CHAIRMAN. We all will come to order. Today our committee considers again the pressing problem of mine safety. We are joined by family members of the fallen miners and rescue workers from Crandall Canyon. Thank you for being here with us. The Nation held its breath, along with you during those long weeks this summer, hoping that your husbands, your brothers, fathers, friends, would be found alive, and we mourn their passing with you.

Some of the family members from West Virginia are here as well. We know your losses were also very difficult to bear. You've been true champions for mine safety, and miners' families around the country. And miners are the better off for it.

The tragedy at Crandall Canyon has again put mine safety on front pages across the country. Already this year, 24 men have been killed in the Nation's coal mines. Ineffective enforcement, outdated technology, and inadequate safety standards are the heart of the problem.

After the terrible accident at the Sago mine last year, members of our committee went to West Virginia to talk to miners, their families, and to the community. We held a hearing on that disaster. We heard particularly about the inadequacy of emergency air supplies and communication technology.

We left those hearings with a commitment to work together, Republicans and Democrats, to do all we could to correct the problem and prevent further tragedies. Senator Enzi, Senator Murray, Senator Isakson, Senator Rockefeller, Senator Byrd, Senator Hatch, and I worked to pass the MINER Act, the most comprehensive mine safety reform in a generation. It required more emergency air supplies, more mine rescue teams, and faster adoption of cutting-edge technology in the mines.

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That act has made a difference. Senator Murray, our subcommittee chair, held an oversight hearing this spring, which found that the legislation was making mines safer.

But today, we find ourselves asking new questions about whether this did enough to make mines safer—make mining safe. For the sake of all miners, we need to understand what went wrong at Crandall Canyon. It is too early to expect these answers today, but at least we can begin to ask the right questions about the Crandall Canyon Mine, about whether MSHA is effectively doing its job, about whether the Congress must do more.

MSHA's basic role is to see that mine plans are safe. At Crandall Canyon, however, MSHA apparently missed the warning flags about serious safety problems. We will hear from NIOSH today about its independent analysis of the Crandall Canyon plan, which raises very serious questions about whether MSHA's review process is strong enough and independent enough. Such questions about the review process are not just about Crandall Canyon, they have nationwide implications.

Another major MSHA responsibility is to control the rescue effort when accidents take place. Mines are inherently dangerous, both for miners and for rescue workers. Tragically, in addition to the six miners, three rescue workers also died at Crandall Canyon. Clearly, something went very wrong.

We had questions, too, after the Sago tragedy about whether rescue workers were used as effectively as possible and were adequately protected in their efforts. So we must also look at how decisions are made at the mine site after an accident takes place.

In particular, we're concerned about MSHA's duty to manage information at mine rescue sites. In the MINER Act, we gave MSHA additional power to control information for the public and the miners' families. We must examine whether MSHA is sufficiently exercising that control in such disasters.

Finally, our committee continues to press the need for better technology to locate and communicate with miners in an emergency. The deaths at Crandall Canyon clearly show that miners are paying the price for this lapse in technology. It's outrageous that the trapped miners could not be located. In the MINER Act, we sought to expedite the adoption of the latest technology. In this hearing, we'll discuss how we can do more and do it faster.

Our work in Congress will continue after today's hearing. We will continue our investigation of the cause of the recent disaster and take up new legislation to strengthen current laws. We clearly need to do more to prevent such disasters, and will do our best to meet that responsibility.

The CHAIRMAN. Senator Enzi.

OPENING STATEMENT OF SENATOR ENZI

Senator ENZI. Thank you, Mr. Chairman. I really appreciate your holding this hearing.

Like all Americans, I'm saddened that we're here again discussing another tragic mining accident, in Crandall Canyon, Utah. Six miners have been lost and three rescue team professionals, who risked their lives to save them, have been lost, as well. I appreciate that the family of those who were lost are here today. I do want

to take a moment to say publicly that we all share your terrible loss.

In my home State of Wyoming, next door to Utah, just a few weeks ago a 17-year mining veteran lost his life when the vehicle he was operating underground overturned. I'd like to express my condolences to his family in the Green River Trona mining community as well.

Every mining accident has a profound impact on the loved ones of those whose lives have been lost. Our prayers and sympathies go out to all of them. Every mining accident of the magnitude of Crandall Canyon demands thorough investigation and appropriate action against anyone found culpable. The investigation and law enforcement efforts, if any, must be carried out by those with the expertise and authority to do so.

Every mining accident must be an occasion for us to learn and to change, if necessary. We honor those whose lives have been lost, when we act to ensure that the tragedy will not be repeated.

Every mining accident should not, however, become an opportunity for political posturing. Likewise, while every mining accident should be a learning experience, not every mining accident will require legislative action. There is an understandable—but not always productive—tendency, among those involved in regulating the mining industry, to prematurely react to those accidents with significant fatalities, rather than taking a wider view of best practices and learning from every single accident, whether fatal or not.

The MINER Act—the bipartisan legislation that Senator Kennedy referred to, that Senators Kennedy, Rockefeller, Byrd, Isakson, Murray, Hatch, and I drafted last year, was enacted to break that cycle—was done in record time, in a very bipartisan way. The MINER Act stands for individual mine-based accident prevention instead of a one-size-fits-all approach. With that law, we required that every mine become as best prepared as possible for an accident. We raised the standards for rescue teams, breathable air, communications technology, and seals, among other things. And we sought to turn the power of American inventiveness toward creating improved mine communication and rescue technology, and the emphasis is on inventiveness.

The MINER Act is a law we can all be proud of. It's been in place a scant 16 months. Some of its provisions have not yet become effective. I would mention that that was the first change in mining law in 28 years. Yet, some are proposing that Congress amend the mining laws again. This is something we should look at very closely. Some are trying to connect the legislative proposal to the Crandall Canyon tragedy, but actually it would have done nothing to prevent that accident, and relates not at all to the high-cover mining, retreat mining techniques, seismic activity, and other issues that are raised by that tragedy that we have to look at.

One of the reasons I'm so proud of the MINER Act, is that we wrote it in a way that I believe all legislation should be drafted. We brought in all of the stakeholders, the union, the industry, the safety experts, MSHA, the families, and we sat with them all and worked through the biggest safety concerns and the best way to approach them. MINER was the first major revision of the Mine and

Safety Health Act in 28 years. I believe it's appropriate that we spend some time and get it right.

That's not to say that there won't be lessons from Crandall Canyon, that may require changes, however, most changes in this highly technical area should be accomplished by safety experts, both inside and outside of government, that deal with these complex matters on a daily basis.

In that regard, I'd note that this committee's current work on the MINER Act itself, is still not done. This committee significantly enhanced the mission of the Office of Mine Safety and Health within NIOSH, and I believe we're all very anxious to follow up on their research into wireless two-way communications and tracking devices that might actually help work in most underground mines.

They're also exploring breathable air apparatus that will last longer, be less cumbersome for miners, and be safer to operate.

I'm pleased to see Dr. Jeffrey Kohler from NIOSH here today. I've invited the mining experts here at NIOSH to come and brief me on the State of testing and research they're conducting, just how far we are away from wireless two-way communication systems that can really work on a consistent basis through rock. Of course, any of my committee colleagues that are also interested in these questions, are welcome to join in that briefing.

Clearly, there is much this committee can do for miners. The Crandall Canyon tragedy should certainly re-double our commitment to this agenda. And to harness the promise of technology to ensure miners return home safely to their families. Let us honor those miners and all miners by focusing on real ways to improve mine safety, not just chasing headlines.

I look forward to the hearing and the witnesses' testimony.

Thank you, Mr. Chairman.

[The prepared statement of Senator Enzi follows:]

PREPARED STATEMENT OF SENATOR ENZI

I want to thank Chairman Kennedy for holding this hearing. Like all Americans, I am saddened that we are here again, discussing another tragic mining accident. In Crandall Canyon, Utah, six miners are presumed dead, and three rescue team professionals who risked their lives to save them are also lost. And in my home State of Wyoming just a few days ago, a 17-year veteran in the underground Trona mines lost his life when the vehicle he was operating overturned. I'd like to express my condolences to his family and the mining community there in Green River.

Every mining accident has a profound impact on the loved ones of those whose lives have been lost. Our prayers and sympathies go out to all of them. Every mining accident of the magnitude of Crandall Canyon demands thorough investigation; and appropriate action against anyone found culpable. The investigation and law enforcement efforts, if any, must be carried out by those with the expertise and authority to do so. Every mining accident must be an occasion for us to learn, and to change if necessary. We honor those whose lives have been lost best when we act to ensure that the tragedy will not be repeated. Every mining accident should not, however, become an opportunity for political posturing. Likewise,

while every mining accident should be a learning experience, not every mining accident will require legislative action.

In Wyoming, we are blessed with many natural resources and mining is a major source of employment. So it is very important to me that we do all we can here in the HELP Committee to keep mining as safe as it can be and to improve conditions wherever and whenever we can. In the case of Crandall Canyon, once all the facts are known and once the experts have fully analyzed the situation, we will then have an accurate picture of what may have gone wrong. This factual picture should be the guide for any future action.

There is an understandable, but not always productive, tendency among those involved in regulating the mining industry to prematurely react to the last accident with significant fatalities, rather than taking a wider view of best practices and learning from every accident, fatal or not. One of the goals of the MINER Act, the bipartisan legislation Senators Kennedy, Rockefeller, Byrd, Isakson, Murray and I drafted last year and which was enacted, was to break that cycle.

The MINER Act stands for individual mine-based accident prevention instead of a one-size-fits-all approach. With that law, we required that every mine become as best prepared as possible for an accident. We raised the standards for rescue teams, breathable air, communications technology and seals, among other things, and sought to turn the power of American inventiveness toward creating improved mine communication and rescue technology.

The MINER Act is a law we can all be proud of. It has been in place a scant 16 months, and some of its provisions have not yet become effective. Yet some are proposing that Congress amend the mining laws again. This is something we should look at very closely. The legislative proposals some are trying to connect to the Crandall Canyon tragedy actually would have done nothing to prevent that accident, and relate not at all to high cover mining, retreat mining techniques, seismic activity or other issues raised by that tragedy.

I would also like to bring to the committee's attention an article in the New York Times last week. They sent a reporter to Huntington, Utah to cover a meeting of the State Mine Safety Commission. The reporter wrote that every miner in attendance opposed new laws and believed current regulations were not inadequate. So that is the view of miners there in Utah, according to the New York Times. One of the reasons I am so proud of the MINER Act is that we wrote it in the way I believe all legislation should be drafted. We brought in all of the stakeholders—the union, the industry, the safety experts, MSHA—and we sat them all around the table and worked through the biggest safety concerns and the best way to approach them. MINER was the first major revision of the Mine Safety and Health Act in 28 years. I believe it is appropriate to wait at least 28 months before going into the statute again.

That is not to say that there will not be lessons from Crandall Canyon that may require changes. However, most changes in this highly technical area should be accomplished by the safety experts both inside and outside of government that deal with these complex matters on a daily basis. We should listen to those experts to in-

form our decision about whether a change in the law is warranted. This is an area in which the experts should lead, and we should make sure the way is clear for them to do so.

In that regard I'd note that this committee's current work on the MINER Act itself is still not done. This committee significantly enhanced the mission of the Office of Mine Safety and Health within NIOSH and I believe we are all very anxious to follow up on their research into wireless two-way communications and tracking devices that might actually work in most underground mines. They are also exploring breathable air apparatus that will last longer, be less cumbersome for miners, and be safer to operate. I am pleased to see Dr. Jeffrey Kohler from NIOSH here today. I have invited the mining experts there at NIOSH to come and brief me on the state of the testing and research they are conducting. Just how far away are we from wireless two-way communications systems that can really work on a consistent basis? Of course, any of my committee colleagues that are also interested in these questions are welcome to join in that briefing.

Additionally, the committee is awaiting reports on the belt air technical review panel and on mine refuge chambers. The rescue team provisions from the MINER Act must be finalized by regulation before the end of the year, but there have been concerns raised in some States that have state-rescue teams that the new rules may be problematic. The HELP Committee has a responsibility to ensure that the MINER Acts' provisions are properly carried out so that they fulfill the promise we have made to miners. I hope we will do that.

Following the Crandall Canyon tragedy Chairman Miller in the House and our own Chairman made it clear that they would initiate an aggressive oversight effort into what went wrong. Chairman Kennedy and I asked the Dept. of Labor Inspector General to investigate MSHA's actions at Crandall Canyon before and after the accident, and I'm glad to say that review is underway. The Secretary of Labor has also initiated an independent review by mining experts and the State of Utah has established a review panel. But these are not the only investigations going on. There are six official investigations into the Crandall Canyon accident, and by some counts as many as eight. Majority committee staff in both chambers are running separate and overlapping investigations, making extensive document requests of private citizens and State agencies, issuing subpoenas, questioning witnesses before MSHA has a chance to question them, and making multiple trips to the accident site. The Department of Labor's Solicitor has issued a warning that such committee activities could easily compromise MSHA's investigation and pleaded with Congress not to jeopardize MSHA's ability to hold those who may have violated the law accountable.

Let me make it clear, I want to understand what went wrong and learn from this accident as much as anyone. But I believe that the best way to accomplish that goal is to allow experts to review these highly technical issues and issue reports. Based on these reports, Congress should determine whether there was misconduct by Federal agencies or mine operators and ensure that proper actions are taken. These multiple, overlapping investigations simply complicate the picture, delay results, add an unnecessary level of com-

bativeness into the situation, and they cost a lot of money. When we are talking about protecting miners lives, it is certainly not something we put a price tag on. But the worst of the duplicitous investigations are not really targeted at protecting lives; they are about scoring political points. And the cost of this misuse will be taken out of the MSHA resources that really do protect miners' lives.

Colleagues, we have established an Office of Inspector General for the Labor Department that has 423 employees and a budget of 71 million taxpayer dollars. They are investigating at our behest, and they have the access, expertise and staff necessary to conduct this investigation. Quite frankly, congressional committees do not. Let's allow the IG to perform their role and stop diverting resources away from MSHA's fundamental functions. We may be just one of the committees currently conducting this sort of oversight, but we could set an example for the others.

Finally, I would like to point out another important responsibility this committee has towards miners. One I hope we will be able to keep. The Mine Safety and Health Review Commission (MSHRC) is an independent agency which acts as a lower court for questions of law and regulation under the Mine Safety and Health Act. This Commission is especially import now as many of the MINER Act provisions which will better protect miners are going into effect and facing challenges. Yet the 5-member Commission is 2 members short and will lose a third by the end of the year. With only two members, it will be unable to make any rulings (but will still spend appropriations!). Two nominees for the Commission have been pending before the committee since January with no activity. I hope that we will move these nominations and ensure that the Commission is able to act to enforce our mining safety and health laws.

Clearly, there is much this committee can do for miners. The Crandall Canyon tragedy should certainly re-double our commitment to this agenda. Let us honor those miners and all miners by focusing on real ways to improve miner safety, not just chasing headlines.

The CHAIRMAN. Thank you, thank you very much, Senator Enzi. We would welcome to hear from Senator Hatch and maybe Senator Murray, if they'd like to, or other members. This is Senator Hatch's home State and he has been very much involved in working on this issue with all of us. We imagine he'd want to say a word. We'd welcome it if he did.

STATEMENT OF SENATOR HATCH

Senator HATCH. Well, thank you, Mr. Chairman. I very much appreciate your holding this hearing. This is an important hearing today.

I would like to just recognize my constituents who are in the audience today. I think I've got them all here. They are the family members of both the trapped and rescue miners, who gave their lives at the Crandall Canyon Mines in Huntington, Utah. We are joined this morning by family members of Manuel Sanchez, Kerry Allred, Louise Hernandez, Carlos Payan, Brandon Phillips, and

Don Erickson, each of whom gave their lives in this noble profession of mining.

Let us not forget the three brave rescue miners, who gave their lives in an attempt to rescue the six trapped miners at the Crandall Canyon Mine. We are also honored to be joined by members of their families, those of Mr. Brandon Kimber, Mr. Dale Black, and Mr. Gary Jensen. The three rescue miners who bravely gave their lives, made the ultimate sacrifice in an attempt to free their six trapped colleagues.

All of these men are examples of the best of Utah. Their courage, their sacrifice, are why I'm so honored to serve the people of Utah, they are among some of the most selfless individuals in the country today. My thoughts and prayers are with each and every one of you at this time.

I would also like to take another brief moment to thank all of those Utahans that participated in the rescue effort. My list is long and varied of the many that have sacrificed and given their time, knowledge, and resources to help with this tragedy. The list includes members, or officials from the Federal Mine Safety and Health Administration, Murray Energy Corporation, the U.S. Air Force, Utah's Transportation and Public Safety, Natural Resources, and Human Services, the Utah Air National Guard, local, State, and national government, and last but perhaps most importantly of all, the men, women, and children in the communities impacted by this tragedy.

Mr. Chairman, these are good people. They're hardworking people and we understand how important mining is in our country today. We also understand that it's a dangerous profession. We want to get to the bottom of these things and see if there's any way we can protect more people in the future.

I'm personally grateful for the work that you and Senator Enzi and others have done on the Mining Act and I'm very grateful that you're hosting this hearing this morning.

Thank you very much.

The CHAIRMAN. Thank you very much.

We want to, if we could, hear from our chairman of our Subcommittee on Employment and Workplace Safety. Senator Murray has had a special interest in this subject matter, has had oversight hearings, and has been a leader in the legislative undertakings that we've had on this committee. If she'd say a word, we'd be grateful.

STATEMENT OF SENATOR MURRAY

Senator MURRAY. Well, thank you very much, Mr. Chairman, for holding this hearing to talk about the tragic events that surrounded the Crandall Canyon Mine disaster and the ongoing mine safety concerns that face our country today.

I want to join with others in recognizing the family members who are here and I want you to know that across the country, families are praying for all of you, from as far away as Washington State to the other end of the country. We all know what you're going through and are with you and want you to know that our thoughts and prayers are with you every day as you go through this.

Mr. Chairman, we all know that miners work very hard every day on the job to provide the energy demands of our country and the needs of our families here at home. As a nation, I think we owe them a lot more than a debt of gratitude. We owe them our sincere efforts to ensure that each and every miner returns home safely. We also owe their families. We owe their families a guarantee that they will be treated with respect and with dignity and with consistency if they are ever faced with a tragedy.

I know that many of my colleagues and the witnesses here have talked with a lot of these families who've lost husbands or fathers or brothers or sons to mining tragedies. The pain in their eyes is something that you just don't forget. I know that that will remain with all of us as we work our way through a response to this tragedy.

As I watched from my home State of Washington, the tragedy play out at Crandall Canyon, I was angered that the families of the victims were subject to such an emotional rollercoaster caused by inaccurate and inconsistent information sharing. I think we can all agree that the families of victims deserve better than receiving life and death information from the nightly news. Tragedies like Sago, that we saw before, and Crandall are only compounded when family members are not given the best information first.

So, Mr. Chairman, as a result, I've been working with others and will soon be introducing legislation, the Mine Disaster Family Assistance Act of 2007, to address that problem. I am also Chair of the Transportation Appropriations Subcommittee, and I am very familiar with the model that is used by NTSB to ensure that families have the best information when a tragedy occurs. I believe that we should incorporate elements of that highly effective model, when we deal with the Nation's mine safety legislation.

We are very fortunate to have Mr. Joseph Osterman, who's the Managing Director of NTSB, with us today. He will be testifying about the NTSB model and help us learn how we can be more effective in supporting miner families during a tragedy.

I want the families that are here today to know that we watched what you've gone through, we have learned from that, and we want to make sure that other families, if they're ever faced with a tragedy like this—we obviously want to prevent any tragedies first—but if they are ever faced with a tragedy, don't have to go through what all of you have suffered through. I appreciate your being here today.

Thank you, Mr. Chairman.

[The prepared statement of Senator Murray follows:]

PREPARED STATEMENT OF SENATOR MURRAY

Thank you, Mr. Chairman, for calling this important hearing to examine the tragic events surrounding the Crandall Canyon Mine disaster and the ongoing mine safety concerns facing our country today.

I would like to take a moment to join my colleagues in expressing my deepest sympathy to the families of the brave men who lost their lives in this tragedy, many of whom are here with us today. Thank you for honoring us with your presence during such a difficult time.

Miners work hard on the job every day to provide for the energy demands of our country and the needs of their families at home. As a nation, we owe them more than a debt of gratitude—we owe them our sincerest efforts to ensure that each and every miner returns home safely and that their families will be cared for with respect, dignity, and consistency if they are ever faced with tragedy.

PAIN OF FAMILIES

As I know many of my colleagues and the witnesses here have done, I have talked with many of the families who've lost their husbands, fathers, brothers, and sons in previous mining tragedies. The pain I saw in their eyes is something very few of us have had to endure. And, it's something I'll never forget.

After the tragedies in West Virginia last year, Senators from both sides of the aisle quickly worked together toward the same goal—crafting bi-partisan legislation designed to improve mine safety in the hope that tragedies like Sago and Alma would never be repeated.

The MINER Act was a landmark piece of legislation and an important first step in meeting our goals but, as we have seen, we still have work to do.

As was the case in Sago, we can't undo what happened and we can't take away the pain. But we can resolve to work together to give miners better protection and, when tragedies do occur, ensure that their families receive the best care possible. And that's why we're here today.

MINER HEALTH AND SAFETY ENHANCEMENT ACT OF 2007

That's also why I, along with Senators Kennedy and Byrd, introduced the Miner Health and Safety Enhancement Act of 2007 earlier this year, to address critical improvements to mine safety.

MINE DISASTER FAMILY ASSISTANCE ACT OF 2007

But tragedies like the one at Crandall Canyon don't just focus our attention on the thousands of brave men who enter our coal mines every day to produce the energy our Nation relies on—they remind us that there are families who anxiously await word on their loved ones during times of disaster. And they deserve honest and clear answers from their government.

We need to do more to make sure that if there is a mining incident they have access to accurate and consistent information from government officials.

As Chair of the Transportation Appropriations Subcommittee, I am very familiar with the model used by the National Transportation Safety Board (NTSB) to ensure families have the best information first in the aftermath of an accident. And I believe we should consider incorporating elements of this highly effective model into the Nation's mine safety legislation.

I think we can all agree that tragedies like Sago and Crandall are only compounded by inaccurate and inconsistent information sharing. That's why I'm proud to soon introduce the Mine Disaster Family Assistance Act of 2007 to address this problem.

Modeled after the NTSB model, my bill does three things:

• First, it establishes a family care and support program director at MSHA that puts the concerns of the accident victim's family first. Oftentimes there is confusion about the responsibilities of the party's involved and who is communicating with the family and the public about what is happening during an emergency. This bill defines those responsibilities and delegates a family support services director to ensure family members are getting support services and accurate information from a credible source. The program would work closely with an organization that specializes in disaster assistance, such as the American Red Cross, along with mine operators and other vital partners in mine safety.

• Second, this bill requires all mine operators to develop a disaster family assistance plan that must be approved by MSHA, requiring mine operators to strategically plan for family care before an incident happens.

• Finally, this bill establishes a task force to provide MSHA with additional recommendations on how to support families during mining disasters. It includes vital partners in the conversation such as the Bureau of Land Management, the American Red Cross, mine operators, including operators of smaller mines, union representatives, and, most importantly, families who have lost loved ones in past mining tragedies.

It is critically important that family members who have experienced these tragedies have a voice in deciding how families in the future are cared for after an incident, and this bill aims to make that a reality.

We're fortunate that Mr. Joseph Osterman, the managing director of the National Transportation Safety Board, could join us today to discuss the NTSB model and help us learn how it can be effective in supporting miner families. I understand that several members of your staff including Ms. Bryson, who's here with you today, have been very helpful to my staff during this process, and I would like to express my gratitude for their efforts.

IMPLEMENTING PROMISING TECHNOLOGIES

Finally, we also need to make sure that if promising technologies are available, they're implemented sooner rather than later. I'm anxious to hear a progress report on that from NIOSH.

As I've said before, I hope that as we move forward, we will not allow the perfect to be the enemy of the good. We know that every technology has limits, and nothing is foolproof, but if there are steps we can take to make progress—we shouldn't hold back.

So, we have an important mission, Mr. Chairman. As Chairman of the Employment and Workplace Subcommittee, I look forward to working with my colleagues to identify how we can prevent future mining tragedies and better care for families during an emergency.

The CHAIRMAN. I want to thank Senator Murray. That's enormously important, the issue in question and one that she's been very much involved in. We certainly welcome her leadership in this area.

We have two other members here, who represent States which have important and significant mining responsibilities. I'd welcome

a brief comment from Senator Allard then Senator Brown, if they would, and then we'll get on with the witnesses.

STATEMENT OF SENATOR ALLARD

Senator ALLARD. Mr. Chairman, thank you. I understand that you're anxious to get on to hear from the witnesses as I am, so I will keep my comments very brief. I wanted to thank you and Senator Enzi for holding this hearing. This is an important hearing.

I'd also like to express my sympathies to the Senators from Utah, as well as the families that we have here in the hearing room today.

I would also like to welcome Robert Ferriter, who is the Administrator of Mine Safety and Health, from the Colorado School of Mines, and his testimony here. I won't be able to be here for the full hearing and may very well miss his testimony because I have a conflict with another meeting.

But I am very interested in what happens in this hearing. I think that we have to be ever vigilant. I come from a State where we've had mine tragedies occur and I can relate to many of their concerns. I'd also, just again, say that I think this is a very important hearing because it's been 16 months since we passed new legislation and I think we need to see how things are operating as far as mine safety is concerned, so that we fully understand the facts and take whatever action may be necessary to prevent tragedies from happening again.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, and we'll look forward to listening to the Professor. He has a very interesting background and a wide range of experience. I know his testimony will be very helpful.

Senator Brown.

STATEMENT OF SENATOR BROWN

Senator BROWN. Thank you, Mr. Chairman.

I would like to acknowledge the many Utah families that have traveled here today and offer you my condolences as you go through this period of mourning, and my prayers.

Sometime during, after the tragedy, there was an article online where a woman wrote, and I'd just like to quote from what she said. She wrote,

> "I'm a coal miner's wife as well as a coal miner's daughter. I think that everyone that can not physically or otherwise assist in the rescue efforts needs to pray and ask God to take care of these families and their loved ones who are under that mountain. This is a fear you live with every day in the mining community. I also want to say that these men know what they're going into, they know the risks, they do it anyway. My husband would never do anything else. It's like it's in their blood. They are the most respectful, loyal individuals you'll ever meet."

How important their services are to this Nation as a whole. For the last 6 or 7 years, I have worn on my lapel a little pin that depicts a canary in a bird cage. You all, of course, know this story

a hundred years ago, of the miners taking the canary down into the mines. That really represents to me, a lot about mine safety, worker safety, protections for workers. It illustrates to me how far we've come in mine safety, but it also challenges us, that we need to do a good bit more on mine safety and on all the issues that Senator Murray talked about.

You—the mine workers—do their jobs every day. We, in the Senate, need to do our jobs.

Thanks, Mr. Chairman.

[The prepared statement of Senator Brown follows:]

PREPARED STATEMENT OF SENATOR BROWN

I would like to acknowledge the many Utah families that have traveled here today.

My condolences go out to you. And I pray that you will find strength and peace in your time of mourning.

I would also like to thank the HELP Committee Chairman, Senator Kennedy for calling this important meeting.

In response to an online article written about the tragedy in Crandall Mines in Utah, a reader posted comments that I imagine mirror the way many people in this room feel today.

Her words were straightforward and plain. She wrote,

> "I am a coal miner's wife, as well as a coal miner's daughter. I think that everybody that cannot physically or otherwise assist in the rescue efforts, needs to pray, and ask God to take care of these families, and their loved ones who are under that mountain. This is a fear you live with everyday in the mining community."

She continued,

> "I also want to say that these men know what they are going into. They know the risk and do it anyway. My husband would never do anything else. . . . It is like it is in their blood."

She finished,

> "They are the most respectful, loyal individuals you will ever meet. How important their services are to this Nation as a whole."

Coal miners, and their families, are a humble people who proudly perform their jobs. They provide for their families and take pride in their communities. Our country depends on them to extract the resources necessary to power this country.

More than anyone else, coal miners and their families understand the dangers of a coal mine. They live with that risk day-in and day-out. As that coal miner's daughter stated, "They know the risk and do it anyway."

But to the extent we can minimize the risks coal miners face, we must do it. And we must do it now.

It was only a short time ago that this committee was discussing the Sago and Alma disasters. And yet here we are today, again, reeling from a mine disaster, holding yet another hearing on mine safety.

You would have thought that we would have finally learned our lesson. You would have thought that we had experienced enough

loss and heartbreak. The most frustrating fact of this hearing today is how tragically familiar it sounds. If the loss was not so painfully real, you would think we were simply reliving the past.

Unfortunately, that's not the case. Another miner has lost his life, another spouse has lost a partner, and another child has lost a parent.

The passage of the MINER Act was a step in the right direction. It provided needed updates to the outdated 1977 law. The MINER Act finally provided miners with emergency plans, increased supplies of oxygen, and improved rescue teams.

The MINER act was a step in the right direction, but it is only a first step. Tragedies like the one at Crandall Canyon demonstrate the need for the continued improvement of our mining practices, regulations and equipment.

We owe it to the Crandall Canyon coal miners and their families to take action. Congress, MSHA and coal mine operators must work together to learn from our mistakes. We must pledge not to repeat them.

The miners we lost in Utah went to work every day and simply did their jobs. It's time for us to do ours.

The CHAIRMAN. Thank you very much.

Our first witness, Kevin Stricklin, worked for MSHA for 26 years and has been the Administrator of Coal Mine Safety and Health at MSHA since October 2006. He's been involved in many mine emergencies throughout his career as District Manager of Coal Mine Safety and Health, MSHA's Morgantown, West Virginia District Office. Mr. Stricklin's a graduate of the University of Pittsburgh with a degree in mining engineering.

Then we'll hear from Jeffrey Kohler, who's an Associate Director of Mine Safety and Health Research at the National Institute for Occupational Safety and Health. Dr. Kohler served as the Director of the NIOSH Pittsburgh Research Laboratory from 1998 to 2004, which is internationally renowned for its work in all areas of mining safety and health. He holds a B.S. in engineering science, M.S. and Ph.D. degrees in mining engineering, all from Pennsylvania State University.

Joseph Osterman has served as the Managing Director of the National Transportation Safety Board since March 2005, has worked for the Board since 1986. He is responsible for the Family Assistance Center, which cares for family members of transportation disasters. He has been involved with, or overseen the investigation of, over 2,500 serious transportation accidents and the issuance of over 900 safety recommendations.

Gentlemen, welcome. You are here and we'll ask Mr. Stricklin if he would start, please?

STATEMENT OF KEVIN STRICKLIN, ADMINISTRATOR FOR COAL MINE SAFETY AND HEALTH, MINE SAFETY AND HEALTH ADMINISTRATION, ARLINGTON, VA

Mr. STRICKLIN. Chairman Kennedy, Ranking Member Enzi, members of the committee, I am pleased to appear before you today.

My name is Kevin Stricklin, and I currently serve as the Administrator for Coal Mine Safety and Health. I have 28 years of experi-

ence in mining, including 27 with the Mine Safety and Health Administration.

I am deeply saddened by the tragic accident that occurred at the Crandall Canyon Mine on August 6, which claimed the lives of six miners and by the subsequent accident that claimed the lives of three rescue workers, including one MSHA employee on August 16. Such losses are always felt deeply by all of us in the mining community, including the personnel of MSHA.

We will not know the cause of these tragedies until MSHA completes its accident investigation, which is now ongoing. As in every investigation, MSHA has committed to providing a full report as expeditiously as possible to the public when the investigation is complete. We're also cooperating with officials from Governor Huntsman's Office, as well as Utah State Mining Commission, and has offered to provide all relevant information to the Commission as soon as possible without prejudicing its ongoing law enforcement investigation. A separate investigation of the Agency's role into this matter is being directed by another investigative team headed by experienced mining professionals who are not MSHA employees. That report will also be made public.

MSHA's records indicate the first plan for retreat mining at Crandall Canyon Mine was approved on September 27, 1989. Retreat mining is a common practice nationwide, where coal pillars are mined—where coal is mined from coal pillars. When this coal is mined the roof normally falls in a structured manner to relieve the pressure placed on the underground mine workings.

Currently, 223 underground mines have approved roof-control plans that allow for pillar removal, which represents about 48 percent of all active underground coal mines. When conducted according to proper engineered roof-control plans that are developed by mine operators and reviewed and approved by MSHA, retreat mining can be done safely, especially with today's technology advances that include mobile remote-controlled roof supports.

Overall, the roof fall fatality rate in the U.S. underground coal mines has averaged .001 per 200,000 hours worked in recent years, prior to the Crandall Canyon accident, which is significantly down from its average in the past.

But while this practice has become safer, mine operators must still follow the approved roof-control plans to ensure that the practice is safe. By way of comparison, the entire mining industry fatal rate, incident rate is .0142.

Since Murray Energy took control of the mine in August 2006, MSHA has approved two amendments to the roof-control plan that allowed for pillar extraction in both the North Barrier of main west and in the South Barrier of main west. Prior to the approval of these amendments, an MSHA roof-control supervisor and specialist visited the mine to assess the conditions in the north main barrier. And based on their observations, required additional roof support.

The operator subsequently amended the plan to meet the additional MSHA requirements and then the plan was approved. The operator submitted another amendment to its roof-control plan, asking for permission to use retreat mining in the south main barrier on May 17. Again, an MSHA roof-control supervisor and a specialist were underground on the section on May 22, to evaluate the

submitted plan. The retreat plan, with the increased pillar dimensions, was approved on June 15 of this past year.

Before each of these plan amendments were approved, MSHA technical specialists in the area of roof-control support made onsite visits to the mine, reviewed the technical supporting data submitted by the operator, and made evaluations of the proposal, based on their knowledge of deep-mine conditions that prevail in the Rocky Mountain underground coal mines.

With more mining operations moving into reserves under deeper overburden and/or below previously mined areas, there is a need to understand methods to prevent, and in the event they do occur, to mitigate the consequences of bumps in such new circumstances. For this reason, MSHA is reviewing the operator's ground control plans, to assure operators minimize the dangers associated with bumps.

In District Nine, which has jurisdiction over the mines in Utah, we have rescinded all room and pillar retreat mining plans in areas with greater than 1,500 foot of cover.

Again, thank you for inviting me to be here today, and I'll look forward to answering any questions that any of you may have.

[The prepared statement of Mr. Stricklin follows:]

PREPARED STATEMENT OF KEVIN G. STRICKLIN

Chairman Kennedy, Ranking Member Enzi, members of the committee, I am pleased to appear before you today.

My name is Kevin Stricklin, and I currently serve as the Administrator for Coal Mine Safety and Health. I have 28 years of experience in mining, including 27 years with the Mine Safety and Health Administration (MSHA).

I am deeply saddened by the tragic accident that occurred at the Crandall Canyon mine on August 6, 2007, which claimed the lives of six miners and by the subsequent accident that claimed the lives of three rescue workers, including one MSHA employee on August 16, 2007. Such losses are always felt deeply by all of us in the mining community, including MSHA.

We will not know the cause of these tragedies until MSHA completes its accident investigation, which is now ongoing. As in every investigation, MSHA has committed to providing a full report to the public when the investigation is complete. A separate investigation of the Agency's role in this matter is being directed by another investigative team headed by experienced mining professionals who are not MSHA employees. That report will also be made public.

RETREAT MINING

Retreat mining is a common practice nationwide where coal is mined from coal pillars. When this coal is mined the roof normally falls in a structured manner to relieve the pressure placed on the underground mine workings. Currently, 223 underground coal mines have approved roof control plans that allow for pillar-removal. This represents 48 percent of all active underground coal mines. When conducted according to properly engineered roof control plans that are developed by mine operators and reviewed and approved by MSHA, retreat mining can be done safely, especially with today's technological advances that include mobile, remote controlled roof supports. Overall, the roof fall fatality rate in U.S. underground mines has averaged 0.001 per 200,000 hours worked (or 1 annually per 100,000 full-time miners) in recent years (prior to the Crandall Canyon accident), down significantly from its average in the past. But, while the practice has become safer, mine operators must follow the approved roof control plans to ensure that the practice is safe.

RETREAT MINING AT CRANDALL CANYON MINE

MSHA's records indicate the first plan for retreat mining at Crandall Canyon Mine was approved on September 27, 1989. Prior to Murray Energy taking control of the mine, longwall mining at Crandall Canyon had been completed and the previous ownership was conducting retreat mining at various locations. Since Murray Energy took control of the mine in August 2006, MSHA approved two amendments

to the Crandall Canyon roof control plan that allowed for pillar extraction in both the North Barrier of Main West and in the South Barrier of Main West of the mine. The first plan for retreat mining under Murray Energy Corp.'s ownership was submitted on January 3, 2007, and approved on February 2, 2007. The roof-control plan for the mine was amended to allow retreat mining of the North Barrier of the Main West and was signed by the MSHA District Manager Allyn Davis. A second amendment to the roof control plan was approved on June 15, 2007, for retreat mining of the South Barrier of the Main West. The accident on August 6, 2007, occurred in the South Barrier of Main West. Before each of these plan amendments were approved, MSHA technical specialists in the area of roof control support made onsite visits to the mine, reviewed the technical supporting data submitted by the operator and made evaluations of the proposal based on their extensive knowledge of deep mining conditions that prevail in the Rocky Mountain underground coal mines.

As part of the operator's submission for roof control approval of the North Barrier, two geotechnical reports by Agapito Associates, Inc. (Agapito) were provided, upon request, to MSHA for review and consideration. In their reports, Agapito concluded that retreat mining could be conducted safely in that area of the mine. Prior to the approval of the plan, a MSHA roof control supervisor and specialist visited Crandall Canyon to assess the conditions in the North Main Barrier and based on their observations, required amendments to the roof control plan for additional roof supports. The operator subsequently amended the plan to meet the additional MSHA requirements and then the plan was approved.

Mining took place on the North Main Barrier until March 2007, when a mountain bump occurred, but MSHA was not officially notified about this bump or the magnitude. According to Murray Energy this was not a reportable incident because the outburst did not significantly disrupt mining activity, impair ventilation, or impede passage in the area. However, after the bump, mining was abandoned in that section. The accident investigation team will confirm whether the incident was required to be reported to MSHA as part of its work. The operator submitted another amendment to its roof control plan asking for permission to use retreat mining in the South Main Barrier. Murray Energy again commissioned Agapito to evaluate the stability of that section of the mine. While Agapito again concluded that retreat mining could be conducted safely, it also suggested enlarging the dimension of coal pillars that were left to support the roof from 80 by 92 feet to 80 by 129 feet. A MSHA roof control supervisor and a roof control specialist were underground in the South Barrier Section on May 22, 2007, to evaluate the operator's submitted plan to retreat mine. The retreat mining plan with the increased pillar dimensions was approved by MSHA on June 15, 2007.

MSHA INSPECTION ACTIVITY AT CRANDALL CANYON

Under the Mine Safety and Health Act, MSHA is required to inspect all underground coal mines four times a year. Since the purchase of the Crandall Canyon mine by Murray Energy, MSHA performed five regularly scheduled inspections and two spot inspections, responded to a safety complaint from one of the miners, and performed a roof control technical inspection. One of the regularly scheduled inspections was occurring when Murray Energy Corp. purchased the mine.

MINE BUMPS

One of the most difficult, longstanding engineering problems associated with mining is the catastrophic failure of mine structures known as bumps. Coal and rock outbursts caused by bumps or bounces have presented serious mining problems for decades in metal, nonmetal, and coal mines. Fatalities and injuries have resulted when these destructive events occur.

Bumps have been categorized as either pressure or shock bumps. A pressure bump occurs when a pillar in a developed area is statically stressed past the failure strength of the pillar. A shock bump is caused by dynamic loading of the pillar through dramatic changes in stress distribution within the overlying strata as the result of breaking of thick, massive strata. In many cases bumps are the result of the combination of both pressure and shock forces. Bumps occur when complex arrangements of geology, topography, in situ stress and mining conditions interact to interfere with the orderly dissipation of stress. Strong, stiff roof and floor strata not prone to failing are also contributing factors when combined with deep overburden. Questions about the influence of individual factors and interaction among factors arise, but are difficult to answer owing to the limited experience at a given mine.

Bumps have occurred in all types of mining systems. A U.S. Bureau of Mines report that reviewed bumps that occurred between 1936 and 1993 found that pillar retreat mining accounted for 35 percent of the bumps, barrier splitting for 26 per-

cent, longwall mining for 25 percent, and development mining for 14 percent. Longwall mining methods have increasingly replaced pillar retreat mining since the 1960's and would most likely account for a higher percentage of bumps today.

With more mining operations moving into reserves under deeper overburden and/or below previously-mined areas, there is a need to prevent, and, in the event they do occur, to mitigate the consequences of bumps in such new circumstances. For this reason, MSHA is reviewing operators' ground control plans to ensure operators minimize the dangers associated with bumps, and District 9 has rescinded all room and pillar retreat mining plans in areas with greater than 1,500 feet of cover.

THE CRANDALL CANYON MINE ACCIDENT

On August 6, at approximately 2:50 a.m. Mountain Daylight Time, a mine bump occurred at the Crandall Canyon mine, located near Huntington, Utah. The force of this mine bump was registered by seismographs, and the U.S. Geological Survey National Earthquake Information Center initially disclosed that an earthquake with a magnitude of 3.9 on the Richter Scale occurred near the mine. Seismologists with the U.S. Geological Survey National Earthquake Information Center in Colorado and the University of Utah have since stated that the seismic event was a mine collapse, not an earthquake. Inside the mine, the force of this bump was so intense that it blew the ventilation stoppings out through cross-cut 95—more than a mile from the area where the miners were working. After the event, six miners—Manuel Sanchez, Brandon Phillips, Alonso Hernandez, Don Erickson, Carlos Payan, and Kerry Allred—were missing. The subsequent rescue attempt within the mine moved slowly, because safety dictated the installation of rib supports consisting of 40-ton rock props, chain-link fence and steel cables to protect the rescue workers from further mine bumps. These safety precautions—which were recommended by experts from MSHA and outside the agency—proved not strong enough to prevent a second burst from fatally injuring three rescue workers. At that point, MSHA halted the rescue attempts inside the mine, while continuing the rescue work from the surface.

CRANDALL CANYON ACCIDENT OUTLINE

On the early morning of August 6, 2007, a ground failure occurred at the Crandall Canyon Mine in Huntington, Utah, that, according to the U.S. Geological Survey, registered 3.9 on the Richter Scale, and was initially reported by the Associated Press as an earthquake. MSHA's call center was subsequently notified and MSHA quickly dispatched an inspector to the mine site. Before arriving onsite, MSHA issued a section 103(k) order over the phone which required management to evacuate the mine and effectively secure the site. This verbal order was put into writing early on the morning of August 6.

MSHA "(k) orders" are an enforcement tool used to ensure the safety of any person in a mine when accidents occur. The mine operator, in consultation with any appropriate State representatives must, under a (k) order, obtain MSHA's approval of its rescue or recovery plans. The original (k) order issued by MSHA was modified several times in the days following the initial mine collapse. At Crandall Canyon, MSHA modified the (k) order to allow recovery operations to continue in accordance with approved site specific plans. These plans were signed by the senior onsite mine operator's official and by the senior onsite MSHA official prior to their implementation.

Shortly after arriving onsite, the MSHA inspector contacted the MSHA Field Office to report that a six-man crew was working in the South Barrier section when a bounce occurred that extensively damaged the mine's ventilation controls. These individuals were unaccounted for, but they were believed to be working approximately four miles from the mine's entrance.

On the afternoon of August 6, 2007, with MSHA's approval, Murray Energy Corp. began removing coal and debris from the No. 4 entry at crosscut 120. Meanwhile, a mine rescue team had breached the No. 1 seal in Main West, hoping to be able to get behind that seal and clear an easier pathway to reach the trapped miners. Unfortunately, the rescue team encountered significant amounts of coal blocking its pathway, and then had to withdraw altogether from the sealed area because another bounce occurred.

Mucking or clearing out the fallen coal from the main entry was a time-consuming process and Murray Energy and MSHA believed that it needed to reach the trapped miners more quickly to save their lives, if they survived the initial collapse. Thus, following the first day of the rescue operation, Murray Energy decided, with MSHA's consultation and approval, to drill bore holes into the mine from the surface in an attempt to establish contact with the miners and to assess the conditions in the area where they were believed to be.

By August 7, drilling had begun on the first borehole, which was a two-inch hole at crosscut 138. The mine operator selected all of the borehole locations with input and approval from MSHA. These locations were based upon the probable locations of the missing miners after the first bounce occurred on August 6. The first set of boreholes was drilled to intersect the mine at the location where the miners were last thought to be working at the time of the accident. Mine survey coordinates were used to pinpoint specific drilling locations.

In all, seven boreholes were drilled (the rest being 8 and 5/8 inches in diameter) but rescuers were not able to determine the location of the miners. In every borehole, rescuers attempted to insert a microphone and camera to either hear or see the trapped miners. Rescue workers also tapped repeatedly on the drill steel to signal to the trapped miners; miners are trained to reply by tapping below the surface. However, none of these communication efforts were successful.

As the rescuers continued to drill boreholes from the mine's surface, another group continued the mucking and clearing efforts in the mine's entry until another bounce occurred on August 16, which claimed the lives of three of the rescuers and injured six others. Because of that bounce, mucking efforts within the mine were suspended indefinitely. Neither MSHA, nor the outside experts brought to the mine site to review the mining conditions and rescue plan could devise a way to stabilize and reenter the mine. MSHA believed the plan it approved for the rescue operations prior to August 16 provided the maximum amount of protection to the rescuers possible, but it was not enough.

MSHA'S COMMUNICATION RESPONSE AT CRANDALL CANYON

Immediately after MSHA was notified of the Crandall Canyon accident, MSHA began acting as the primary communicator with the families, policymakers, the public and the media; a responsibility which MSHA takes very seriously after the Sago Mine accident.

On the morning of August 6, 2007, MSHA dispatched three family liaisons to the location where the family members were gathered to begin regularly updating them on the rescue operation. MSHA also provided interpreters for the Spanish speaking families. Clergy and counselors were also available. In the evening of August 6, MSHA began participating in these briefings providing updates and answering family members' questions.

MSHA also acted as the primary communicator with the media. MSHA held regular briefings every day for reporters off of the mine site at the sheriff's command center. During these briefings, we provided detailed updates regarding the rescue effort and answered reporters' questions. MSHA also provided regular updates on the Agency's Web site regarding the rescue effort and issued media advisories concerning our updates at the mine site.

In addition, MSHA personnel regularly updated Utah's governor and congressional delegation on the status of the rescue operations, both on and off-site. I also briefed the Utah Legislature at an open public forum on August 29, 2007, in Salt Lake City.

CONCLUSION

Mr. Chairman, thank you for inviting me to testify today to present a technical review of the accident at Crandall Canyon. I look forward to answering any questions you may have.

APPENDIX 1: CRANDALL CANYON ROOF CONTROL TIMELINE

In spring 2006, Genwal Resources, Inc. (Genwal) discussed the possibility of pillar mining the Main West barrier pillars. (Robert Murray is the current Controller of Genwal.) MSHA required an adequate justification for this activity.

SEPTEMBER 8, 2006

- Genwal provided MSHA with two Agapito geotechnical engineering reports that concluded the Main West barrier pillars could be safely developed and retreat mined.

OCTOBER 2006

- MSHA reviewed the Agapito geotechnical reports.
- MSHA reviewed accident/injury data for the mine.
- MSHA reviewed retreat mining data from other mine areas.

NOVEMBER 13, 2006

• MSHA received Genwal's site-specific plan to develop North Main West barrier pillar.

NOVEMBER 21, 2006

• MSHA completed its review and approved the 4-entry 3-pillar development of the North Main West barrier pillar.
• MSHA requested additional information regarding the Agapito report data.

DECEMBER 2006

• MSHA discussed the Agapito report data with mine personnel and clarified outstanding issues.

JANUARY 3, 2007

• MSHA received Genwal's site-specific plan to retreat mine North Main West barrier pillar.

JANUARY 9, 2007

• MSHA conducted an onsite evaluation of ground conditions in the North Main West barrier pillar development; MSHA then made recommendations for additional bleeder entry support and top coal roof support.

JANUARY 18, 2007

• MSHA completed its review and approved a plan revision that allowed top coal in areas of weak immediate roof.

JANUARY 31, 2007

• MSHA e-mailed the mine to stipulate the minimum requirements that would provide acceptable support for the bleeder entry.

FEBRUARY 1, 2007

• MSHA received the requested information with bleeder support revisions.

FEBRUARY 2, 2007

• MSHA completed its review and approved the plan to retreat mine the North Main West barrier pillar.

FEBRUARY 23, 2007

• MSHA received Genwal's site-specific plan to develop South Main West barrier pillar.

MARCH 6, 2007

• MSHA received the Agapito report, dated December 8, 2006, onsite visit to North barrier development; in-mine conditions reflected accuracy of computer models.

MARCH 8, 2007

• MSHA completed review and approved the 4-entry 3-pillar development South Main West barrier pillar.

MARCH 12, 2007

• MSHA received information from Genwal that pillar mining in North Main West barrier had stopped due to ground stability problems.

MAY 15, 2007

• MSHA received the Agapito report containing recommendations for mining the South Main West barrier pillar.

MAY 17, 2007

• MSHA received the plan to retreat mine the South Main West barrier pillar.

MAY 22, 2007

• MSHA conducted an onsite evaluation of ground conditions in the South Main West barrier pillar development and made recommendations against mining the eight pillars from crosscut 139 to crosscut 142 to protect the bleeder entry; Genwal agreed with the recommendation.

JUNE 15, 2007

• MSHA completed its review and approved the plan to retreat mine the South West Main barrier pillar.

APPENDIX 2: ACCIDENT TIMELINE

AUGUST 7, 2007

• In the early morning hours, repairs to damaged ventilation systems continued. MSHA's roof control personnel traveled into the mine to evaluate conditions to help determine whether or not clearing this entryway could resume safely.
• The drilling equipment used to drill the first 2 inch borehole was put in place at crosscut 138 approximately where the miners were believed to be the evening before and drilling began.

AUGUST 8, 2007

• In the morning, MSHA approved a new mine rescue plan presented by Murray Energy to allow clearing the No. 1 entry, but with extensive rib support.
• In the evening, drilling of the second borehole began. This borehole was drilled with an 8 and 5/8 inch bit.

AUGUST 9, 2007

• In the evening, the drill for the first borehole broke through the mine cavity and a microphone was lowered in to determine whether or not any underground activity could be heard. No activity was detected and rescuers continued drilling the second borehole.

AUGUST 10, 2007

• An analysis of the atmosphere in the first borehole revealed low oxygen readings, but a 3½ foot void was detected in the bored area in the mine.
• In addition, a two-man team tried to advance in the No. 1 entry but to no avail.

AUGUST 11, 2007

• Early in the morning, the second borehole (8 and ⅝ inches) broke through the mine cavity, but no communication was detected from underground. A roof height of 8 feet was detected and a camera was lowered into the cavity but only wire mesh in the roof was detected.

AUGUST 12, 2007

• In the evening, another camera was lowered into the number 2 borehole and compressed air began to be pumped in. No response from the trapped miners was detected.
• In addition, a pad for a third borehole began to be constructed.

AUGUST 13, 2007

• Early in the morning a third camera was lowered into the second borehole, and again no sign of the miners was detected.
• In addition, the drilling equipment was moved from the second to the third borehole and drilling began in the evening.

AUGUST 14, 2007

• Drilling of the third borehole continued while a drill pad began to be constructed for a fourth borehole.

AUGUST 15, 2007

• Mid-morning, the third borehole broke through the mine cavity. A microphone was lowered into the hole but no communication with the trapped miners resulted.

Seismic equipment, however, picked up an unidentified vibration that was not heard again. A camera was subsequently lowered into the hole, but nothing of note was seen.

AUGUST 16, 2007

• In the early morning, the drilling equipment was moved to the site of the fourth borehole and drilling began.
• Later in the evening, a significant bounce occurred in the mine and several rescuers were covered up by coal. In the end, six rescuers were injured and three were killed, including one MSHA employee.
• As a result, rescue efforts proceeding inside of the mine were halted indefinitely after advancing over 900 feet. These have not resumed because no way to proceed safely has been identified by either MSHA or outside ground control experts.

AUGUST 18, 2007

• In the morning, the fourth borehole broke through the mine cavity. No response from the trapped miners was detected.
• In the evening a camera was lowered into the hole and nothing was detected. Nothing was detected with seismic equipment.

AUGUST 19, 2007

• In the evening, rescuers began drilling a fifth borehole.

AUGUST 22, 2007

• Drilling in the fifth borehole broke through the mine cavity. Rescuers could not, however, get a camera into the hole because the hole became blocked.

AUGUST 23, 2007

• Rescuers began drilling a sixth borehole in the evening.

AUGUST 25, 2007

• Drilling in the sixth borehole broke through the mine cavity. A camera was lowered into this hole in the early morning of August 26, but there was no sign of the trapped miners. On August 27, rescuers also attempted to lower a robot into this hole, but were unable to complete this task because there was too much debris in the area.

AUGUST 28, 2007

• In the early morning, rescuers began drilling a seventh borehole, which broke through the mine cavity on August 30, 2007.

SEPTEMBER 1, 2007

• MSHA declared that it exhausted all known options to reach the six miners after 25 days of rescue and recovery operations.

APPENDIX 3: INSPECTION RECORD FOR CRANDALL CANYON DURING MURRAY ENERGY'S CONTROL

Inspection Code	Inspection Type	Beginning Date	Ending Date	Event Number
E01	Regular Inspection	7/5/2006	9/22/2006	4476247
E01	Regular Inspection	11/2/2006	12/13/2006	4474244
E01	Regular Inspection	12/29/2006	3/29/2007	4476407
E01	Regular Inspection	5/30/2007	7/2/2007	4474428
E01	Regular Inspection	7/5/2007	Present	4474193
E03	Hazard Complaint Investigation	2/1/2007	2/7/2007	4474269
E16	Spot	9/25/2006	10/3/2006	4477639
E16	Spot	4/11/2007	4/11/2007	4474279
E20	RC Technical Investigation	5/22/2007	5/22/2007	4476485

The CHAIRMAN. Thank you very much.
Dr. Kohler.

STATEMENT OF DR. JEFFREY KOHLER, ASSOCIATE DIRECTOR FOR MINE SAFETY AND HEALTH RESEARCH

Mr. KOHLER. Good morning, Mr. Chairman, and other distinguished members of the committee. My name is Jeffrey Kohler, and I am the Associate Director for Mine Safety and Health Research, at the National Institute for Occupational Safety and Health, which is part of the Centers for Disease Control, within the Department of Health and Human Services. I am pleased to be here today to give you an update on NIOSH's mine safety activities, including those that have been initiated under the MINER Act.

Mine safety has improved significantly over the years, yet the mine disaster in 2006, and the recent disaster at the Crandall Canyon Mine, serve as painful reminders of the dangers inherent to this industry, as well as drawing attention to our need to ensure the safety of all miners.

Moreover, these tragedies expose the challenges associated with escape and rescue, and underscore the importance of prevention of disaster.

The Crandall Canyon Mine disaster has focused attention on coal mine ground control. The prevention of fatalities and injuries from failures of the roof, pillars or floor has been a priority area at NIOSH for many years, and significant improvements has been achieved.

Coal bumps have been a longstanding hazard in some mines in the Southern Appalachia, Colorado and Utah coal fields. Bump prevention was the subject of intensive research by NIOSH and the former Bureau of Mines, and this work has resulted in the development of best practices booklets and mine planning tools, such as computer models.

Over the past decade, for example, we have conducted many workshops out in the coal fields, and now NIOSH tools such as the Analysis of Retreat Mining Pillar Stability, known as ARMPS, are widely used to improve ground control.

This program, along with others, provides an excellent basis for properly designing coal mine pillars for a wide range of mining conditions.

We have moved ahead with our responsibilities under the MINER Act with a sense of urgency, and today I am pleased to share examples of our progress, which has been facilitated by the $10 million emergency supplemental appropriations provided to us in 2006.

Emergency communications and tracking technologies—our goal is to improve both the coverage and survivability of these systems, such as leaky feeder and wireless mesh, in the near term, while providing a platform that can be expanded in coming years to realize even better performance. We've had some notable breakthroughs in the past few months.

For example, in tests at two underground mines, transmissions from a wireless system were successfully received over a 2-mile distance, despite twists and turns in the mine entries. Additionally, we have demonstrated the feasibility of combining medium-

frequency systems with UHF leaky feeder systems, a significant benefit for both improved coverage and survivability.

These tests have not yet yielded a final product, but they tell us that technologically feasible systems are achievable within the timeframe of the MINER Act.

Recently, we initiated promising, through-the-earth, two-way voice systems work, and the in-mine installation of the improved leaky feeder and wireless mesh systems is still on-target for 2008. While none of these will be the perfect system, they will represent important improvements that will bring benefits to miners.

The next generation Self-Contained Self-Rescuer will have improved performance, and will allow miners to replace their oxygen supply without removing the mouthpiece. The first prototypes were successfully demonstrated a month ago, and delivery of the final units for NIOSH certification should be expeditious.

Separately, we are tackling the more difficult challenge of replacing the mouthpiece with a full-face mask.

The refuge alternatives—our work to advance these on-schedule, and based on findings to date, we anticipate that practical means for refuge can be made available in the near future. Also, we are addressing training to ensure that refuge becomes part of effective escape and rescue strategies.

In closing, I'd like to tell you about collaborations with our Federal partners under the interagency working group that was established by the MINER Act. for example, the Naval Research Laboratory in NASA have offered their knowledge on human performance and survivability in closed systems, and are working with us to apply this to our refuge chamber research. Collaborations within this interagency working group will promote rapid development and implementation of needed technology.

I appreciate the opportunity to present our work to you, and I thank you for your continued support. I am pleased to answer any questions that you may have.

[The prepared statement of Mr. Kohler follows:]

PREPARED STATEMENT OF JEFFREY KOHLER, PH.D.

INTRODUCTION

Good morning Mr. Chairman and other distinguished members of the committee. My name is Jeffrey Kohler, and I am the Associate Director for Mine Safety and Health Research at the National Institute for Occupational Safety and Health (NIOSH), which is part of the Centers for Disease Control and Prevention (CDC), within the Department of Health and Human Services. I am pleased to be here today to give you an update on NIOSH's mine safety activities, including those that have been initiated under the Mine Improvement and New Emergency Response Act of 2006 (MINER Act).

The United States is fortunate to have an abundance of mineral resources to power the economy and the highly skilled men and women who work in the mining industry every day are our most precious resource. Mine safety has improved significantly over the years, yet the mine disasters in 2006 and the recent disaster at the Crandall Canyon Mine in Utah serve as painful reminders of the dangers inherent to this industry, and our shared responsibilities to ensure the safety and health of our mineworkers. These tragedies raise serious concerns about coal mine safety among all constituencies of the mining industry. In the wake of a mining disaster, NIOSH is available to assist MSHA and provide technical assistance and support as needed. We have a long and rich history of advancing mine worker safety and health and we remain vigilant to the practices that we recognize work to prevent future disasters.

Under the legislative mandates provided in the MINER Act of 2006, current changes are underway, and represent the most significant improvement in mine safety in three decades. New communications and tracking technologies, Self Contained Self Rescuers (SCSRs), and refuge alternatives are being developed. New and more effective training programs, emergency procedures, and mine safety practices are being designed using innovative risk analysis and management systems. Any one of these alone would improve mine safety, but in combination the effect is expected to be great. The legislative mandates have created an unprecedented environment of partnership among labor, industry, and government.

PROGRESS ON NIOSH MINER ACT ACTIVITIES

Under the Mine Improvement and New Emergency Response Act of 2006 (MINER Act) (P.L. 109–236), NIOSH was given the responsibility of conducting research to help develop new technologies for the survival and successful rescue of trapped miners after a mine emergency.

Inside the mine, survival hinges on the availability of safe shelter and breathable air. Above ground, because every hour counts, rescue crews need reliable and precise means of locating and communicating with those who are trying to escape or have become trapped. Specifically, the legislation gave us the responsibility for meeting these needs through research critical for developing new technologies for communication and tracking, safe refuge, and oxygen supply.

Underground mines are uniquely rugged and complex environments. In working to advance beyond current technologies for survival and communications, researchers must test their technical expertise and ingenuity against some basic laws of nature. For example, in seeking improvements in communications and tracking technologies in emergencies, we face fundamental limitations in both types of systems—wired and wireless—that are used for transmitting voices or signals over long distances or through the earth.

Signals sent by wireless systems, such as radio signals, are blocked by rock and other barriers. This poses a basic hurdle, whether the intent is communication from above ground to trapped miners hundreds or thousands of feet below, or communication from the mine opening into a tunnel that has been blocked by rock after an explosion or a mine collapse.

Wired transmissions depend on signals sent along wires and cables. Wires and cables are susceptible to being snapped or damaged beyond use in an explosion or a crushing roof collapse. The breaks or damage may occur at locations that are not readily accessible.

To engage such challenges, we have had to apply a mix of scientific know-how and creativity, our close-working knowledge of the underground mine environment, and persistence in working through the technical questions that always come up in scientific studies.

We have also had to design research across several related but different tracks, and to administer contracts and award funds to outside partners with resources and expertise that complement ours. We have moved ahead with a sense of urgency while doing everything we can to assure high-quality research.

Some of the more significant accomplishments include:

• Communications and Tracking Technology.—We have awarded seven research contracts to outside partners that address key needs for advancing communication technologies. The partnerships join NIOSH's resources and expertise with complementary outside resources and expertise. The projects address several related but separate targets for improving communication systems in emergencies. Among these, three important targets are: (1) a more survivable leaky feeder system; (2) an improved medium frequency capability that is integrated with either leaky feeder or wire mesh systems; and (3) a through-the-earth, two-way voice system. Taken in total, reaching these targets will contribute to the overall goal of significantly improving both the coverage and survivability of emergency communications systems. We expect that combinations of these technological innovations will become available within the timeframes specified by the MINER Act.

• A Subterranean Wireless Electronic Communication System.—We achieved a notable milestone in August in the research to improve communication technologies. In tests at two underground mines, transmissions from a wireless system were successfully received over a 2-mile distance, despite twists and turns in the mine tunnel and other physical barriers. To date, such barriers have limited two-way wireless communications to much shorter distances. In simplest terms, we tested a system in which a signal would hop along all available conductors such as electrical wires and water lines to get around barriers. The tests have not yielded a final product, but they tell us that it is technologically feasible to develop a system that

communicates over much longer distances than existing systems, which was a fundamental challenge that we faced. We are proceeding toward next steps of this research with our partners, to address questions about other key aspects of this promising approach.

• Self-Contained Self-Rescuer (SCSR).—The major goal of the oxygen supply work is to develop a next generation Self-Contained Self-Rescuer (SCSR), which will be "dockable"[1] and will overcome existing performance problems. Under the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (P.L. 109–234), which provided $10 million to NIOSH for mine safety technology research, the first prototypes of this unit have been designed, built, and evaluated. All of the performance parameters have been achieved. At a meeting with industry and labor representatives, in which they examined the new units, concerns were raised about their shape and the comfort in wearing them. Accordingly, the manufacturer has been directed to redesign the housing to make the units smaller and easier to wear. The new prototypes are expected within the next 9 months.

• Refuge Alternatives.—All of our work in advancing safe shelter or refuge alternatives is on schedule, and we expect to complete the report required of us under the MINER Act by the deadline set by the act. In a related project, we have also offered to help the State of West Virginia by developing and conducting a test program for refuge chambers. Although the program has been delayed as we wait for test equipment to be delivered, and it has placed additional demands on our limited number of staff, our stakeholders have emphasized to us that this is an important need, and we agree. We expect to begin testing within a few weeks. Based on findings to date, we anticipate that practical means for refuge or safe shelter can be made available to mines in the near future. However, it will be important to establish appropriate training and other administrative procedures for mines, to ensure that alternatives for refuge become a part of more effective escape and rescue strategies.

We have also pursued a flow of information back and forth with other Federal agencies, with whom we have been collaborating under the Interagency Working Group that was established by the MINER Act. Our Federal partners have made us aware of technologies currently used in other applications that may be adaptable to our needs in the mining environment, and are helping us to see how they may fit. For example, the Naval Research Laboratory and NASA have offered their knowledge on human performance and survivability in closed systems that protect humans from hostile environments, such as submarines and spacecraft. They have worked with us to see how this knowledge may advance our research on refuge chambers. The U.S. Army and the Department of Homeland Security are leveraging their knowledge and needs in regard to communications and tracking systems with ours. These and other partnerships will save time, resources, and trial-and-error for NIOSH, and we hope that these collaborating agencies will benefit similarly. The partnerships will also help us meet our duties under the MINER Act more quickly and efficiently.

GROUND CONTROL IN UNDERGROUND MINING

The recent disaster at the Crandall Canyon Mine in Utah has brought several topics to national attention in the area of ground control in underground mining. The prevention of fatalities and injuries from failures of the roof, pillars or floor has been a priority area of research, development, demonstration, and research to practice activities at NIOSH for many years. Significant safety improvements have been achieved. Coal bumps, bounces, and outbursts have been a longstanding safety hazard in some mines in the Southern Appalachian, Colorado, and Utah coal fields. A coal bump is the sudden and violent failure of highly stressed coal or surrounding strata. Bumps caused many fatalities in past decades, and were the subject of intensive research by NIOSH and its predecessor agencies. The results of this research were best practices documents and mine planning tools, such as computer models. Over the past decade, for example, many workshops have been conducted and now the NIOSH tools are widely used to improve ground control in the mines.

NIOSH has developed several computer programs to help mine planners design coal pillars. For longwall mining, there is the Analysis of Longwall Pillar Stability (ALPS). For room-and-pillar and retreat mines, there is the Analysis of Retreat Mining Pillar Stability (ARMPS). Both of the programs are widely used throughout the United States. These programs, along with others developed by industry or aca-

[1] The docking port mechanism is designed to allow the user to plug in additional oxygen units without opening the breathing circuit to the potentially poisonous atmosphere.

demia, provide an excellent methodology for properly designing coal mine pillars for a wide range of mining conditions. Important enhancements to the NIOSH models are the associated databases, which document observed in-mine failures and successes of various designs.

The application of seismic monitoring has been mentioned in recent weeks as a potential technology for predicting coal bumps. For more than 30 years scientists and engineers around the world have invested hundreds of millions of dollars attempting to understand coal bumps and rock bursts, and to develop systems that could predict or warn of impending events. Much has been learned about the events and how to reduce their occurrence through engineering design, but no success has been achieved in prediction. Today, seismic monitoring is used more in hardrock mining, as part of a risk management program, but very infrequently in coal mining. Despite advances in technologies, such as geophones, signal processing equipment and computers, many of the fundamental barriers that existed 30 years ago remain today. Notwithstanding, there could be value in applying seismic monitoring at mines with a history of bumps, as part of a larger risk management program, as is done in Australian and many European coal mines.

CONCLUSION

In closing, NIOSH continues to work diligently to protect the safety and health of mineworkers. The relevance of our past work and continued need for further safety and health research is highlighted by the recent mine disasters. We have made significant improvements in the areas of communication and tracking, oxygen supply, and refuge alternatives. Moreover, our safety and health research program is addressing the critical areas identified by our customers and stakeholders, and through our research, development, demonstration, and diffusion activities, we are enabling a shift to a prospective harm reduction culture in the mining industry. I appreciate the opportunity to present our work to you and thank you for your continued support. I am pleased to answer any questions you may have.

The CHAIRMAN. Thank you.

Mr. Osterman.

STATEMENT OF JOSEPH OSTERMAN, MANAGING DIRECTOR, NATIONAL TRANSPORATION SAFETY BOARD

Mr. OSTERMAN. Good morning, Chairman Kennedy, Ranking Member Enzi, and members of the committee. Thank you for allowing me the opportunity to present testimony on behalf of the National Transportation Safety Board during today's hearing regarding mine safety disasters.

Let me add that Ms. Sharon Bryson, Director of our Transportation Disaster Assistance Program, is here with me today.

The Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident, and significant accidents in other modes of transportation, and the NTSB makes recommendations from those investigations to prevent similar accidents from happening again.

Eleven years ago, the Board assumed the additional responsibility of coordinating assistance to victims and their families, following major aviation accidents.

This responsibility grew out of a series of major aviation disasters in the 1990s when a number of family members shared with the Board and congressional leaders, their experiences involving the lack of a coordinated response from the airlines.

In response, Congress passed the Aviation Disaster Family Assistance Act in 1996, that designated the Safety Board as the lead Federal agency for coordinating information and services of local, State, and Federal agencies to victims and their families, impacted by a major aviation disaster.

It gave the Board additional responsibilities to facilitate the recovery, and identification of fatally injured passengers, ensure family members briefings prior to a public release, and inform family members of the Board's public hearings and meetings.

The Safety Board created the Office of Transportation Disaster Assistance, and carefully recruited experienced individuals in the primary disciplines of victim recovery and identification, mental health, and emergency response operations. This four-member unit travels with the investigative teams to all major aviation disasters, as well as selected major accidents in other modes of transportation.

The act also details the responsibilities of the air carriers, including publicizing a reliable toll-free telephone number, providing trained staff to handle calls from family members, timely notification to families of passengers about the accident, and assisting family members in traveling to the accident city. Carriers must file their plans about these responsibilities with the U.S. Department of Transportation and the Safety Board.

The 1996 legislation also requires the establishment of a task force comprised of representatives from Federal agencies, the American Red Cross, air carriers, and family members involved in aircraft accidents to make recommendations to those agencies and the air carriers regarding their family assistance plans, and to devise best practices.

The recommendations became the foundation for the development of the Board's Federal Response Plan for Aviation Disasters. The input of these stakeholders has been critical to the success of the NTSB Program.

Our Family Assistance Program also continues after the on-scene response. TDA staff communicate with the family members throughout the investigative process, they provide updates, information regarding the Board's public hearings and meetings, and respond to family members' questions. For the air carriers, the NTSB serves as a neutral agency that helps facilitate coordination and communication with family members by serving as the single-source of factual information concerning the accident, allowing the carriers to respond more effectively.

The two largest industry groups—the Air Transport Association and the Regional Airline Association—both strongly support the Program, and advise TDA staff on air carrier concerns.

At the time the legislation was passed, there were some concerns that the primary investigative agency—the Safety Board—may not be the best-suited organization to execute the responsibility for Family Assistance. However, the TDA team quickly earned a reputation for handling its tasks effectively, and became an integral part of every go-team launch in all transportation modes.

The Family Assistance Program's effectiveness resides largely in our ongoing interaction with our private and public partners to ensure their readiness to respond. Because of its success, the TDA team has assisted other Federal agencies in developing Family Assistance Plans and training, and has worked with representatives of the Mine Safety and Health Administration on family assistance issues and challenges.

In 2002, the Board assisted MSHA in training, and sharing best practices, and in January 2007, the TDA team delivered a 2-day training course to members of MSHA, to the MSHA Family Liaison Program.

This concludes my statement, Mr. Chairman, and I will be happy to respond to the questions you may have.

[The prepared statement of Mr. Osterman follows:]

PREPARED STATEMENT OF JOSEPH OSTERMAN

Good morning Chairman Kennedy, Ranking Member Enzi, and members of the committee. Thank you for allowing me the opportunity to present testimony on behalf of the National Transportation Safety Board regarding mine safety disasters. In particular, I will provide testimony regarding the NTSB experience providing assistance to victims and their families following a transportation disaster. The NTSB is an agency dedicated to the safety of the traveling public and it is my privilege to represent such an agency.

As you know, the Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—marine, highway, railroad and pipeline. In addition, the Board conducts safety studies on issues of national significance such as personal watercraft safety and operator fatigue. Based upon these investigations and studies, the Board makes recommendations to prevent similar accidents from happening again. Eleven years ago, the Board assumed the additional responsibility of coordinating assistance to victims and their family members following a major aviation disaster.

I would like to take a moment to first explain how the Board was identified for this important responsibility and then briefly discuss how the program has worked.

After a series of major aviation disasters in the early to mid-1990s, including USAir flight 427 in Aliquippa, Pennsylvania, ValuJet flight 592 in the Florida Everglades, and TWA flight 800 off Moriches, New York, a number of family members began sharing with the Board their experiences involving a lack of a coordinated response from the airlines, continuous busy signals on the airline's 800 number, untimely and often incomplete notification of the accident, misidentified remains of loved ones, personal effects being destroyed without family members' consent, and the use of confidential information in litigation. Family members felt abandoned and in some cases abused at a time when they needed guidance, assistance, and compassion. These feelings were not isolated but shared by family members of many other accidents.

In response to these concerns, Congress passed the Aviation Disaster Family Assistance Act in 1996. This legislation designated the Safety Board as the lead Federal agency responsible for coordinating information to victims and their families impacted by a major aviation disaster. This act gave the Board its authority to bring together Federal, State and local government agencies to assist victims and their families when an aviation disaster occurred. It gave the Board additional responsibilities to facilitate the recovery and identification of fatally injured passengers, ensure to the maximum extent possible that family members were briefed about the investigation prior to any public release, and make sure family members were informed of and allowed to attend any public hearings and meetings on the investigation that was held by the Board. Additionally, it directed the Board to designate a director of family support services who would be responsible for acting as a primary point of contact within the Federal Government and act as a liaison between the carrier and the family members. The act also directed the Board to designate an independent non-profit organization to be responsible for coordinating the emotional care and support of those family members. The Safety Board designated the American Red Cross to be that independent organization.

To carry out the assigned task, the Safety Board created the Office of Family Affairs, currently the Office of Transportation Disaster Assistance (TDA). The Office has carefully recruited skilled and experienced individuals in the primary disciplines of victim recovery and identification, mental health, and emergency response operations. Members of the TDA team travel with the investigative teams to all major aviation disasters as well as selected major accidents in other modes of transportation. The team also provides assistance on a case-by-case basis to the Board's regional investigators handling general aviation accidents. For the first time in history, a trained and experienced team is now in place to coordinate the response to transportation accident victims and their families.

In addition to the Board's disaster assistance role, the act also requires air carriers to prepare for and assist victims and their families. All domestic air carriers are required to have a plan to publicize a reliable, toll-free telephone number and provide trained staff to handle the calls from family members and have the plan on file with the U.S. Department of Transportation and the Safety Board. The plan must also include a process for notifying families of passengers in a timely manner that an accident has occurred, an assurance that the carrier will assist the family members in traveling to the location of the accident, and provide for their physical care while they are in the accident city.

Following a 1997 crash in Guam, the Board realized that foreign air carriers flying in and out of the United States were not covered by the 1996 legislation. As a result, Congress passed the Foreign Air Carrier Family Support Act of 1997 that required foreign air carriers serving the United States to develop family assistance plans and fulfill the same responsibilities as domestic air carriers. This helped to ensure equitable support and assistance to anyone impacted by an aviation disaster occurring in the United States.

The 1996 legislation also required the establishment of a Task Force that consisted of representatives from the Department of Transportation, the National Transportation Safety Board, the Federal Emergency Management Agency, the American Red Cross, air carriers, and family members who have been involved in aircraft accidents. The Task Force was convened to make recommendations to government agencies and the air carriers regarding the implementation of their family assistance plans and to devise "best practices" for conducting family assistance operations. The recommendations collaboratively developed by this group of individuals were delivered to Congress approximately 1 year after the passage of the legislation. These recommendations became the foundation for the development of the Board's Federal Response Plan for Aviation Disasters. The Board believes the input and "buy-in" of all of the stakeholders through this Task Force has been critical to the success of its work in assisting victims and their family members.

The Safety Board has learned through extensive experience in all modes of transportation that no one agency or person can manage catastrophic events alone. The Board is also aware that each and every event is unique and therefore must be met with a well thought out response. This Federal Response Plan solicits the support of private and public agencies through a series of Victim Support Tasks (VSTs). Again, the Task Force members articulate the needs of family members, and the Federal Response Plan, through the VSTs, identifies the agency most capable of assisting the family members. While on scene, all of the responding agencies are required to coordinate through a Joint Family Support Operations Center (JFSOC). The JFSOC is managed by the Board and is designed to be the primary location to address the issues of victims and their families.

While the Board has important responsibilities during the initial response to a transportation accident, our contact and support to the victims and their families continues throughout the Board's process by continuing to communicate with the family members through investigative updates, providing information regarding the Board's public hearings and meetings, responding to family members' questions on recovery and return of personal effects, recovery and identification of their loved one, and other issues and concerns. The Board has learned that it is critical to provide family members easy access to trained professionals who can provide answers to their questions.

The interaction between TDA staff and family members underscores the importance of the process of family assistance. Families frequently comment on their desire for a consistent source of factual information, an understanding of what to anticipate in the days, weeks, and months following the accident, and most importantly compassion. The family assistance process provides this in a focused way. A family member from a recent accident commented "the process of family assistance gave me some positive memories that I was able to carry with me as a source of hope beyond the horrible experience of the disaster."

For the air carriers, the NTSB serves as a neutral agency that helps alleviate unproductive tensions that may exist with family members by being the single source of factual information concerning the accident. The Air Transport Association and the Regional Airline Association, the two largest industry groups, both strongly support the NTSB family assistance program and help advise TDA staff on air carrier concerns. This ongoing relationship with the associations and the air carriers has allowed the airlines to respond more effectively.

While today we enjoy a well-integrated and effective family assistance program, that has not always been the case. Many individuals, even some at the Safety Board, did not believe the Board should have the responsibility for family assistance. Some were concerned that this additional role would detract from and inter-

fere with the Board's independence and make it more difficult to maintain objectivity. To address those valid concerns, the Board put a "firewall" between the TDA team and the investigative team. The TDA team quickly earned a reputation for handling its tasks effectively while also protecting the integrity of the investigation. Over time, the TDA team has become an integral part of every go-team launch, and our accident investigators in all modes of transportation have grown to depend on their expertise in communicating with family members and rely on their assistance throughout the investigative process.

While we believe our program has established the "gold" standard in victim and family assistance, we know there is always more work to be done. The TDA team remains involved with its private and public partners to ensure their readiness to respond. Regular meetings are held with the air carriers, our Federal partners and with non-profit agencies. In addition, due to the demand for information, the TDA team has developed several courses on Family Assistance which are currently held at the NTSB Training Center.

The NTSB model of family assistance is evolving beyond large aviation accidents. In addition to serving NTSB in both general aviation accidents and non-aviation disasters, the TDA team has also been asked to assist other Federal agencies in developing plans and providing training to their teams to respond to victims and their family members. Those teams include the Federal Bureau of Investigation, the Department of Health and Human Services following Hurricane Katrina, and the Mine, Safety, and Health Administration (MSHA) on family assistance issues and challenges.

As far back as 2002, the Board was asked by MSHA to provide training and share "best practices." In January 2007, members of the TDA team traveled to the MSHA Academy where they delivered a two-day training course to members of their family liaison program. There have also been a number of MSHA employees who have attended our Basic Family Assistance course offered at our Training Center.

While the Board has responsibility for coordinating assistance to victims of major transportation disasters and their families, it is very much aware that it takes the hard work of many agencies and individuals to be effective. The Board is also prepared to assist our colleagues in other agencies to develop and enhance their programs. The Board has discovered that assistance to families and victims during disasters not only helps them cope, but it improves our ability to investigate those disasters.

This concludes my statement, and I will be happy to respond to any questions you may have.

The CHAIRMAN. Thank you, thank you very much, a lot of material to cover, we're very grateful for all of your testimony, and also for your services.

Mr. Stricklin, I listened carefully to your testimony. What was the announcement that you made with regards to the retreat mining now, that are suspended? Could you tell us that, and what its implications are, just quickly?

Mr. STRICKLIN. Yes, that was done toward the end of August. Basically, me and the District Manager had a conversation and we decided to pull all the retreat mining plans in District Nine, which is west of the Mississippi in any mine that has a cover over 1,500 feet.

The CHAIRMAN. You're going to review those plans? Is that what your intention is?

Mr. STRICKLIN. Well, we're going to review and make sure that the plans can be done safely, based on what has occurred at Crandall Canyon.

The CHAIRMAN. And that's a pretty big chunk of the market, is it not? And it covers about how many people, could you just give us an estimate?

Mr. STRICKLIN. I don't know how many people, but I think there were eight mines involved in that.

The CHAIRMAN. OK.

Mr. STRICKLIN. District Nine has approximately 30 underground mines, so it would be one-fourth of their mines.

The CHAIRMAN. Let's just, if we could, go back and follow the sequence here, Mr. Stricklin. One of the most important jobs is to test and analyze the mining plans before they're implemented, make sure they're safe. What I find troubling about the Crandall Canyon Mine situation is that MSHA apparently missed several red flags about the safety of mine plans.

The report the committee has received from NIOSH suggests that there were significant weaknesses in the analysis of the Crandall Canyon Mine plan that Murray Energy submitted to MSHA. Yet, MSHA approved the plan.

Of course, the investigation into the incident is ongoing, but can you help us understand the process that led to the approval of the Crandall Canyon Mine plans? Who reviewed the Crandall Canyon plan?

Mr. STRICKLIN. Typically, a mine operator will submit a plan to our District Office, in this case it would be located in Denver, CO, and it would go through the Roof Control Group, in this case. They, basically, would do a review of the information, in addition, they may want to do an onsite investigation to include in that review. In both cases, both in the northern barrier and the southern barrier, the roof control supervisor, and a roof control specialist went onsite. As well as, in the District Office, there was a graduate engineering student who basically investigated the Agapito information that was submitted to us.

The CHAIRMAN. Agapito is an independent company, and they do the review in terms of the mine safety. They're basically contracted by the mine operators, is that correct?

Mr. STRICKLIN. That's correct, sir.

The CHAIRMAN. So, you're relying on, here, they're the independent company that's paid by the miner operators themselves, now they are doing the review, and they submit that information to MSHA, is that correct?

Mr. STRICKLIN. Yes, sir.

The CHAIRMAN. And they——

Mr. STRICKLIN. What——

The CHAIRMAN. Go ahead.

Mr. STRICKLIN. What occurs is the mine operator would pay the services of Agapito to do that information, and then the mine operator would submit that to us.

The CHAIRMAN. OK, and you have a chance to review that?

Mr. STRICKLIN. Yes, sir.

The CHAIRMAN. And you did, with regards to the North Barrier?

Mr. STRICKLIN. Yes, sir.

The CHAIRMAN. But, it is true that you didn't re-run the models for the South Barrier, is that so?

Mr. STRICKLIN. I'm not exactly sure of that. My understanding was the graduate student looked at the information that was submitted to us from Agapito. I did not hear what you may have heard, that he didn't run it for the South Barrier.

The CHAIRMAN. Just so that we have on this chart here that you're very familiar with, but it's helpful to some of us, these are the North Barrier and the South Barrier. The North Barrier is the

place where—as you just mentioned—the MSHA took the information from Agapito and said that it met the safety standards, and they went ahead in that area in March 2007. The circled black area is the place where they had the bump, as I understand it, does that seem—can you see well enough from there?

Mr. STRICKLIN. Yes, sir.

The CHAIRMAN. I'm sure you know this like the back of your hand. That was the area.

Now, that is an area that is how far from the red designated area, would you say—as I understand it, it's about 900 feet—does that sound about right to you?

Mr. STRICKLIN. Yes, it does.

The CHAIRMAN. And so, you had the bump on the north area, and they stopped, effectively, the mining, and then went to the other area, which is designated here in July 2007, and the red square indicates where the tragedy took place, the loss of life.

Mr. STRICKLIN. Yes, sir.

The CHAIRMAN. So, they went from what they call the North Barrier here, they used the NIOSH models, they contracted with Agapito, MSHA made the judgment to go ahead. Then they have this bump that took place, which threatened this whole process in that particular section, so they made a judgment and decision to go in this other area, where they also ask Agapito to conduct a review. They make a review, and this is paid for by the company itself, and they move ahead in the mining of that area. Is that your understanding?

Mr. STRICKLIN. The one thing I want to mention to you is, I don't think my folks in MSHA knew of the extensiveness of this bounce, or bump that occurred in the North Barrier section.

The CHAIRMAN. If they had, what would have been their recommendation?

Mr. STRICKLIN. I guess they would have probably dug into it further, and evaluated further. But, at the time our understanding was that they were pulling out of that section based on the fact they could not travel the bleeder entry, which is a ventilation course to the back of that area. And we were unaware of the extensiveness of the bounce that we found out after this occurrence on August 6.

The CHAIRMAN. So, when approving the plan to do the South Barrier, just 900 feet away, did the MSHA—as I understand from your response here—the MSHA's analysis of whether the March bump indicated that the retreat mining in this area was hazardous, MSHA didn't know the magnitude of the March bump?

Mr. STRICKLIN. Yes, our understanding——

The CHAIRMAN. Can you tell us a little bit why—my time is moving on, and your answers have been very fair, and I apologize for, sort of, moving through this—but why wasn't MSHA more concerned that the deteriorating condition in the North Barrier would be repeated in the South Barrier?

Mr. STRICKLIN. Again, the reason that we had heard that they were pulling out of that area was because they could not travel to the back end of the bleeder system. That's typical when you have retreat mining sometimes, to have conditions in a bleeder entry that could cause travel to be hindered. A mine operator would sub-

mit a plan to say that he wanted to move an evaluation point, and not travel to the back end. We had told the operator that we would not move that evaluation point, allow him to come out, we wanted them to travel to the back end. That was the determination they made, that they were going to seal that section.

The CHAIRMAN. Just finally, Mr. Kohler, can you explain the significance of the report we received on Friday, from NIOSH?

Mr. KOHLER. The report—at your request—took a retrospective analysis of the Crandall Canyon North and South mains, using the NIOSH ARMPS Program and recommended procedures, and also with the laminar model, the model. The use of the ARMPS Program indicated that there was an elevated risk of coal bumps in both the North and the South mains, in which the stability factors were significantly less than those that had been published by NIOSH in previous reports.

The CHAIRMAN. So, how would you summarize that? That's a good statement, and a fair one. But, in layman's language, how would you characterize it?

Mr. KOHLER. Well, in layman's language, the NIOSH scientists over a period of 10 or 15 years went out to more than 100 mines, and collected several hundred case studies of which pillars failed and which pillars did not fail. They attempted to understand why they did or didn't fail.

Based on all of that, they put together a database from which one could find suggested or proposed stability factors to reduce the risk of having a bump. If the published stability factor of 2.0 is adhered to, the risk of, the number of cases in which a bump would be likely to occur approaches zero, if it's less than the recommended or suggested factor of 2.0, the risk goes up, maybe, to 60 percent.

So, in layman's language, the ARMPS Program and database provides the mine planner with a first step to inform the decision of how to design the pillars to prevent failures.

The CHAIRMAN. My last question to Mr. Stricklin—why didn't MSHA recognize the problem with Agapito's use of the models, do you think?

Mr. STRICKLIN. I think that's something that the investigation team is going to have to come up with. I mean, we're in a process of interviewing people, and determining what evaluations that we did use, and see if we agreed or disagreed with Agapito.

The CHAIRMAN. Senator Enzi.

Senator ENZI. Thank you, Mr. Chairman.

Dr. Kohler, what are the technical options that NIOSH has been studying to provide reliable deep mine communication that would remain usable in a post-accident situation? What's the current distance that solid material wireless signals can be reliably transmitted through? And, is there wireless communication through large amounts of solid material? Is it technologically possible?

Mr. KOHLER. Senator, as you're aware, the technical challenges of communicating in an underground coal mine environment surpass even the technical challenges in communicating between, say, the earth and the moon.

The issues with the rock layers in between, the limitations on power usage in the underground mine to prevent the communica-

tions equipment from causing an explosion in itself—all of those present formidable challenges.

Despite all of the challenges, however, we believe that there are three or four different technologies, all of which we are advancing in parallel—we believe that of those, some of them will come online within the timeframe of the MINER Act to provide increased coverage and survivability. Really, the key issue is, after the explosion, after the disaster, we want to increase the chances that the system will remain operable.

Second, we'd like to increase the distance from which the miner can be, and still utilize the communication system, that is, to increase coverage. As I indicated in my opening statement, just a few weeks ago at a couple of mines in West Virginia, we had some important breakthroughs which demonstrated that within the timeframe of the MINER Act, we will have technologies that will provide improved—not perfect—systems, by any means, but will provide improved communications capabilities. So, we've got a number of things that are showing great promise.

Senator ENZI. I know the Navy has trouble with some deep transmissions through water. This is deep transmissions through solid material. At present, is wireless communication through that feasible?

Mr. KOHLER. Under certain conditions, for smaller distances. Certainly, maybe not with 1,500 feet of cover, but we believe it can be done.

This summer, we had a group of experts from all branches of the military, NASA, Homeland Security, other agencies, and we addressed this very problem. They had no silver bullet to offer, but we agreed that jointly there are some very promising approaches.

We recently initiated work with, I believe it was, Lockheed Martin, to apply some defense-type technologies for through-the-earth two-way voice communication. No guarantees that it will work, but we believe it shows considerable potential to get to the goal that we really want, and that would be ultimate in survivability, no dependence on infrastructure in the mine, would go straight through the earth layers themselves.

Senator ENZI. I think that as long as there's an increased use of coal, that there will be increased inventions for mining in coal.

What can Congress do most effectively to assist NIOSH in research and development of better deep mine communication technology?

Mr. KOHLER. I think that the emergency supplemental appropriations that Congress provided, both in 2006 and in 2007 have been a tremendous benefit to us. We have seen more developments, and interest, in the past year than we have in the entire course of the program.

Currently, I think that in the last few months, we've received as many as 50 or so proposals for new ideas for improving survivability, communications, rescue, all of those technologies. We're very grateful for that. I think that that money has really positioned us to do the job that we need to do.

You know, beyond that, it takes this amount of time, the timeframe of the MINER Act, that is our target, we think that there

is some important things that are achievable there, and you know, we're anxious to continue working toward that goal.

Senator ENZI. Thank you, that's very encouraging.

Mr. Osterman, as we've all witnessed, the National Transportation Safety Board plays an important role in incident management in post-accident settings. There has been some question as to whether or not MSHA should adopt the NTSB model. In thinking about this issue, there are a number of differences between a serious mining accident, and for example, a commercial airliner crash.

In a mining disaster, the victims and their families typically live in close proximity to the mine. In an airline disaster, the victims and families could be from all over the country, and typically are at a great distance from the disaster site.

Also, mining disasters almost always involve protracted rescue efforts, while—unfortunately—most airline tragedies are limited to recovery operations. Do you think that these, and other distinctions, should dictate a different approach to incident management by MSHA than that utilized by the National Transportation Safety Board?

Mr. OSTERMAN. Senator, I think the model that is utilized, and that is derived from the legislation from 1996 is very sound, but we recognize, even within the modes that we deal with at the NTSB, the differences that exist between aviation, and highway, marine and so on. So, each of these programs has to be modeled on some sound principles, but also tailored to the specific needs of that community. As you correctly pointed out, each of these industries—even in transportation—are vastly different. Although the tragedy is identical for the families, their needs do change with the nature of the disaster, and the industry.

Senator ENZI. Thank you, I'm not aware of any major NTSB accident investigations that have involved two contemporaneous congressional investigations, a State investigation, as well as other investigations aimed at reviewing the same physical evidence, interviewing the same witnesses, all for the purpose of determining the cause of the accident, and the potential culpability of any of the parties. In my view such multiple investigations are, at best, enormously wasteful of time and resources, and at worst, jeopardize the integrity of the process, as well as any possible subsequent law enforcement efforts.

In the first instance, we need to leave accident investigations in the hands of experts that have the knowledge and resources to conduct them. I'd appreciate your comments as to how the NTSB typically operates, and whether or not you agree with these kinds of multiple accident investigations, and how they would interfere with a typical NTSB investigation?

Mr. OSTERMAN. Well, Senator, the National Transportation Safety Board is the primary Federal agency responsible for the investigation of transportation disasters. In that role, we work with our other Federal partners, but are recognized as the lead agency for those investigations. As we conduct our investigations, however, there are frequently concurrent criminal investigations that are underway at the State, and sometimes, Federal level. Frequently there are other program audits or reviews being conducted by the

Department of Transportation Inspector General, for example, or the Government Accountability Office.

We have learned over our history that the best method to ensure that we're delivering—not only the right probable cause and thorough investigation, but are working with these other entities to deliver the best products for the American people—is to, early on, meet with these organizations, and identify our different pathways and authorities. Now, that seems to have worked out very well for us, we definitely do not want to interfere, in any way, with criminal investigations when they occur, and we are very successful in—early on—meeting with the prosecutors or the District Attorneys, the ADAs and defining the parameters of our investigation and theirs. We work very hard to protect evidence so that it can be used for both investigations.

But we do segregate the accident investigation activity exclusively to the NTSB.

Senator ENZI. Thank you, I have a number of follow up questions, but I too have over-utilized my time, and I've got some that are related for Mr. Stricklin, but I'll submit those in writing, and would appreciate answers to them, so we can figure out how best to handle it. Thank you.

The CHAIRMAN. Senator Murray.

Senator MURRAY. Thank you, Mr. Chairman.

Mr. Stricklin, let me start with you—the MINER Act does require MSHA to temporarily assign a DOL official as a family liaison between the Agency and families in an incident with multiple deaths. For those employees that are designated as family liaisons, is this their primary duty, or do they serve the organization in other capacities?

Mr. STRICKLIN. They serve the organization in other capacities. What we did after Crandall Canyon occurred was immediately notified three of the trained family liaisons to get to Utah as quickly as possible, and we had someone there around the clock and they basically dedicated their time in Utah to being the family liaison.

Senator MURRAY. Typically, what kind of professional or educational background do those liaisons have?

Mr. STRICKLIN. I believe, the three that was out there, one was an engineer, one was a geologist, and I'm not sure what the third individual was. But they were trained by the family liaison training conducted at the Academy that the NTSB participated in.

Senator MURRAY. Does MSHA currently have any kind of structured program, or dedicated staff, with the sole responsibility of providing a full range of support for needs of families?

Mr. STRICKLIN. No, they do not.

Senator MURRAY. They do not.

Were you aware of the March 10 bump at Crandall Canyon that resulted in the abandonment of the North Canyon?

Mr. STRICKLIN. Not until after the accident occurred, after August 6.

Senator MURRAY. Would you have—if you had known—reassessed the South Barrier roof plan?

Mr. STRICKLIN. Yes, we would have.

Senator MURRAY. Do you know Bob Murray?

Mr. STRICKLIN. Yes, I do.

Senator MURRAY. Are you aware of the news accounts, describing retribution from Bob Murray that resulted in the re-assignment of an MSHA Inspector to a different district?

Mr. STRICKLIN. I've heard of those.

Senator MURRAY. Can you tell us, is it common knowledge among inspectors that Bob Murray had an MSHA Inspector reassigned?

Mr. STRICKLIN. I think a lot of people heard those allegations, I don't know if that is true or not.

Senator MURRAY. Have you ever been contacted by an elected representative, making requests on behalf of Bob Murray?

Mr. STRICKLIN. No, I have not.

Senator MURRAY. OK.

From recent press articles and the September 5 hearing that we had in our Labor, HHS Subcommittee, I understand that MSHA is significantly behind in their regular quarterly inspections in District Four, and that they have endorsed using these spot inspections as a replacement for the regular quarterly inspections.

I also understand that you approved the spot inspection program, and I don't think it's difficult to understand that Congress included those required inspections in the MINER Act to identify potential problems before they turned into disasters, and we fully expected MSHA to comply.

If you are 60 percent behind in District Four, it leads me to ask you—how far behind were you in District Nine?

Mr. STRICKLIN. District Nine was pretty close to being on target. District Four was the one District that was the hardest-hit with attrition—you're aware of the Aracoma disaster taking place, we had some initiatives down in that area that we felt needed our attention. What occurred when the District Manager who's in place now got the job last August, he evaluated his needs and decided——

Senator MURRAY. Last August, like in several months ago? Or last August, like in——

Mr. STRICKLIN. I'm sorry, August 2006, over a year ago. When he got the job, he realized that he was not going to be able to complete every EO–1 inspection. So, what he did was a risk analysis of the mines that he had, and decided which ones he needed to ensure got the EO–1 inspections done, and he basically laid out a plan that he wanted participation or inspectors at each other's mine, even though he knew that he did not have enough people to complete the EO–1 inspection.

Senator MURRAY. Can you tell us what MSHA's plan is for fulfilling its statutory requirement on these quarterly inspections?

Mr. STRICKLIN. Well, the one big thing is, Congress has passed a supplemental hiring, and allowed us to hire 170 additional inspectors. Since June 2006 until the present, I've hired 253 inspectors. They're in training now, but I know help is on the way.

Senator MURRAY. Do you have a written plan?

Mr. STRICKLIN. Yes, I do.

Senator MURRAY. Can you submit that for this committee's peruse?

Mr. STRICKLIN. Yes.

Senator MURRAY. I appreciate that.

I just have a few seconds left, and I do have some other questions, but let me just ask, Mr. Osterman, can you tell me what the catalyst was for the creation of NTSB's Disaster Assistance Program?

Mr. OSTERMAN. The catalyst, Senator Murray, was a series of major aviation accidents that occurred in the mid-1990s in which the airlines, quite frankly, were unprepared, and poorly handled dealing with the families. So much so, that it was mentioned in one of the members previous statements, they were learning about issues from the television.

Senator MURRAY. OK, thank you very much.

The CHAIRMAN. Senator Hatch.

Senator HATCH. Mr. Stricklin, what are the strengths and weaknesses of using a collaborative command approach that would include MSHA, State and local operators in directing rescue efforts?

Mr. STRICKLIN. With a rescue effort, I think it's important that you try to get everybody working together. My boss who was onsite, Richard Stickler, really promoted that idea, that we all need to work together for a common goal of getting in there as quickly as we can. That still gave us the ability to oversee, and supersede any plan that we did not like. But, basically, we wanted to work as a team to try to get in there as quickly as possible, unfortunately in this case, that did not occur. But typically, after a disaster, an emergency, you have the company, the Union, the State and MSHA all working together in a rescue effort.

Now that the investigation has started, all bets are off. I mean, we're on our own, and there's no collaborative effort. But during the rescue operation, we try to work as a team.

Senator HATCH. I see.

Now, Mr. Kohler, as you know, the MINER Act was designed to enhance the intra-governmental sharing of research and information that would aid in the development of better mine safety technology. Now, is NIOSH currently receiving sufficient cooperation and assistance from other agencies and departments?

Mr. KOHLER. Yes, we are, in fact, the level of cooperation has exceeded any expectation I had as we moved into that process. We're getting full access to information and people.

Senator HATCH. OK, Mr. Stricklin, how would you characterize the safety record at the Crandall Canyon, prior to the incident of August 6—what was the record of MSHA violations at Crandall Canyon? Was the mine's safety and citation record higher or lower than other mines of comparable size?

Mr. STRICKLIN. It was basically about average, I would say.

Senator HATCH. About average.

Mr. STRICKLIN. Yes, sir.

Senator HATCH. OK, what was the inspection history at Crandall Canyon? How often were MSHA inspectors present at the mine in the 6-month period prior to the August 6 collapse?

Mr. STRICKLIN. We had conducted two complete regular inspections, or EO–1s, and in addition, we had done a couple of spot inspections that included the Roof-Control investigations. We had been onsite and we were in the process of conducting a special investigation, dealing with a complaint that we received, I believe, the inspections were ongoing.

Senator HATCH. I see.

What steps does MSHA take to fulfill its role as a primary source of public communication in a post accident setting? In that regard what challenges does MSHA face in this respect, generally, and what challenges did it face, specifically in the Crandall Canyon Mine disaster?

Mr. STRICKLIN. The first challenge we faced was making sure that the families were aware of all of the information, prior to going to the press. When Richard Stickler arrived onsite on August 7, his interest was making sure that the families were aware and having two meetings with the families per day.

Sometimes he offered the opportunity to them that he would meet one-on-one, in case they did not want to ask a question in front of other people, or they just wanted to talk to him. Unfortunately, sometimes the press conferences were set up to start up immediately after these family meetings. So, in my opinion, he did the right thing by staying there to talk to the family members, and sometimes the press conference got started just a little bit before he showed up. I think we kind of worked through that a little later in the emergency, and basically started holding off on the press conferences until Richard showed up to be the lead person to talk at those news media hearings.

Senator HATCH. I, personally, thought that Mr. Stickler did a good job of that, and did his very best while he was down there, having been there a number of times myself.

But, Mr. Osterman, let me just ask you one final question—given that an airliner or train operator has a right, and may have an interest, in making public statements following a transportation accident—what procedures or protocols does NTSB have in place to ensure the dissemination of accurate information?

Mr. OSTERMAN. Well, Senator, there's really two processes, one is the investigative information, which is channeled through the NTSB. We control the information that is delivered, so that we can ensure its accuracy and that it's factual in nature.

As parties to our investigation, the airlines and the aircraft manufacturers, and other agencies are essentially restricted from discussing the investigation in the press. It does not prohibit them from talking about other issues, but it does confine the investigative information to the NTSB.

Second, with the families, the NTSB is the neutral liaison between the carriers and other entities to the family members, so that we can guarantee that the information that they are receiving is timely, it is first, and it is, in fact, accurate, it is not conjecture. We also spend a great deal of time answering their questions, and working on those kinds of things that they have heard that may be speculative.

Senator HATCH. Thank you, Mr. Chairman, if I could ask just one other question, I know my time is expired.

Mr. Stricklin, I know that the Governor of Utah set up a special Commission to review this and study this, too, and they're a little bit uptight about the fact that—maybe more than a little bit uptight—that MSHA is not willing to work with them or cooperate with them. Is there anything we can do about that?

Mr. STRICKLIN. Well, I think we're trying to sit down and work through some of these issues. We do have a State representative that does participate with us in our interview process and our investigation at the mine. That's been in place since we started the investigation. We were just a little concerned that sharing information with the Utah Commission, possibly if it ever got out into the press or something like that, it could affect the other people that come in to testify. Maybe their information that they share with us won't be as firsthand as we would like it to be.

We're willing to share as much as we can with them, we just don't want to compromise our interview process with the accident.

Senator HATCH. Well, I think I understand that. They have some very good people on this Commission, and of course, naturally we're very concerned in Utah, and of course, the Governor has been extremely concerned, as has the congressional delegation. To the extent that you can cooperate, I would like you to do that. But I do also understand how important it is to be able to get the interviews done, and get them done in a way that—without media interference or any other type of third-party interference. So, I do understand.

But, to the extent that you can cooperate with them, I know the people on the Commission, they're very good people, and I think that they would be capable of being very discrete in handling any information without going to the media.

Mr. STRICKLIN. My understanding is the Solicitor from the Department of Labor and the chairman of the Commission is going to be in discussions tomorrow, to see how we can work better together.

Senator HATCH. That would be great. Well, anything you can do, I think we'd appreciate it out there. I know the people on the Commission, and there's some very, very good people. We'd appreciate any kind of cooperation you can give.

I personally have appreciated the work of you and Mr. Stickler and others of MSHA at the mines, staying on top of it throughout the process. I know how difficult it was for the families, it was just awful, and it was very difficult for you folks, as well.

Thank you, Mr. Chairman.

The CHAIRMAN. Just some wrap-up questions.

Mr. Stricklin, did I understand earlier in response to a question that, when Murray submitted the plan to MSHA, this was approved by a graduate student?

Mr. STRICKLIN. No, it was not, it was evaluated by a graduate student. It would have gone through the process of the roof-control supervisor looking at it, a roof-control specialist. My——

The CHAIRMAN. What was the evaluation? What was his role? What was the graduate student's role?

Mr. STRICKLIN. He basically would have evaluated the numbers that Agapito had submitted, and looked at it from the MSHA standpoint, and basically given a recommendation to the roof-control supervisor, who would have done the same thing with the numbers.

The CHAIRMAN. Yes. And how much training do they have?

Mr. STRICKLIN. As far as evaluating, they would go through the Mine Academy in Beckley, WVA, as well as travel with inspectors.

In this case, this was an engineer, so he would have had an engineering background to evaluate it, as well.

The CHAIRMAN. Just, finally, in looking at the NIOSH report, they have these kinds of observations, on page 16, the BPSF, which is the barrier pillar stability factor, says,

> "The Barrier Pillar Stability for these structures were 1.0, significantly lower than the 2 percent guidelines that was based on the deep cover case histories collected by NIOSH. A BPSF of 2 would have required barrier pillars that were approximately 250-feet wide, without such substantial barriers, the pillars developed within the original are subjected to substantial abutment loads which likely exceed their load-bearing capacity."

Then it continues along on page 16, Agapito's calculation uses another model that you've used the word results have proved to be "misleading." I'm just wondering. And then on page 9, you have NIOSH criticizing Agapito's analysis as not conservative enough on safety. It uses these words,

> "The result is a very unconservative analysis, because a solid 210-foot barrier has far more load-bearing capacity than 130-foot solid pillar, plus a row of 60 or 60-foot square pillars."

I'm just wondering, as you go through this, whether it doesn't raise sufficient kinds of issues that are enormously distressing?

Mr. STRICKLIN. I understand your position. On our investigation, we've put two mining engineers who have a lot of roof-control expertise, and basically they're evaluating the same thing that you're looking at here, looking at the NIOSH report, and discussing with our own folks their thought process in approving these plans.

The CHAIRMAN. OK. Well, thank you very much.

Senator MURRAY. Mr. Chairman, if I could just follow up——

The CHAIRMAN. Sure. Yes.

Senator MURRAY [continuing]. With two clarifications that I understand—in response to a question you were just asked, Mr. Stricklin, about safety inspections at the Crandall Mine you said, about average. For those of us who don't know what "average" is, can you tell us what "average" means? How many safety violations were there?

Mr. STRICKLIN. It depends on the size of the mine. In this case, it was just basically a one-section mine, so I wouldn't expect to see the large number of violations that we issue at a mine, say, that has six sections.

I guess my position is, there's no good mines, and no bad mines. There are just mines, and if we find it, we issue it.

Senator MURRAY. But, about average. You can't tell us how many safety violations occurred over, say, the last 6 or 8 years?

Mr. STRICKLIN. We would have those numbers available to us, I don't have them in front of me, but I can get you those, Senator Murray.

Senator MURRAY. I did ask my staff, there was 154 violations in 2003, 129 in 2004, 70 in 2005. Those numbers sound fairly high for "about average." Were there a lot of fines assessed with that, as well?

Mr. STRICKLIN. They would have had to meet the criteria that the regulations spell out, as far as how many violations you get—there's a formula that's used to determine those numbers.

Senator MURRAY. Well, if you could supply the committee with what they've actually paid in fines, and how many safety violations, I think that would clarify for us what average is.

Mr. STRICKLIN. I guess, Senator Murray, just—we have coal mines that we issue over 1,000 violations in a 1-year period.

Senator MURRAY. My other question, really quickly—do graduate students typically approve plans?

Mr. STRICKLIN. There was no approval by a graduate student, approval has to be done by the District Manager.

Senator MURRAY. What did the graduate student do?

Mr. STRICKLIN. He basically evaluated, when Agapito submitted the report to us, he had a firsthand look——

Senator MURRAY. Based on his evaluation, that's what the approval was done on? Graduate students, are they the ones who are doing the evaluations? That you then look at and approve from?

Mr. STRICKLIN. In this case, he just talked to the roof-control supervisor, gave him his opinion, and then the roof-control supervisor did, basically, an evaluation of the plan as well. I may have misspoke and gave you the impression that the graduate student was the one who approved the plan. He, basically, had the first look at the plan, and then it went to the roof-control supervisor who basically did the same type of thing.

Senator MURRAY. Well, let me ask again—are graduate students typically the ones who are doing the evaluations for your, then, later use?

Mr. STRICKLIN. No, ma'am.

Senator MURRAY. Can you give the committee, in writing then, how often the only evaluation that is done, is done by a graduate student? For the record?

Mr. STRICKLIN. Could you repeat that?

Senator MURRAY. Could you, for the record, give us, the committee, the information on how often a graduate student is doing the evaluation that MSHA then uses for their final approval?

Mr. STRICKLIN. I can do that.

Senator MURRAY. Thank you.

Senator HATCH. Mr. Chairman, could I just ask one further question?

The CHAIRMAN. Yes, sure. Senator Hatch.

Senator HATCH. To folks who may not understand mining, 100 violations or thereabouts, seem like a lot of violations. Could you give us some idea of what the range of violations, what type of violations they are, and especially if you can tailor it to the Crandall Mine it would be helpful to us.

Mr. STRICKLIN. The most violated mines in the country last year, Senator Hatch, probably had about 1,000 to 1,200 violations.

Senator HATCH. What kind of violations, from minor ones to major ones.

Mr. STRICKLIN. It could be anything from what we refer to as a non-S&S violation—that basically costs about $112 to a flagrant violation, that could go up to $220,000.

Senator HATCH. Describe those violations, what would be a non-S&S violation?

Mr. STRICKLIN. Non-S&S violation would be that the Port-a-Potty on the section wasn't ready for use.

Senator HATCH. I see.

Mr. STRICKLIN. A flagrant violation would be a mine operator who continues to mine coal when he knows that the fan is not operating.

Senator HATCH. Do you know how many flagrant violations there were, or near-flagrant violations there were at Crandall Canyon?

Mr. STRICKLIN. At Crandall Canyon, there were no flagrant violations.

Senator HATCH. I see.

OK. Thank you, Mr. Chairman.

The CHAIRMAN. Just to finish this up in my own mind, isn't it true that Andalex, prior to the Murray ownership, considered the mine to have been completely mined out, and that the Bureau of Land Management agreed?

Mr. STRICKLIN. My understanding, Andalex completed all of the long-wall mining.

The CHAIRMAN. That's a lot less risky, as I understand, is that correct?

Mr. STRICKLIN. Well, basically it took up most of their property that had already been mined, and it left these areas that Murray Enterprise wanted to come in and mine. I don't know anything about the BLM report.

The CHAIRMAN. Well, as I understand, you're the expert on it. They have to get the approval to mine, they have to get the sign-off that the mining is terminated, at the very end. Don't they have to get that?

Mr. STRICKLIN. Well, basically, we have no involvement with BLM.

The CHAIRMAN. No. Well, that's another point I want to just mention, because, some people believe that it's not coincidental that you had the earlier owners basically close that mine down. And then you have the BLM report,

> "On October 27, 2004, John Lewis, Mining Engineer of Andalex called and informed me that Genwal would need to seal off the west portion of the main west mains at the Crandall Canyon Mine (those are the North and South Barriers). Conditions were deteriorating,"

and it has the whole report here, here's the BLM—yet you don't know—you don't get that information. This is like the CIA not talking to the FBI when we're getting attacked by the terrorists. I mean, here's the Bureau of Land Management making these judgments here, and you don't know about it, they're not supposed to let you know, the Bureau of Land Management make these judgments? "The situation in Main West is untenable for future pillar recovery"—I mean, did that grad student know this? Did they have this information?

Mr. STRICKLIN. That information was not shared with us, that I'm aware of, sir.

The CHAIRMAN. Don't you think it's useful if they do share—Bureau of Land Management, they make a report on safety issues that they give you a copy or include you?

Mr. STRICKLIN. I think that's important that we would have that, yes, sir.

The CHAIRMAN. OK.

Thank you very much.

Our next panel will be Dennis O'Dell, who oversees Health and Safety Operations for the United Mine Workers of the United States. Mr. O'Dell sits on several boards for mine safety, including NIOSH Mine Safety and Health Research Advisory Committee. Also, he is a member of the Utah State Commission investigating the Crandall Canyon disaster.

And then we'll have Robert Ferriter, who has served as the Director of Mine Safety Programs at the Colorado School of Mines since 1999. In that role, he develops programs to provide training, professional education, on a wide variety of topics related to safety and occupational health in mining, including risk assessment, regulatory compliance and safety management.

Mr. Ferriter previously spent 26 years at the Mine Safety and Health Administration at the Department of Labor. We thank you very much, thank all of our guests here, and Mr. O'Dell, if you'd wish to proceed, we'd be glad to hear from you.

STATEMENT OF DENNIS O'DELL, ADMINISTRATOR FOR HEALTH AND SAFETY, UNITED MINE WORKERS OF AMERICA

Mr. O'DELL. Thank you, sir. Mr. Chairman, Ranking Member, Senator Enzi, and members of the committee, I appear before you today, currently serving as the Administrator of Occupational Health & Safety for the United Mine Workers of America.

The CHAIRMAN. Excuse me, I didn't, Bruce Watzman, I apologize, I didn't introduce you on this. The National Mining Association Vice President for Safety and Health, and is responsible for the development of NMA's policy position on the matters when pending before both the Congress and governmental agencies.

Responsibilities also include working with member companies in the design of safety and health programs for use in the mines with Federal and State regulators on the management of safety and health programs. We're delighted to welcome you here. Thank you very much.

Mr. O'Dell.

Mr. O'DELL. Yes, sir. I appear before you today currently serving as the Administrator of Occupational Health & Safety for the United Mine Workers of America, but more proudly, I am a coal miner with 30-years experience in the industry, 20 years, approximately of which I mined coal.

It is with great sadness that I appear before you today to discuss, yet again, and in far too short a span of time, the deaths of mine workers. We pray for the families of the six miners who remain trapped in the Crandall Canyon Mine and for the families of the brave rescuers who perished trying to rescue them.

We have family members attending this hearing today. I wish to both acknowledge their presence, and to personally express my deep sorrow to them, as well as my gratitude for their coming to

the halls of Congress to witness and participate in the legislative process.

Together, we seek to ensure that what happened at Crandall Canyon will never be repeated.

Unfortunately, all of the factors that led to the catastrophic collapse at Crandall Canyon Mine may not yet be evident, and they may never be fully known.

What is apparent, after reviewing the available information and examining the mine map, which you have before you, is that the conditions that led to this tragic event should have been avoided. Contrary to what some may tell you, there is little doubt that this was a man-made disaster.

Let me explain why I believe this to be true, not only as a safety expert, but from a coal miner's perspective.

It is important to understand that the Crandall Canyon Mine was in the last stages of its productive life. The previous operator, Andalex Resources, had extracted most of the mine's recoverable reserves, utilizing a technique that we call long-wall mining.

After a completion of the final long-wall panel, the only remaining reserves were the barrier pillars and the mine's main entry pillars, Andalex Resources deemed this remaining coal crucial to maintaining the mine's stability.

In documents filed with the Utah Division of Oil, Gas and Mining, the Company stated,

> "Although maximum recovery is a design criteria, other considerations must be looked at in the final analysis of the extraction of the coal. These factors consider the insurance of protection of personnel and the environment."

In their statement they say,

> "Solid barriers will be left to protect the main entries from being mined-out panels, and to guarantee stability of the main entries for the life of the mine."

This means that only the North and South Barrier pillars separated the mine's main entries from vast areas of unsupported roof.

Yet, Murray Energy sought to mine in this area. They submitted plans to MSHA, and it was improved by MSHA's District Nine office in Denver, CO. Because of the extent of the previous long-wall mining, there can be no doubt that the overburden was exerting extreme pressure on the remaining coal reserves, adversely impairing and impacting the conditions of the mine.

In early March 2007, you heard that the mine then experienced a large mountain bump while pillar extraction was being conducted in the North Barrier. The bump was so severe that Murray Energy abandoned its plans to develop the remaining North Panel, and sealed that area off.

While it's unclear if Crandall Canyon Mine management officially notified MSHA of this event, the resulting seal plan that they had submitted to the Agency should have, at least, raised questions about why the operator has abandoned that large area of a mine to where they left approximately 54 blocks of coal that they intended to mine.

As we all know, in August, another catastrophic mountain bump trapped 6 miners in the south section, approximately 900 feet due

south from the north area that had been abandoned for the same reason. This is why I believe that the plans to perform pillar development and extraction of the barrier pillars should never have been submitted. Further, and perhaps more importantly, MSHA—which is charged with protecting miners' health and safety—should have never approved such request.

As I said earlier, we may never fully know, because the main parties involved in this investigation are MSHA and Murray Energy. Utah Governor Huntsman recently appointed me to the Utah Safety Commission as one of his members. Our Chairman, Mr. Scott Mathison, has made several requests to MSHA to be provided the information from MSHA's investigation, as it progresses, so that our Commission can make recommendations to Governor Huntsman to improve miner's protection as a result of what happened at Crandall Canyon Mine.

MSHA is refusing to cooperate, saying that they will only provide information to us that they release to the general public. In other words, we're being shut out, and therefore, handcuffed from being able to make recommendations that will improve the safety at the miners' workplace.

MSHA has to allow independent parties to be a part of their investigations to restore the miner's and miners' families trust and faith in them. As it stands now, the company which submits the mining plans, and MSHA who approves the plans, are the only parties involved in this investigation, other than one observer from the State, which means that they are investigating themselves. This is preposterous, because they are the two parties with the most at risk when it comes to uncovering the failures and shortcomings that caused this disaster to occur in the first place.

I can also tell you that Mr. Scott Mathison, our Chairman from the Utah Mine Safety Commission, is equally frustrated with MSHA's roadblock. I am also equally disappointed that MSHA has also refused the United Mine Workers of America the ability to represent the families during the investigation, as they had requested by us.

What is it that they are trying to hide? By MSHA taking this approach, a great injustice is being imposed on the miners, and miners' families.

I'm closing up, but let me further clarify that I am not referring to MSHA inspectors, when I talk about MSHA. These inspectors are in the mine on a day-to-day basis, trying to do the best job they can. These are dedicated, hardworking individuals that are trying to ensure our mines are safe to work for our miners. I am referring to the culture of the Agency, of those running the Agency, the policymakers. They're the ones that need to change. Our inspectors need to be restored with the tools necessary to allow them the ability to do their job.

Miners are still dying, unnecessarily. There are many more improvements that need to be made, and I have included them in my written testimony. I hope that you will be able to take the time to review these, so that more improved regulations can be made to ensure our miners get the health and safety protections we deserve.

Mr. Chairman, members of the committee, I thank you for your time and devotion to this very important matter. I will be happy to answer any questions that you may have.

[The prepared statement of Mr. O'Dell follows:]

PREPARED STATEMENT OF DENNIS O'DELL

On behalf of the United Mine Workers of America ("UMWA"), I appreciate having this opportunity to testify about the many health and safety issues and challenges that continue to confront miners in this country. The UMWA has been an unwavering advocate for miners' health and safety for 117 years.

It is with great sadness that I appear before you today to discuss—yet again, and in far too short a span of time—the deaths of mine workers. We pray for the families of the six miners who remain trapped in the Crandall Canyon mine, and for the families of the brave rescuers who perished trying to rescue them. Seven of those miners have family members attending this hearing. I wish to both acknowledge their presence, and to personally express my deep sorrow to them as well as my gratitude for their coming to the halls of Congress to witness and participate in the legislative process. Together we seek to ensure that what happened at Crandall Canyon will never be repeated.

I come out of the coal fields, having been an underground coal miner for 19 years where I was elected and served as Chairman of the Local Union health and safety committee. From there I was appointed as an International health and safety representative for the United Mine Workers of America for 9 years. In 2005 and currently I serve as the Administrator of the UMWA's International Health and Safety Department giving me 30 years experience in the coal mining industry. I have participated in and spoken about the recent and most tragic mining disasters of the last decade, including the Jim Walters No. 5 mine explosion in September 2001, the three multi-fatal coal mine accidents of 2006: Sago and Aracoma, both in my home State of West Virginia and Darby in Kentucky, as well as other mine fatal-related investigations. I was also recently appointed by Utah Governor Huntsman to the Utah Mine Safety Commission to consider a number of issues that arose in connection with the Crandall Canyon disasters.

Last year this committee was instrumental in enacting legislation that brought about the first improvements to miners' health and safety legislation for nearly 30 years. Nevertheless, there are many more improvements yet needed to ensure that miners can return home after a day's work, and not fall ill from their work. I will offer you some of my thoughts about areas of concern based specifically on the Crandall Canyon disasters, as well as the coal mining disasters of 2006.

I appeared before this committee's Subcommittee on Employment and Workplace Safety earlier this year to express thoughts about progress made since the MINER Act was passed last year and about the areas still requiring legislative attention. Today I will update and expand upon those remarks. The Crandall Canyon disaster demonstrates that the remaining needs are substantial.

COMMUNICATION AND TRACKING

Despite passage of the MINER Act over a year ago, very little has changed concerning the inability to communicate with and locate trapped miners. Despite the repeated assurances at press conferences by Bob Murray that he knew exactly where to find the miners trapped in the Crandall Canyon Mine, 8 weeks later the six trapped miners still have not been located. It goes without saying that until they can be located, recovering them is virtually impossible. Yet, we still ask that the miners be recovered and brought home.

The situation at Crandall Canyon stands in stark contrast to the experiences last year when a Polish miner was pulled from wreckage after he was located through use of a tracking device, and when Canadian miners trapped underground were safely retrieved from the safety chamber to which they had retreated. Throughout the last 18 months, we have learned more about what is available in terms of communications and tracking, but very few operators have taken advantage of the technology and equipment that is available. Yet, if other countries' miners can survive and escape these disasters, then so should American miners. We need change, and we need it now. Why our miners do not have the benefits of these protections is a key question that demands an answer in the wake of the Crandall Canyon disaster.

MSHA and the industry must aggressively require the use of improved communication systems and tracking devices. Improved communication and tracking technology, including one-way text messaging and two-way wireless systems, is avail-

able now and should be immediately installed in all mines. Any system that can increase the ability for miners to escape or be rescued from a mine emergency, even if it is limited in scope, must be utilized. The Federal Government, through NIOSH and MSHA, should fund and direct continued studies and research to develop the next generation of tracking and communication devices. As this newer technology becomes available, mine operators should be required to upgrade existing systems at all their operations.

THE RISKS OF PILLAR MINING AT CRANDALL CANON

Unfortunately, all the factors that lead to the catastrophic collapse at Crandall Canyon Mine may not yet be evident, and they may never be fully known. However, what is apparent after reviewing the available information and examining the mine map, is that the conditions that lead to this tragic event were man-made. The disaster at Crandall Canyon could and should have been prevented. Contrary to what some may say, there is little doubt that this was a man-made disaster.

We hope that by figuring out all that went wrong at Crandall Canyon we will be able to prevent further needless death. It is important to understand that the Crandall Canyon Mine was in the last stages of its productive life; it had already been in operation for about 50 years.

The previous operator, Andalex Resources, had extracted most of the mine's recoverable reserves utilizing a technique known as longwall mining. After completion of the final longwall panel the only remaining reserves were the "barrier pillars" and the mine's main entry pillars. Andalex Resources deemed this remaining coal crucial to maintaining the mine's stability. In documents it filed with the Utah Division of Oil, Gas and Mining that company stated,

> "Although maximum recovery is a design criteria, other considerations must be looked at in the final analysis in the extraction of coal. These factors consider the insurance of protection of personnel and the environment. Solid barriers will be left to protect the main entries from the mined out panels and to guarantee stability of the main entries for the life of the mine."

Despite these expressed concerns of Andalex Resources, e-mail correspondence between the engineering firm of Agapito Associates, Inc. and Mr. Lane Adair of GENWAL Resources on August 9, 2006, indicated it had completed a preliminary review of the ". . . proposed retreat mining sequence in the Main West Barriers. . . ." This correspondence occurred on the same day that Murray Energy Corp. apparently became the "controller" of the operation. On December 10, 2006, Agapito President and Director, Michael Hardy, sent a letter to Mr. Adair after visiting the mine to ". . . review the ground conditions of the room and pillar mining in the north pillar along Main West. Mr. Hardy determined that, "There was no indication of problematic pillar yielding or roof problems that might indicate higher-than-predicted abutment loads." Beginning 10 days later, December 20, 2006, Murray Energy's subsidiary, UtahAmerican Energy, Inc. (hereafter referred to as "Murray Energy") submitted several amendments to the roof control plan to develop entries into the North Barrier, Main West; it sought to remove pillars from those entries during retreat mining operations after the entries were developed. MSHA, District 9 Office in Denver, Colorado approved each of these plans.

In early March 2007, the Crandall Canyon Mine experienced a large "mountain bump" while pillar extraction was being conducted in the North Barrier. The bump was so severe that Murray Energy abandoned its plans to develop the remaining north panel (consisting of approximately 54 pillars), and sealed the area. While it is unclear if Crandall Canyon Mine management officially notified MSHA of this event, the resulting seal plan that had to be submitted to the Agency should have at least raised questions about why the operator was abandoning that large area of the mine. It will be interesting to see whether MSHA will decide that the mountain bump of March 2007 was "reportable" under existing law; if that comes back negative, then we should consider what changes are needed to ensure that future events of that magnitude are considered by MSHA when it reviews a mine's operating plans.

Before the large "mountain bump" in early March, Murray Energy had submitted plans to develop the South Barrier of Main West. On March 8, 2007, MSHA approved a request by mine management to pillar the area. Pillar extraction continued until August 6, 2007, at which time the retreat mining was almost due south of the area where the bump had caused the operator to abandon the North Barrier section. At that time, a catastrophic "mountain bump" trapped the six miners in the working section. The force of the bump registered approximately 3.9 on the Richter Scale at the University of Utah Seismic Stations.

Considering that only the North and South Barrier pillars separated the mine's main entries from vast areas of unsupported gob, and that the previous owner refused to mine these barriers for safety reasons, it is deeply distressing that Murray Energy sought to mine in this area, and submitted such plans to MSHA. Because of the extent of the previous mining there can be no doubt that the overburden was exerting extreme pressures on the remaining coal reserves. It is impossible to believe that development and pillar extraction of the barrier pillars in the Main West area of the mine, which began sometime after August 2006, would not adversely impact the conditions in the mine.

From all that we have seen, we believe that plans to perform pillar development and extraction of the barrier pillars at the Crandall Canyon Mine should never have been submitted. Further, and perhaps more importantly, MSHA is charged with protecting miners' health and safety, and should never have approved such a request. It is high time for mine operators and MSHA to realize that miners' lives, and not the mining product, is the most valuable resource of the mining industry. Only when this happens can we arrest the needless loss of life in our Nation's coal fields.

EXTERNAL COMMUNICATIONS PROBLEMS AT CRANDALL CANYON

It is unfortunate that the management team at the Crandall Canyon Mine spent so much energy trying to deflect blame in this tragedy. It is equally unfortunate that MSHA ignored the will of Congress in its reaction to this disaster.

Section 7 of the MINER Act states that MSHA "shall serve as the primary communicator with the operator, miners' families, the press and the public." Nevertheless, in Utah, it appeared as though MSHA surrendered its role as chief communicator. As a result, a great deal of inaccurate and misleading statements and information went over the airwaves. The effect was that millions of Americans were given incorrect and misleading information right from the start of this disaster, and MSHA allowed it to happen. Here are some examples:

1. From the very beginning, Murray Energy's Owner and Chief Operating Officer, Robert Murray, asserted that "an act of God" in the form of a natural earthquake caused this catastrophe. He suggested that the "seismic activity" at the mine was uncontrollable and unrelated to his company's activity. However, from tapes made of calls to the local Sheriffs office that same morning, it is apparent that from the time it occurred, University of Utah seismologists believed the activity was the result of coal mining.

2. Time and time again Mr. Murray emphatically stated that he knew exactly where the trapped miners were. Yet 8 weeks and many boreholes later he still has not been able to locate the miners.

3. Mr. Murray also strenuously objected to reports that miners were performing a final method of mining referred to by the media as "retreat mining." Again, he was not giving true information: from the approved mining plan it is evident that this mine was in the process of "pulling pillars," which is a particular type of retreat mining. Not only was this operation performing "pillar mining" or "pillar extraction," but in communications involving this mine, principals characterized this mining process as "retreat mining."

4. Mr. Murray claimed that the mine was perfectly safe when he invited nonessential personnel from the media and families to tour the underground rescue work. However, not only did they experience a "bump" while they were underground, but it was in the same vicinity where nine rescuers were injured and three were killed just days later.

5. Mr. Murray stated that he had not had any major accidents at any of his mines prior to this. The truth is that four miners have been killed at Mr. Murray's mines. Any time a miner is killed, that constitutes a major accident.

6. Mr. Murray continually said that the UMWA was trying to organize the Crandall Canyon mine, and that somehow was intended to suggest nothing we had to say about this incident could be trusted. While we strongly believe that all miners should have the benefits of a union contract—not the least of which is the enhanced safety language written into our contracts—we were not engaged in an organizing campaign at that mine at the time of the incident there, nor had there been any organizing activity at that mine for years.

7. Mr. Murray also claimed that the UMWA was responsible for the stories about the company intending to reopen a part of the mine to production, when in fact it was his own Murray Energy vice president who made those statements to reporters.

These are but some examples of the inaccurate and misleading statements Mr. Murray made that met with no contradiction from MSHA—statements that were

seen by many as having an "official" stamp of approval since in most cases they were made with MSHA officials looking on, making no attempt to correct him.

What was so astounding about the press conferences at Crandall Canyon is that the conduct of Mr. Murray, and MSHA's indulgence of him, were directly contrary to Section 7 of the MINER Act, which Congress expressly added to prevent the kind of misinformation debacle that occurred at the Sago mine. There, the families were first told their loved ones were alive and were leaving the mine, whereas the reality was that only 1 of the 13 survived; it was hours before the misinformation was corrected.

Regardless of whether Mr. Murray may have wanted to convene and conduct press conferences, there was no reason, requirement or benefit to the miners, their families or the public for MSHA to participate in the events that he, as the private operator, staged. As the Federal Agency affirmatively charged with communicating with the families and press, MSHA should have exercised its power and conducted independent press conferences to provide objective reports of developments at the disaster site. Instead MSHA representatives yielded their authority; at best they stood in the shadows as the coal operator spun his story, at worst they cowered out of view refusing to correct the half truths and misstatements. Further, it has been widely reported that Mr. Murray's attitude was abrasive and demeaning to these grieving family members. MSHA's responsibility to serve as the liaison should have protected the families from him.

FAMILIES FACING A MINE DISASTER DESERVE BETTER

In the MINER Act, Congress took action to ensure that families facing mining disasters would be treated with the dignity they deserve and would be kept abreast of the most accurate information available. This did not happen for the families of the trapped miners at Crandall Canyon. Like the Sago families in January 2006, they were held almost as captives, awaiting any bits of information (or misinformation) delivered by the coal operator.

How is it possible that MSHA could get it so wrong in Utah? How could it ignore the mandates of Congress, which requires the Agency to take charge of such accidents and serve as the liaison with the families and press? By allowing this mine owner to take center stage, MSHA ignored the directives of the MINER Act. In so doing, it failed the families at Crandall Canyon. They deserved—and still deserve—much better. If the leadership of MSHA is not willing or able to limit the activity of a single mine operator in the face of express authority to take such control, how can we expect them to effectively lead the Agency that is charged with regulating an entire industry?

On behalf of their loved ones, the families of those trapped at Crandall Canyon asked the UMWA to serve as their miners' representative. They want their designated representative to participate in the accident investigation. However, MSHA has rejected their request, claiming that it would have to first verify that the miners themselves made the designations. Obviously, a trapped miner cannot provide that assurance. Their next of kin attempted to fill the void to ensure that the trapped miners have a representative looking out for their interests.

By denying the family members a right to designate a miners' representative for their trapped miners, MSHA has essentially said that when miners are trapped in a mine, they forfeit their right to designate a section 103(f) representative; their Mine Act rights are thereby nullified through no fault of their own. In denying the families the right to make such a designation for their trapped miners, MSHA has prevented those most affected by the tragedy from having a voice at the table during the investigation. This is offensive and must be corrected.

MSHA's spokesperson criticized the UMWA for attempting to serve as the trapped miners' designated representative, claiming that we "are trying to use a law enforcement investigation for its own purposes." We confirm that the UMWA does have its own purpose in mind. The reason is simple: we want honest and complete information about everything that happened—from before the latest mining plan got prepared, submitted and approved. We want to make sure no more miners' lives are needlessly lost. The UMWA is the ONLY organization in this country that is dedicated to advocating for miners' health and safety. We are proud of advancements that have been made at our urging, and we don't plan to stop anytime soon.

So yes, the UMWA does have a purpose of its own here: to fight for and improve mine safety in America. We invite MSHA to join us in that endeavor, instead of casting veiled aspersions on our efforts on behalf of coal miners and their families.

To the extent that MSHA feels current law may not allow it to recognize the UMWA as a miners' representative absent proof that the miners themselves have made the designations—something the trapped miners obviously cannot satisfy—we

urge Congress to change the law. Family members of those trapped, injured, or killed in a mine accident should have the right to designate a trusted representative to participate in the accident investigation.

MSHA has further indicated that *regardless* of whether the UMWA would be recognized as the miners' section 103(f) representative, the Agency plans to limit attendance at witness interviews to just MSHA and representatives of the State of Utah. Not only is the Agency excluding the UMWA, but MSHA is refusing to share access to interviews and documents with the Utah Mine Safety Commission until after MSHA completes its investigation, which will likely be many months from now. It is also denying such access to the press.

While MSHA claims that providing such access might "compromise the integrity of the investigation and potentially jeopardize MSHA's ability to enforce the law," we are skeptical of the asserted bases for restricting access. Moreover, this is materially different from how MSHA conducted investigations of the Jim Walters and Sago disasters. I participated in both of those investigations and the UMWA had access to information *while* MSHA pursued its investigation. After making our own independent review of the facts from each disaster, the UMWA issued separate reports: they were critical of MSHA, as well as the respective operator. In considering MSHA's rationale for denying access during its investigation at Crandall Canyon, it is important for you to know that MSHA has never claimed that access to other interested parties during either the Jim Walters or Sago investigations in any way compromised the Agency's ability to engage in its law enforcement efforts.

We have asked Secretary Chao to reverse the position MSHA has taken both in response to our effort to serve as the trapped miners' designated representative, and our request to attend the witness interviews. We await her reply.

Further, and as we have written to you, the UMWA feels that it is imperative that there be a truly *independent* investigation of this tragedy. A copy of the letter President Roberts sent to congressional leaders is attached. Curiously, Secretary Chao *claims* to have appointed an independent team, but those she appointed assuredly are *not* independent. Rather her team is being lead by two retired MSHA inspectors. Thus, MSHA and the operator are once again investigating what they themselves (i.e., their colleagues) did. This is not the best way to ask the hard questions or to get the full truth. Our goal must be to learn from what went wrong at Crandall Canyon so that no more families will suffer such needless loss of life.

COLLECTION OF CIVIL PENALTIES

In the MINER Act, Congress charged MSHA with revising and enhancing its penalty structure. While it has adjusted the penalty structure, the Agency still needs to do a better job of tracking and collecting the fines it imposes and enhancing the pressure when operators refuse to pay final penalties.

Last year MSHA blamed computer problems on its inability to track fines; we understand that it still faces some technological challenges. If that is the case, then MSHA needs to fix the problem. When fines go unpaid it not only gives an unfair competitive advantage to the delinquent operator, but that operator's disregard for the mine health and safety laws and regulations imposes excessive risk on its employees. Moreover, the fine system itself is not working well. Indeed, GAO reported that almost half of the fines that underground coal operators challenge are compromised, and that of those contested the fine has typically been cut by about 50 percent!

To the extent that MSHA takes the position that it cannot close an operation for having substantial unpaid fines, we submit that Congress should expressly grant the Agency such authority. MSHA's top personnel claim that if MSHA had that authority the Agency would exercise it to close operators who refuse to pay their fines. We would welcome that.

MSHA HOTLINE AND RETALIATION

The Union has complained for some time that the current hotline system miners use to report hazardous conditions is ineffective. When a UMWA member called the 800 number listed on MSHA's Web site to report a problem at the mine, his call was answered by a contract employee who did not have any knowledge of mining, making it extremely difficult for the miner to convey his message. Further, the individual at the call center was not remotely familiar with MSHA's District structure and therefore did not know which office should receive the complaint.

The Union has stressed on many occasions that the MSHA hotline should be staffed 24 hours a day, 7 days a week by MSHA personnel with an understanding of both the mining industry and the Agency. The current practice of contracting this work out to call centers lessens miners' health and safety.

Also, many miners are reluctant to voice their concerns about safety and health problems due to a fear of retaliation and black-balling. Coal mining jobs are good jobs and in many mining communities they are by far the best (if not only) jobs to be had. Unfortunately, the problem of retaliation plagues the entire industry, from East to West, and North to South.

The most recent examples involve Crandall Canyon Mine owner Bob Murray. He has sent threatening letters to at least some of those who criticized him while the Crandall Canyon disaster was playing out. We understand that he has sent such letters to press and private citizens, as well as politicians.

The UMWA has its own experience defending against such claims of Mr. Murray. He sued the UMWA's Secretary Treasurer for comments made during a labor dispute we had with some of his Eastern operations. Though the UMWA successfully defended those suits and both were dismissed by the courts, his threats *could* serve to silence some would-be critics, and we suspect that is his chief goal. His threats are inconsistent with this country's notion of free-speech, though they illustrate the kind of challenges a rank and file miner might worry about before daring to speak out.

When miners fear that speaking out will cost them their livelihood, they remain silent, even when they have bona fide concerns about mine health and safety. I submit that no job is worth sacrificing your health or safety. It is the role of the government to protect miners' safety and health. The Mine Act states that plainly. Nevertheless, when miners are afraid to speak out, the government is not doing its job of providing them with adequate protection.

MINE RESCUE TEAMS

We are also troubled by MSHA's failure to undertake meaningful action to facilitate the creation and training of additional mine rescue teams. Over the past 20 years MSHA and some operators have weakened how the regulations regarding mine rescue teams are interpreted and applied. The existing mine rescue team structure is spread too thin. It takes a lot of time and much practice for any mine rescue team to function well.

Congress in the MINER Act clearly outlined its intent regarding the need for additional mine rescue teams. In addition, the language clearly defines how this is to be applied at both large and small mines. Nevertheless, MSHA's newly proposed regulations fall far short of what is needed. We will be submitting comments through the rulemaking procedure, but I can tell you today that the regulations bear little resemblance to what we anticipated, and what is needed.

The MINER Act contains language that was negotiated between the union and management representatives based on numerous shared concerns. Both sides of the table were concerned about the inadequate number of rescue teams as well as the fall-off in training opportunities, and teams' participation in contests that offer them a chance to experience mock emergencies so they can respond with skill and confidence when they confront real disasters. The proposed regulations do not meet the statutory language or its intent.

Though the MINER Act provided for MSHA to certify mine rescue teams every 5 years, the certification process MSHA has proposed consists largely of paperwork reviews, rather than testing of rescue teams' practical skills. Thus, not only is the mine rescue system no better today than it was in January 2006 when it took many hours for the first teams to arrive at Sago, but the regulations MSHA has proposed will not induce the creation of more highly-skilled mine rescue teams. The need is real and it is immediate.

We believe MSHA will require additional funding to do the kind of certifications that are needed to ensure that mine rescue teams are qualified *as contemplated by the MINER Act*. The UMWA has training facilities and is willing to provide mine rescue training and first responder training if we receive the necessary funding. Miners cannot afford to wait any longer for the training of new teams to begin.

ADDITIONAL SAFETY ISSUES AND CHALLENGES

- Miners should be provided multi-gas detectors to alert them to the mine atmosphere they are working in.
- Atmospheric monitoring systems should be mandated at all mines to alert miners if any dangers occur throughout the entire mine, not just in the area they are working.
- We need to push the development of a new self-rescuer that will last longer and be more user-friendly when switching from one to another if necessary during escape.

• Stronger ventilation controls should be required that are used to separate our fresh air escapeways that miners have to travel in the event of a mine fire.

ADDITIONAL HEALTH ISSUES AND CHALLENGES

While my concern for miners' safety is substantial, I would be remiss if I did not also speak briefly about challenges miners confront with regard to outstanding health issues:

• Miners are still dying from Black Lung. The use of a new device called a Personal Dust Monitor can be a very helpful tool in keeping miners from being overexposed to high levels of dust concentrations.

• With the development of the PDM we also need to explore a new dust standard that would reduce the miners level of exposure to coal dust and silica.

• A new rock dust standard should be put in place that would decrease the amount of coal dust that is currently allowed to accumulate on the mine roof, ribs, and floor.

• Equipment manufacturers should be made to design less noisy mining machinery, which would help reduce hearing loss.

Addressing these matters would represent a good start in addressing today's challenges. If and when we can address all these issues then maybe we would bring our safety and health standards up to the 21st century. There are still other recommendations listed in the UMWA's Sago report, which has already been made available to you. That report can also be seen on our Web site at UMWA.org. We expect to be making further recommendations after more information comes to light about all that transpired throughout the Crandall Canyon disaster.

We are most appreciative that Congress has worked towards increasing MSHA's budget so that more mine inspectors can inspect mines to ensure compliance with the Mine Act, which it now fails to accomplish. The need is immediate and continuing. We also need to take the next step in being more proactive in our approach to miners' protection. Operators have long been quick to introduce new technologies that improve production. It is time that they dedicate the same resources to the miners' health and safety.

I also urge you to do all that you can to ensure that the investigation of the Crandall Canyon disaster is full and independent and that the families touched by this disaster get all the answers they want and deserve.

CONCLUSION

Although some changes have been made, I am sorry to report that MSHA's efforts over the past year have done little to change much for miners confronting a mine emergency. The Crandall Canyon disaster made that all too apparent.

We are here to demand that MSHA commit to a full and consistent enforcement of both the Mine Act and the MINER Act, to improve miners' health and safety so that our industry will never again experience another mine disaster like Jim Walters, Sago, Alma, Darby, or Crandall Canyon. New technology is progressing on a daily basis and the UMWA urges MSHA to require mine operators to employ these technologies as they become available.

We also seek assurances that MSHA will be aggressive in performing all mandated inspections, protecting miners who speak out for mine health and safety, assessing and collecting meaningful penalties when operators violate the law, and taking the lead when disaster strikes.

I thank you for your attention today and your interest in miners' health and safety. I would be happy to answer your questions.

The CHAIRMAN. Senator Allard introduced you before, if you want to expand on that, otherwise we'll go right to his testimony. Thank you.

Senator ALLARD. Mr. Chairman, thank you for the opportunity.

STATEMENT OF ROBERT FERRITER, DIRECTOR OF MINE SAFETY AND HEALTH PROGRAM, COLORADO SCHOOL OF MINES

Mr. FERRITER. Good morning, Mr. Chairman, and other distinguished members of the committee. My name is Robert Ferriter, I am the Director of the Mine Safety Program at the Colorado School of Mines in Golden, CO, and I very much appreciate the oppor-

tunity to add my comments, and address the events of the Crandall Canyon Mine disaster.

I know that we are running short on time, so I'm going to abbreviate my remarks and just go to the meat of the things, because a lot of this has already been said.

First of all, I'd like to clarify for the committee what a coal mine bump is. What is a coal mine bump? We've heard that expression used here several times this morning. What causes a coal mine bump? It's the fact that we have a very strong roof and floor, sediments above and below the coal deposit. These sediments in the area of Crandall Canyon, as a matter of fact, in the entire Wasatch Plateau—we have these sediments that are ranging in depth from two to three hundred feet. They are very heavy, very stable and what they do is squeeze the coal, or load the coal, until the coal is mined, and then it can explode.

The Bureau of Mines in its previous research stated that a bump is an explosive-like failure of a pillar, part of a pillar, or many pillars. And if you saw some of the videos that were taken in Crandall Canyon, you see all of the debris, and the floor heave, we know this was a bump. It was caused by excess pressure on the overlying, on the strata.

To move on, quickly, my personal experience with coal mine bumps, having been an MSHA technical person, about 10 years in the supervisory capacity and about 17 years working in the different coal mines in Utah and other places—I have always been of the opinion that we will experience coal mine bumping in the Wasatch Plateau Coal Fields, when we reach depths of about 1,000 or 1,200 feet. So, the mine design should always be prepared to handle these type of things.

Now, to mitigate the frequency of gate road pillar bumps in these mines in the Utah area, over the years mine operators in the area have used what is called a two-entry gate road yielding road configuration. Now, the gate roads are the entries which are developed to access the coal area of a long-wall panel, and if you look on the map up there, you will see that there are two entries there, going back to where the long walls were.

Mine crews, supplies, ventilation air, and extracted coal are moved through these entries. This approach attempts to soften the ground around the gate road system, thereby restricting bump-inducing stresses, to deep within the confines of the adjacent barrier pillars.

In general, this approach has been very successful when employed correctly. Problems, however, arise when pillar sizes are too large or too small, and the improperly sized pillars are termed critical pillars, and these are the ones most likely to suffer a bump.

There are several techniques commonly accepted in the coal fields: de-stressing of the pillars, volley firing, hydraulic fracturing—all of these are an attempt to soften the pillar by one means or another, and actually move the stresses deeper within the pillar so they don't fracture out where they can actually injure miners.

NIOSH and its predecessor agency, the Bureau of Mines, has done an extremely good job, in my opinion, of preparing the industry for handling coal mine bumps, they have issued a lot of publica-

tions, they have done a lot of research. The Denver Center, in Colorado, did a lot of computer modeling of coal mine bumps, and have issued many, many publications on this. Probably the most noteworthy at this time is the NIOSH Publication 1–95, which was published in 1995, and it's really considered the Bible of bump control. There are other NIOSH publications addressing this topic, also.

In more recent years, in 1995, NIOSH developed the ARMPS program with some of the panel members you talked about earlier. This program has been proven and it is readily available through the Internet. It is available to consultants, to mining companies, and to anyone who wants to use it.

They have also developed the program called "The Model." These technologies were developed, documented, and have been distributed freely as engineering design tools to assist both long-wall, and room and pillar coal operators in their daily decisionmaking process. The tools are particularly useful during the mine planning stage, pillar design and layout, and the retreat mining warning of early red flags of potential catastrophic events.

The second aspect of computer modeling is you have to have physical property testing, which you can put into the models. And this has to be realistic. Again, NIOSH has created a comprehensive database that includes more than about 4,000 tests, strength tests, from 60 different coal seams, and these data were compared with about 100 case studies of in-mine pillar performance in the Retreat Mining Stability Database, and are available on a default basis in the computer programs.

So, we have the publications and we have the techniques to handle bumps.

Now, in the Crandall Canyon Mine disaster, in the pre-planning mining configuration, both pillars—the north and the south of the main entries there—the main entries are actually the lifeline of the mine—all of your ventilation comes in through this, the coal is removed, mining crews travel these entryways, so the mine operator will protect those entries at all costs. If he loses those entries, he loses the mine.

But, in this case, they are both—both barrier pillars are subjected to loading and stress build-up, one from the adjacent gob areas, and your drawing up there does not show the gob area to the north, but it's about the same size as what the one on the south is, and it goes up to the ceiling there. These adjacent gob areas are caved areas left after the long-wall mining process, and they are definitely areas to be considered when you are modeling any of these type of things.

The CHAIRMAN. Is this more reflective of what you were just——

Mr. FERRITER. That's more reflective, yes, because that shows the gob areas both to the north and to the south of the main entries. Yes.

Thank you.

The CHAIRMAN. Thank you.

Mr. FERRITER. Naturally occurring overburden above the coal seams—and in this case, we had something in the neighborhood over 1,700 to 2,200 feet—the loading created by the planned cave-in event on the extracted pillars in the pillar-robbing area, basi-

cally taking these barrier pillars, some 415 feet in length, when Murray coaled this, this was kind of a salvage operation of the mine. I mean, you would not operate the mine unless those pillars were in place for a long period of time, and in my opinion, Murray was merely trying to get recoverable coal resources out of the mine, because it was going to be abandoned. So, I would classify this as a salvage operation.

Now, we know we had bumps in the North Barrier pillar, and we moved to the South. This, to me, is a real red flag. We had the same geologic conditions in the South Barrier that we had in the North Barrier, we've had bumping in the North Barrier, we've made minor changes in the mining plan in the South Barrier, and then we went in there and started mining again.

The first few months, as you would expect, as you retreat a pillar mining section, you will develop your cave behind the pillar line, so we probably did not see any bumps in the first few months. But as that cave area gets bigger and bigger, and then you load the pillar line, and then you will see bumping.

Now, I checked MSHA's accident data files, and I did not see any reported bumps in the South Barrier pillar in the months of May, June or July. However, my experience tells me that bumping probably did occur. I suggest that the committee interview miners who worked in the South Barrier pillar, and they will either confirm or counterject this opinion.

Miner interviews should also be conducted to validate if visual signs of excessive pillar loading, such as stress buildup or pillar hour glassing, floor heave, unstable roof, the abnormal breaking of pillars—all of these things are indications, visual indications, which can be attributed to over-stressing of the pillars and they should be taken seriously to prevent a major catastrophic event.

Now, there's been some erosion of bump expertise in the West. The Wilberg Mine disaster, which I'm sure some of us here remember, was not caused by a bump, but the Wilberg Mine disaster was a mine fire in December 1984.

The CHAIRMAN. We're going to give you another minute and a half or so, just so you know.

Mr. FERRITER. OK, I'll just—we have a broken system here with the approval of the plan. Let me just make a couple of recommendations and then you can ask questions.

In my opinion, the recommendations that the committee should take is the rescue effort at the Crandall Canyon Mine was severely hampered by the inability to both locate the missing miners and determine their physical condition, heart beat, respiration, etc. The importance of through-the-earth two-way communications and tracking was spotlighted in the development of new technology to alleviate this condition needs to be addressed. The sooner the better.

Also, I would strongly recommend to the committee, that accidents involving multiple fatalities or disasters, should be investigated by a Federal entity, independent of the regulatory department. To protect the validity of the investigation and to ensure impartiality and fact finding, an independent entity needs to conduct these investigations. This will allow an unbiased determination of process errors, misjudgments by all involved parties, and speed the

requirements for corrective actions to further improve workplace safety for our Nation's most valuable resource, the miner.

If this is not done, I don't believe anything will change and these miners will have died in vain. So I would strongly make that recommendation to you.

Thank you for your time and attention and I will answer any questions.

[The prepared statement of Mr. Ferriter follows:]

PREPARED STATEMENT OF ROBERT L. FERRITER, EM, PE, CMSP AND NICK KRIPAKOV, MSME, PE

Good morning Mr. Chairman and other distinguished members of the committee. My name is Robert Ferriter. I am the Director of the Mine Safety and Health Program at the Colorado School of Mines in Golden, Colorado. I very much appreciate the opportunity to address the committee today to present my views on the events and conditions which led to the disaster at the Crandall Canyon Mine, and the actions of both the operator and the Mine Safety and Health Administration (MSHA) during the failed rescue attempt. Based on my observations of the recent disaster, my experience as a mining engineer, an MSHA employee (27 years) and supervisor (17 years), and frequent evaluator of underground mining practice in the Utah coal fields, I believe there is much that needs to be done to improve safety and workplace conditions in western underground coal mines to protect our Nation's most valuable resource—the *miner*.

To offer my views in an orderly fashion, I will briefly revisit the Crandall Canyon disaster in chronological order, adding pertinent geologic information, explanation, historical safe mining practices, and applicable MSHA safety regulations and contributing events which framed the disastrous event of August 6, 2007.

A. FIRST REPORTS

(a) *Earthquakes.* On the morning of August 6, 2007, the company reported to the news media that a seismic event, or earthquake, caused a major underground mine collapse at the Crandall Canyon Mine located in Carbon County near Huntington, Utah. These reports were immediately challenged by various mining experts who had studied the coal mine bump phenomena in the Wasatch Plateau and Book Cliff coal fields in east-central Utah. By Tuesday, August 7, 2007, the very next day, seismologists and the U.S. Geological Survey's National Earthquake Center in Golden, Colorado established that the August 6, 2007 event recorded on various seismographs throughout the west was indeed an implosion, or mine collapse located at the Crandall Canyon Mine. There is no debate among professionals that this was a mining-induced seismic event (coal mine bump).

(b) *Coal Mine Bumps.* Coal mine bumps have presented serious mining problems in the United States throughout the 20th century to the present day. Fatalities and injuries have resulted when these destructive events occurred at the working face of the mine. Persistent bump problems have caused numerous fatalities and serious injuries, the abandonment of large coal reserves, and premature mine closure and loss of coal reserves. Bumps are characterized as releases of energy associated with unstable yielding that occurs with progressive mining. An unstable release of energy occurs when the coal and rock is not able to absorb the excess energy released by the surrounding rock during the yielding process. Holland (BuMines Bulletin 535, 1954) defined a bump as a sudden and explosive-like failure of a single pillar, part of a pillar, or several pillars with varying degrees of violence accompanied by a very loud noise.

Through the years, a variety of techniques were proposed and implemented to mitigate bumps. Mining history is rich with examples of innovative proposals that, at best, temporarily alleviated this complex problem. From the 1930's to the present, NIOSH (former USBM) has conducted fundamental research on the geologic environments and failure mechanisms responsible for coal mine bumps and on methods to control them.

During the 1930's, USBM research indicated that both geology and mining practice (geometry and sequence) play key functions in bump occurrence. Strong, stiff roof and floor strata not prone to failing or heaving were cited as contributing factors when combined with deep overburden. Various poor mining practices that tended to concentrate stresses near the working face were identified and discouraged. Although such qualitative geologic descriptions and design rules-of-thumb have per-

sisted through the years, the need to better quantify bump-prone conditions remains.

Mine operators take little comfort in generalities when they have experienced a bump and must determine if another is imminent. Specific questions about the influence of individual factors and the interaction among factors arise but are often difficult to answer owing to the limited experience at a given mine. Often, many parameters change simultaneously, i.e., strength and stiffness of roof and floor, proximity of strong lithologic units in a coal bed, depth of overburden, mine geometry, and mining rate. (Above discussion referenced from—Occurance and Remediation of Coal Mine Bumps, by Iannacchione and Zelanko, 1995.)

B. GEOLOGIC CONDITIONS WHICH CAUSE BUMPS

(a) *Strong Roof and Floor Strata.* Strong floor strata immediately below the coal seam and strong roof strata within 30 to 50 feet of the seam have long been recognized as major contributors to coal bumps (Holland and Thomas, 1954; Iannacchione and DeMarco, 1992; Peparakis, 1958). In fact, the confinement offered to the coal seam by these stronger, stiffer strata appears necessary to generate levels of stored energy sufficient to cause bumps within and immediate to the coal seam structure (Babcock, 1984).

(b) *Sandstone Channels in Immediate Roof.* Sandstone channels are stress-concentrating structures that are directly related to bumping along longwall panels nationwide. The massive nature of many of these units appears to be the major factor affecting bump initiation immediate to these features.

(c) *Strong Coal Seams.* While it has been shown that most U.S. coals can be made to bump under the right combination of confinement and loading conditions (Babcock, 1984), it is worthwhile to mention the seam characteristics in some Western operations that appear to influence bumps. The two most prominent contributors are: (1) randomly changing coal cleating, and (2) the presence of strong rock splits in the mid to upper portion of the seam. While it is not necessary for these conditions to be present for bumps to occur, they have been linked to some of the worst bump conditions documented in Western mining.

(d) *Fault and Shear Zone Structures.* Investigations of fault and shear zone structures in the central Utah coalfields point to basic concerns: (1) the effect of significant changes in the stress field in the vicinity of these discontinuities, and (2) the loading potential of isolated blocks of strata above the seam. Whether strike-slip movement along fault structures is responsible for dynamic load changes has yet to be more thoroughly determined (Boler, 1994), but changes in loading conditions have been noted as major contributors to bumping when mining approaches a discontinuity (Iannacchione and DeMarco, 1992; Peparakis, 1958).

(e) My personal experience in dealing with coal mine bump problems in the Utah coal fields have indicated that one should always anticipate bumping when mining deeper than about 1,200 feet, and develop the mining plan accordingly.

C. MINING TECHNIQUES TO REDUCE BUMP OCCURRENCES

(a) *Mine Design.* To mitigate the frequency of gate road pillar bumps, over the years mine operators in the Wasatch-Book Cliffs coalfields have implemented the use of two-entry, yielding-pillar gate road configurations. (Gateroads are the entries which are developed to access the coal extraction area of a longwall panel. Mine crews, supplies, ventilation air and extracted coal are moved through these entries.) This approach attempts to soften the ground around the gateroad system, thereby restricting bump-inducing stresses to deep within the confines of the adjacent panel abutment. In general, the approach has been very successful when employed correctly. Problems arise, however, where pillar sizes are too small or too large. These improperly sized pillars are termed "critical pillars" and their use can result in the most extreme hazard possible.

(b) *Destressing.* Coal, or in some instances roof and/or floor rock, is intentionally fractured and made to fail. As a result, high stress accumulations can not occur in the fractured part of the mine structure. Unfortunately, destressing can occasionally trigger a bump in another section of the mine.

(c) *Volley Firing.* Destressing by volley firing has successfully reduced the number of bumps in several Western coal mines. In this method, explosives are used to fracture the coal face to a certain depth before mining. The method is used prior to face advance or entry development to advance the high stress zone away from the working face.

(d) *Hydraulic Fracturing.* This method involves the injection of fluid under pressure to cause material failure by creating fractures or fracture systems. Hydraulic fracturing is most effective in the roof and coal seam ahead of the longwall face.

(e) *Recent Publications. Special Publication 01–95*, U.S. Bureau of Mines (BOM)(Function transferred to NIOSH).

Papers presented at a BOM technology transfer seminar describes the causes of violent material failure in U.S. mines, measurement techniques for monitoring events that result in violent failure, and mitigation techniques for controlling failure. The BOM looked at 16 mines—both coal and hard rock—and analyzed 172 bumps or mining-induced seismic events. The BOM publication describes new monitoring and analysis techniques developed as tools for assessing violent failure; and seismic methods for determining source locations, calculating energy release, and determining source mechanisms are described. USBM studies identified the advantages using both yielding and stable pillars for coal bump control. A computer program has been developed as an aid for selecting room-and-pillar layouts. Additional available references include:

- *Deep Cover Pillar Extraction in the U.S. Coal Fields* (see NIOSH Web Site).
- *Preventing Massive Pillar Collapses in Coal Mines* (see NIOSH Web Site).

(f) *Modeling Programs.* NIOSH (former BOM) has developed three computer-based technologies for use by the mining industry to evaluate proposed mine designs. The programs are called LAMODEL, ALPS and ARMPS. These technologies were developed, documented, and have been distributed freely as engineering design tools to assist both longwall and room-and-pillar coal operators in their daily decision-making process. The tools are particularly useful during: (1) the planning stage (pillar design and layout), and (2) retreat mining, as an early warning of potential impending failure.

(g) *Physical Property Testing.* NIOSH (formerly BOM) created a comprehensive database that includes more than 4,000 compressive strength test results from more than 60 coal seams. These data were compared with 100 case studies of in-mine pillar performance from the Analysis of Retreat Mining Pillar Stability (ARMPS) database.

There is also evidence showing why laboratory strength does not always correlate with pillar strength. The data showed clearly that the "size effect" observed in laboratory testing is related to coal structure. Laboratory tests do not account for large-scale discontinuities, such as roof and floor interfaces, which apparently have more effect on pillar strength than a small-scale laboratory mining structure.

D. EVALUATION OF MINING PLAN

(a) *Pre-pillar mining configuration.* Prior to the practice of retreat mining in the Crandall Canyon Mine, previous mine development by Andalex Mining Co. had left a five-entry primary ventilation, belt conveyor, and services conduit known as Mains West. This primary access to the mine was protected on both the north and south sides by a massive "barrier pillar" of solid coal approximately 500-ft. wide. Longwall extraction panels had been extracted both to the north and south of Mains West barrier pillars. Apparently, this configuration was stable, as no indication of bumping or roof falls were recorded in the area of planned retreat pillar mining. In several areas, both the North and South barrier pillars lie beneath approximately 1,700 to 2,200 feet of massive sandstone and various sedimentary strata.

In the pre-pillar mining configuration, both barrier pillars are subjected to loading and stress buildup from: (1) the adjacent longwall gob areas, (2) naturally occurring overburden above the coal seam (1,700 to 2,200 ft.), and (3) loading created by the planned cave in-by the extracted pillars. Therefore, the pillars to be extracted are subjected to the combined loading from these three separate sources, which create high stress levels in the pillars and increase the probability of bumping. The geologic environment in the mining area is known to be conducive to the occurrence of coal mine bumps. In spite of these known conditions, the complete removal of all the weight bearing pillars was planned.

(b) *Mining of North barrier pillar.* As the North barrier pillar was mined and the coal pillars removed, a cave developed in-by the pillar line. Apparently, bumping problems occurred about x-cut 137 and two rows of pillars were left to alleviate the bumping. However, weight transfer overrode these pillars and major bumping occurred when the three pillars at x-cuts 133 through 135 were mined. This forced abandonment of coal extraction in the North barrier pillar near the end of March 2007 and movement of the extraction process to the South barrier. One should note that the overburden in both mining areas is 1,700-plus feet in thickness indicating that very high static ground pressures existed in both mining areas.

(c) *Mining of South barrier.* Pillar extraction was initiated in the South barrier sometime in May 2007. Extraction pillars were increased in size from 80 ft. by 92 ft. to 80 ft. by 129 ft. This increase was intended to isolate bumps to the face area and reduce the risk of larger bumps over-running the crews in out-by locations. The

South barrier was also slabbed to a depth of about 40 feet to improve caving conditions and reduce concentrated loads at the face. (To slab in mining means to remove additional coal from the barrier pillar, thereby reducing the effective width of the barrier.) Again, it is noted that the geologic environment in the North and South barrier pillars is similar. Minor changes to the pillar sizes were made to reduce bumping at the face; however, basically a similar mining plan was in effect. Considering the similarities in geologic conditions, the similar pillar extraction plans with only minor modification, the history of bumping in the immediate mining area, and the development of an active cave in-by pillar extraction mining, one could reasonably anticipate the occurrence of additional coal mine bumps. The risk was quite clear.

MSHA accident files do not document any reported bumps in the South barrier area during the months of May, June and July, 2007. However, my experience tells me that bumping to some degree most likely occurred, even though it is not documented. Interviews with miners who worked in the South barrier pillar area will either confirm or contradict my opinion. Miner interviews should also be conducted to validate if visual signs of excessive pillar loading and stress buildup (pillar "hourglassing", floor heave, unstable roof, abnormal breaking of pillars, roof and/or floor) were observed. These are all common visual expressions of stress build-up which should be evaluated by competent technical personnel.

(d) *Post-Seismic Event Observations.* Two observations of interest are readily apparent from the August 6, 2007 MSHA Web site postings and seismic event records: (1) the reported elapsed time of seismic event is approximately four (4) minutes. Based on my experience in similar investigations, this means that the event was initiated in one or more pillars (probably in the active pillar extraction area) at some location in the mine, and that not all pillars bumped at the same time. Rather, after the initial pillar(s) disintegrated, a weight transfer occurred, overloading adjacent pillar(s), which then disintegrated and transferred their load to successive pillar(s), in effect creating a domino effect, or "cascading pillar failure." This would account for the extraordinarily long run of the bump; and (2) all the pillars that failed appeared to be located under approximately 1,700 feet or more of overburden. In my opinion, this indicates that all pillars under 1,700 feet or more of cover were subjected to combined loads (as previously explained) which created stress levels somewhat under the failure level for the pillar. As the "domino effect" of the failure mechanism occurred, the weight transfer from the failed pillars to the adjacent pillar(s) increased the stress level of the receiving pillar(s) to the failure level, etc. Pillar(s) under less than 1,700 feet of cover had lower initial stress levels and, therefore, were able to accept the weight transfer without reaching unacceptable (failure) stress levels.

E. CONTINUING EROSION OF COAL MINE BUMP EXPERTISE IN THE WEST

(a) *Wilberg Mine Disaster (1984).* Although not caused by a bump, the Wilberg Mine disaster (mine fire in December, 1984) focused significant attention on the geologic environs of the Utah coal deposits, their depths, bump occurrence, and the stability of deep (2,000 ft.) underground coal mine entries.

In the Wilberg disaster, 27 miners lost their lives due to carbon monoxide poisoning. An underground compressor overheated, igniting and setting fire to the surrounding coal bed which burned for nearly 1 year before it could be extinguished. The miners underground at the time were trapped, unable to escape and died from poisonous gases.

The mine used the two-entry retreat longwall mining method for removing coal. Access to the longwall panels was by what is known as the two-entry longwall gateroad access system. This system requires MSHA approval of an operator initiated 101 (c) Petition for Modification to use two-entry gateroads rather than three entries (one for intake air, one for return air, and one for the conveyor belt to remove coal from the longwall face). With only two-entries, the conveyor belt must be placed in either an intake or a return entry. Either case is a violation of current MSHA regulations, mandating approval of a 101 (c) Petition to use only two access entries.

(b) *MSHA's Two-Entry Longwall Task Force (1985).* Immediately following the Wilberg mine disaster, the United Mine Workers of America (UMWA) began criticizing the use of the two-entry longwall mining system. The basis for their criticism was that with only two entries available for escape, the Wilberg miners were trapped, and that only three-entry longwall gateroad systems should be allowed by MSHA. Stung by this criticism and lacking any technical study to rebut the UMWA's charges, MSHA, in partnership with the U.S. Bureau of Mines, convened its Two-Entry Longwall Task Force to study all aspects of the Two-Entry system

including, but not limited to: ground control, ventilation, fire prevention, electrical, dust control, escapeways, etc. The resulting report overwhelmingly endorsed the two-entry system because of its proven ability to reduce the occurrence of devastating coal mine bumps in western deep coal mines. The report, however, recognized the reduction in escapeways from face areas of the mines, and compensated for this reduction by recommending numerous safeguards, in addition to those required by MSHA regulations. The two-entry longwall gateroad system is now commonly used by Utah mine operators developing longwall extraction panels under more than 1,000 feet of overburden.

(c) *Elimination of U.S. Bureau of Mines (1995).* In 1995, the Secretary of Interior disbanded the U.S. Bureau of Mines. All research centers were closed with the exception of the Spokane Research Center and the Pittsburgh Research Center. The effect on western coal mines was significant with the closing of the Denver Research Center and the termination of much of the research effort focused on coal mine bump prevention and multi-seam mining in western coal mines. Although a few new modeling programs have been written in the intervening years, significant new research efforts in bump prevention have not been undertaken.

(d) *Closing of MSHA's Denver Safety and Health Technology Center and Transfer of All Positions to Eastern Centers.* Arguably the most significant negative impact on western coal mine bump remediation occurred when MSHA closed its Denver Safety and Health Technology Center. With the transfer of approximately all 50 technical positions to West Virginia and Pennsylvania when the closure was announced, the western mining community lost easy access to technical experts in ventilation, ground and roof control, bump prevention, industrial hygiene, hoisting, and practically all technical disciplines found in western coal mining. Of the 50 employees at the Denver Center, only approximately four (4) employees elected to transfer to West Virginia and Pennsylvania. Included in loss of technical expertise was a small group of six (6) highly qualified mining engineers and geologists who had been engaged in western coal mine bump evaluation for 15 to 20 years. This group regularly reviewed roof control plans for MSHA's Coal Mine District 9, ran computer simulations, and investigated bump occurrences and roof falls in western mines. Unfortunately, with the closure of the Denver Technology Center, all but one member of the group left MSHA. In my opinion, if this group or a similarly qualified group had reviewed the Crandall Canyon roof control plan, the disaster would not have occurred.

(e) *Summation—Are Western Miners Less Valuable Than Eastern Miners?* Ever since the Wilberg Mine Disaster in 1984, and the resulting Two-Entry Task Force Study, MSHA has known that western deep mines are highly susceptible to explosive-like disintegration of coal pillars. Apparently MSHA's technical capability to analyze roof control plans for conditions and mining practices which would encourage bump occurrence has deteriorated to an unacceptable level. Does MSHA have any plans to reinvigorate its western technical expertise? With western coal mines reaching deeper into the earth for their resources (3,000 feet below the surface) (the shallow, easy to mine resources have already been mined), more hazardous mining conditions will be encountered. Western miners are as valuable as Eastern miners and deserve the same protections under the law. As Crandall Canyon has demonstrated, these protections are not being provided by MSHA.

F. THE RESCUE EFFORT

(1) *Initial Response.* Initial public briefings were always conducted by Murray Energy Company. MSHA was noticeably in the background giving some comments later in the briefings. The message conveyed to the public was "its Robert Murray's mine, he's in charge and can do whatever he thinks is right." MSHA was not the primary communicator the first couple of days, allowing for a poor public image.

(2) *Reporters and TV Crews Filming Underground.* Five reporters, including CNN, were allowed underground while the rescue was taking place. While the videos were informational, the video and photos did not in any way aid the rescue effort. In fact, another bump occurred while the reporters were underground. If one of the crew had been injured, MSHA would have had another disaster to deal with. Other non-involved mines in the Price, Utah area probably would have allowed visits for informational purposes if asked by MSHA.

(3) *Safety of Rescue Crews.* Anyone involved with mine rescue work knows that the safety of the rescuers is of primary importance. It must be assumed that the victims may be fatalities. To risk rescuers for bodies is unacceptable. Even though Assistant Secretary Stickler stated that the rescue crews had installed steel sets every 2.5 feet, this protection proved inadequate, emphasizing the explosive-like force of a coal mine bump. A more appropriate protective device would have been

pre-fabricated tunnel liners (large U-shaped steel sections) which construction crews work under when tunneling through unstable soil or rock.

MSHA standard 75.202 Protection from falls of roof, face and ribs states:

> (a) The roof, face and ribs of areas where persons work or travel shall be supported or otherwise controlled to protect persons from hazards related to falls of the roof, face or ribs and coal or rock bursts.

G. U.S. BUREAU OF LAND MANAGEMENT REPORTS

The following excerpts from Bureau of Land Management (BLM) Inspection Reports document mining conditions in the West Mains as described by the BLM inspector. Generally the statements of the inspector describe deteriorating conditions, bumping, roof falls, etc., as mining of both the North and South barrier pillars progressed. Typically the BLM inspector was Steve Falk and the company representative was mining engineer Tom Hurst unless otherwise noted.

1. Inspection Report of November 4, 2004:

> Andalex mining engineer John Lewis
>
> Conditions were deteriorating (west portion of the West Mains) and access through the area near impossible.
>
> The barrier planned on both sides looked like it was designed to only hold up for only a short while. The north entry was taking weight and extra roof supports and re-bolting had to be done. Now the situation is even worse.
>
> . . . (overburden) is about 1,500 feet and rises to 2,000 feet . . .
>
> It was apparent from traveling down the intake that the area is taking unacceptable weight.
>
> It is apparent the pressure arches from both side gobs are sitting right down on the main entry pillars.
>
> The situation in Main West is untenable for future pillar recovery.
>
> No mining company in the area has ever pulled pillars in main entries with mined out sides and under 1,500 feet of cover.
>
> Genwal's thoughts and plans to try pillar recovery was wishful thinking. . . .

2. Close Out Discussion—1/24/05:

> . . . the pillars in Main West are failing over time with greater than 1,700 feet of cover.
>
> Caves are occurring at intersections by irregular intersection dimensions.
>
> . . . attempts to split pillars under this depth could not hold the top and prevent pillar outbursts.
>
> Weight on the pillars is substantial and dangerous conditions are present.
>
> Mining any of the coal in the pillars will result in hazardous mining conditions such as pillar bursts and roof falls.

3. Inspection Report of August 1, 2006:

> Genwal is continuing to pull pillars from south to north in the South Mains . . .
>
> Pillar pulling has been pretty good. Depth at this area is less than 1,000 feet.
>
> The crew is getting adept at this pillaring as they now had about 2 years experience.
>
> Though Tom Hurst is new, he is not as pessimistic as the previous engineer. . . .

4. Inspection Report of December 2006:

> The sale of Andalex is complete to Bob Murray's Utah American.
>
> The new 3 entries in the barrier now would leave 130 foot barrier to the north gob.

5. Inspection Report of February 27, 2007 (North barrier pillar):

> This section finished driving 4 entries on 92 foot entry centers and 80 foot crosscut centers.
>
> So far no inordinate pillar stresses have been noted, though thing(s) should get interesting soon. The face is under 1,600 feet of cover now and will increase to over 2,000 feet by crosscut 139.

6. Close Out Discussion—March 5, 2007 (North barrier pillar):

> This section is mining coal that was not considered minable in the previous plan .
>
> . . . BLM is pleased to have them try for coal that was thought unminable but warned them to beware of the depth above the ridge and mining a barrier pillar that has been sitting for a number of years. Pulling pillars will be interesting if even MSHA will OK a ventilation and roof control plan for the section.

7. Inspection Report of March 15, 2007 (North barrier pillar):

. . . Utah American obtained the property in August 06 . . .

. . . water inflows much greater than available pumping facilities. This was at crosscut 158 which was about 400 feet short of the back end of Main West next to Joe's Valley Fault.

The section pulling the two bottom pillars on retreat out this area (between 133 and 132 crosscut) experiencing greater stresses on the pillars.

Pillar bumps were increasing and some damage to the stopping to the north bleeder entry were occurring.

Genwal tried to stop the stress override and left two rows of pillars at 137 to 135 and then started up again . . .

Hurst reported that a few large bounces occurred on off shift soon after start up of pillar mining which did most of the damage.

Entry ways out-by two breaks from the face has extensive rib coal thrown into the entry way.

The bounces had either knocked out or damaged all the stoppings to the north bleeder entry from crosscut 132 in-by to crosscut 149.

The weight of the area will only be the same or worse as this is under the ridge top on the surface.

Hurst said the risks are too great that this event will happen again out-by should they try pillar pulling again and east.

8. Inspection Report of June 13, 2007 (South barrier pillar):

They moved over to this section from the North Barrier block at the end of March when pillar pulling in the North Barrier block was halved about half way through due damaging bumps and out-by pillar loading.

. . . back in March when they were having the tough conditions in the North Barrier and asked to leave the rest of the pillars.

After receiving the various reports, it is obvious that mining conditions in the barrier pillars were extremely hazardous, yet the removal of coal pillars from the barrier pillars continued.

H. RECOMMENDATIONS

(1) The rescue effort at the Crandall Canyon mine was severely hampered by the inability to both locate the missing miners and determine their physical condition (heartbeat, respiration, etc.). The importance of through-the-earth, two-way communications and tracking was spotlighted, and the development and implementation of the technology clearly needs to be accelerated.

(2) Using a single or very few runs of the LAMODEL structural analysis program, or any computer modeling program, does not properly frame the risk (probability for failure). Rather, varying the values of input parameters over their practical ranges is important. These input parameters should include but not be limited to:

a. coal strength (unconfined and confined),
b. peak strain in an element of the model,
c. coal modulus of elasticity,
d. Poisson's ratio,
e. angle of internal friction,
f. depth of cover, and
g. progressive mining steps from initial entry development through the completion of retreat mining.

By doing this, a practical range of stability factors could have been calculated for various scenarios of mining (mining entries and crosscuts in the barrier as well as full or partial retreat of the pillars created in the barrier).

A consulting firm does only the analyses required in the scope of work issued by the mine operator, who pays for the analyses. If a risk assessment with a sensitivity analysis is not requested by the mine operator, then it will not be done, i.e., it costs more money to run many more analyses (varying parameters). If MSHA would require a more thorough risk-based sensitivity analysis, then the company would be required to do it in order to gain approval of the proposed mining plan. Requiring a sensitivity analysis with varying parameters would frame the level of risk mining in bump-prone mines.

(3) MSHA should reevaluate its policy for reviewing and approving roof control plans (mining plans) and require, as a minimum, several computer analyses using a range of input data. NIOSH has developed the Analysis Retreat Mining Pillar System (ARMPS) program by Dr. Chris Mark. This program is readily available, easily run, and is based on 150 case studies. Some updating of the program may be required to include deep-cover pillar design.

(4) MSHA should revisit its policies on rescue team safety and Command Center decisionmaking training. The loss of three rescuers, including one Federal inspector during a rescue mission, and six injured rescuers is not acceptable.

(5) Clearly, the technical expertise to recognize and remediate bump hazards associated with coal mining within the geologic environs found in the coal-producing areas of Utah and western Colorado has been lost to both industry and MSHA by the abolishment of Federal offices (U.S. Bureau of Mines and MSHA's Denver Safety & Health Technology Center). With the depletion of easily mined, high-grade coal deposits, mine operators are forced to consider mining deeper deposits with the ensuing risk of accentuating coal mine bump problems, or leaving large blocks of coal un-mined (loss of valuable resource). It is recommended that Congress mandate the creation of a small staff of highly qualified engineers and geologists within an existing Federal agency to focus attention on the bumping problem. The office should be easily accessible by western coal mine operators in Utah and Colorado.

(6) MSHA, through its Mine Health and Safety Academy and its Educational Field Services Office, should develop new and informative training material on coal mine bumps, geologic environments and hazard recognition for operator and miner use. Availability of this material would enhance the miner's knowledge of hazards and allow early recognition and remediation of hazardous conditions.

(7) In the long-term, industry should review current pillar load monitoring technology and determine its acceptability for in-mine use and remote monitoring of pillars in bump prone areas. Systems such as current CO and methane monitoring data recorders which can be continuously read outside the mine are envisioned. This would allow continuous monitoring of pillar stress buildup in active mining areas.

(8) MSHA's public image at the Crandall Canyon mine was not impressive. It is obvious that additional training should be provided to Command Center personnel and Public Information Officers. The critical role of objectivity and staying on point in briefing the press and families of victims needs to be emphasized.

(9) The cooperation between the Bureau of Land Management and MSHA needs to be reviewed. From the referenced BLM Inspection Reports, BLM noted the effects of the bumps in the North barrier pillar and expressed concern. Although BLM's primary focus is resource recovery, their inspectors appear to be quite knowledgeable of underground hazards, and an early exchange of information between the two Agencies may have focused MSHA's attention on the bump problems at the Crandall Canyon mine.

(10) As evidenced by both the Sago and Crandall Canyon disasters, the need for training of mine rescue crews (teams) and both operator and MSHA command center personnel remains great. Congress should consider funding the establishment of several mine rescue training centers in mining areas throughout the United States.

(11) Accidents involving multiple fatalities should be investigated by a Federal entity independent of the regulatory Department. To protect the validity of the investigation and to ensure impartiality in fact finding, an independent entity needs to conduct these disaster investigations. This will allow an unbiased determination of process errors and misjudgments by all involved parties, and speed any requirements for corrective actions to further improve workplace safety for our Nation's most valuable resource—the miner.

The CHAIRMAN. Thank you very much.

Mr. Watzman.

STATEMENT OF BRUCE WATZMAN, VICE-PRESIDENT FOR SAFETY AND HEALTH, NATIONAL MINING ASSOCIATION

Mr. WATZMAN. Thank you, Mr. Chairman. NMA appreciates the opportunity to appear before you to discuss the efforts to improve mine safety since passage of the MINER Act of 2006, and the challenges that remain to realize our goal to return every miner home after each shift.

The Crandall Canyon accident has affected our Nation's entire mining community and we mourn our fallen colleagues. We are determined to return to the path that existed for much of the past three decades, when steady reductions in fatalities and serious injuries were achieved. We've heard testimony about a possible cause of the Crandall Canyon incident. All should exercise extreme caution and not draw conclusions until the results and the findings of

the various investigations have been completed. To do otherwise would be premature, given the complexity of the event.

As you know, the coal industry worked with this committee, the Congress, and others to pass the most sweeping mine safety legislation in more than three decades. The requirements recognize that good safety practices continually evolve, based upon experience and technologic development, and that every underground coal mine presents a unique environment. What may work in one mine, may well not in another.

Since passage of the act, the industry has moved aggressively to identify technology that satisfies the law's requirements as quickly as possible. Our written submittal details some of the progress that has been made, while much more needs to be done to reach our ultimate goal.

The recent accident at Crandall Canyon spotlighted our continuing challenge to develop reliable, two-way devices that could help locate and communicate with trapped miners. Most Americans are well connected to each other through cell phones and wonder why we can not communicate with miners underground. We understand why. Sending a signal through rock deep underground is far more challenging than signaling through the air. Despite these challenges, the industry is not sitting idly by until a reliable system reaches acceptable functionality under all circumstances.

A recently approved tracking system, that was developed by one of our member companies, Alliance Coal, is one of several systems that uses radio frequency identification tags and bi-directional readers to track miners' movement throughout the mine. This is an improvement over earlier systems, and is considered state-of-the-art. Yet it, too, is susceptible to damage. The system currently requires a connective through the mine fiber optic cable that is vulnerable to damage and could potentially render the system useless.

As we continue to work with our colleagues to develop the technologies to meet the act requirements, we are beginning to turn our sights to work with recognized experts to develop safety management systems that encourage integration of safety into the entire suite of business management systems. In so doing, we hope to reestablish a safety culture of prevention throughout the industry. Our efforts will build upon the recommendations in the report of the Mine Safety Technology and Training Commission, to formalize risk assessment and management practices, to identify, eliminate, and manage conditions or practices that have the greatest potential to cause harm.

To conclude, the mining industry is eager to learn from our experience with implementing the MINER Act and with all who share our determination to safeguard our miners. Fatalities are tragic, but failing to learn from them and failing to act on what we learned would be inexcusable. We will not let that happen.

Thank you, Mr. Chairman. I'd be happy to answer any questions you or any members have.

[The prepared statement of Mr. Watzman follows:]

PREPARED STATEMENT OF BRUCE WATZMAN

INTRODUCTION

Mr. Chairman, members of the committee, I am Bruce Watzman, Vice President, Safety, Health and Human Resources for the National Mining Association. Thank you for providing us this opportunity to share our thoughts regarding the issues we face as we strive to meet the mandates of the Mine Improvement and New Emergency Response Act (MINER) Act of 2006 and the challenges that remain as we strive to return each miner home safely to their families after each shift.

Today I want to discuss two related issues: safety technology and safety culture. But, before turning to the specific issues before the committee let me again express our sympathy to the families of the fallen miners at the Crandall Canyon mine. We mourn their losses and are determined to return to the path that existed for much of the past three decades, when steady reductions in fatalities and serious injuries were the rule. That is why we supported strong new mine safety legislation last year, established an independent commission to provide recommendations for new safety risk-based systems and continue to partner with the National Institute for Occupational Safety and Health to develop and test new safety and communication technology.

In 1977 Congress declared in the Mine Act that "the first priority and concern of all in the coal or other mining industry must be the health and safety of its most precious resource—the miner." The mining industry strives to reflect this priority through performance. Indeed, the industry's commitment is reflected in 35 years of decreasing injuries and fatalities. And, while last year this steady progress was tragically interrupted by a series of accidents, 83 percent of our Nation's operating mines worked the entire year of 2006 without a single lost-time accident. Nonetheless, these recent accidents are a powerful reminder that indicates a need for the industry to reinforce the "safety-first" culture that exists within companies throughout our industry.

MINER ACT

Last year, NMA joined you in supporting passage of the most sweeping mine safety legislation in more than 30 years. The MINER Act, as implemented through Emergency Response Plans, recognizes the need for a forward-looking risk assessment, that good safety practices continually evolve based upon experience and technological development, and that every underground coal mine presents a unique environment and what may work in one may not be effective or desirable in another.

Since passage of the MINER Act the industry has moved aggressively to identify technologies that satisfy the law's requirements as quickly as possible. While more work needs to be done, the industry has made significant investments and progress. Briefly,

- 100,000 additional self-contained self-rescuers (SCSRs) have been placed into service, with another 100,000 on back order.
- All underground coal mines have submitted emergency response plans including plans to supply breathable air and other supplies to sustain miners trapped underground. Units to meet these requirements are being ordered and installed without the normal testing that a device such as these would normally receive.
- All underground coal miners have received new training and will continue to receive quarterly training.
- Underground coal mines have implemented procedures to track miners underground.
- Existing communications systems have been hardened and redundant systems installed.
- More than 35 new mine rescue teams have or will be added around the country.

This progress is only the beginning of our continued commitment for reaching our desired goal, to protect our Nation's miners.

The recent accident at Crandall Canyon spotlighted our continuing challenge to develop reliable two-way communication devices that could help locate and communicate with miners trapped underground. At a time when most Americans are well-connected with each other through cell phones, many wonder why miners cannot communicate from underground to the surface. Intuitively, we understand why: Sending a signal through rock deep underground is far more challenging than signaling through the air.

Apart from these fundamental technical barriers to in-mine or through-the-earth signal propagation, explosions, fire and roof falls produce destructive forces that can damage or destroy system components and render the system inoperable. At

present, there is simply no available single system that can withstand all potential scenarios while maintaining mine-wide communications.

Despite these daunting technological challenges, the industry is not sitting idly by until a reliable system reaches acceptable functionality under all circumstances. Today one member of NMA, Alliance Coal, has developed one of several systems that use radio frequency identification (RFID) tags and bi-directional readers to track miner's movement throughout the mine, pre-event. This is an improvement over earlier systems and is considered state-of-the-art. Yet, it too is susceptible to damage by destructive forces that will affect its functionality. The system currently requires a connective through-the-mine fiber optic cable that is vulnerable to damage and could potentially render the system useless.

NMA member companies recently conducted tests of communication technology being developed primarily for Department of Defense use. The results indicate that improved communication systems are possible. The Kutta system, a subterranean wireless communication system having the ability to couple onto and transmit radio signals using the existing metallic infrastructure in the mines, including metal core lifelines, phone cables, tracks, etc. holds great promise. Its ability to interface with a mine UHF leaky feeder communication system has the potential to integrate an analog and digital hand-held multifrequency radio and complementary repeaters to overcome traditional barriers to enhanced wireless communication.

Obviously there are other improvements in communication that can be achieved. Our concern is not that additional communication requirements will be mandated, nor is it the cost of communication systems. Rather, it is that realistic expectations of what is technologically achievable drive whatever requirements become the industry practice. Working with researchers at the National Institute for Occupational Safety and Health (NIOSH) we continue to approach this issue through sound science and realistic timeframes for implementation.

In sum, there is no silver bullet technology yet available. True "through-the-earth" wireless technology does not yet exist. Until we overcome the technical barriers that preclude transmission of signals through the earth, the systems will require some form of underground backbone and infrastructure, which are susceptible to damage. Nevertheless, the perfect solution may still be beyond reach, we will not be deterred in the quest to find and deploy it.

CREATING A CULTURE OF PREVENTION

We have so far commented on technical improvements and these are clearly important. But perhaps the most important element in improving safety is the relentless focus on "safety culture." For successful companies safety culture exists at every level of the organization. In those companies with outstanding safety performance safety is emphasized at every meeting, at every shift at the mines and is an integral part of the business model.

In a recent speech to the Utah Mining Association, J. Brett Harvey, President and Chief Executive Officer of Consol Energy, Inc. stated this succinctly. Let me quote key passages from his speech:

> "To achieve our goal, we will need to join the science of safety with a culture of safety.
>
> The science of safety is technology-driven. We use technology to help us monitor conditions, to provide early identification of problem areas, to improve communications between sites underground or between the underground and the surface, and to enhance the safety of equipment.
>
> By deploying technology to augment the efforts of our employees, we can minimize physical conditions in a mine as a source of accidents. We are great engineers, and we intend to engineer our mines so that the physical conditions in the mine are as predictable as those inside this room.
>
> The culture of safety, on the other hand, involves engaging the mind of every employee. We want to make safety their core value. You do that in many ways: with constant training regarding safe work practices, with regular discussion of safety issues—both at work and at home, and with programs that acknowledge and reward safe work practices and safety achievements."

Mr. Harvey's remarks reflect what so many in the industry have come to recognize, that safety must be a core value that "trumps production, it trumps profits, it trumps all other rules, policies or procedures." These same views were captured by the Mine Safety Technology and Training Commission (MSTTC) in its December 2006 report, *Improving Mine Safety Technology and Training: Establishing U.S. Global Leadership.* In the section on prevention the Commission stated that:

> Prevention requires that systematic and comprehensive approaches be used to manage risks. Compliance is an important aspect of prevention, but it is

more important to realize that it is only a starting point in a more comprehensive process of risk management.

A critical action to ensure success of the process for any company is the creation of a "culture of prevention" that focuses all employees on the prevention of all accidents and injuries. . . . In essence the process moves the organization from a culture of reaction to a culture of prevention. Rather than responding to an accident or injury that has occurred, the company proactively addresses perceived potential problem areas before they occur.

To achieve these goals we will be working with recognized experts to develop a safety management system that encourages integration of safety into the entire suite of business management systems.

Our efforts will build upon the strong leadership demonstrated last year by the industry through the establishment of the MSTTC as an independent body of safety experts charged with examining how advanced technology and training procedures can be more readily adapted for use in our mines. The commission provided a proactive blueprint for achieving zero fatalities and zero serious injuries in U.S. underground coal mines and our actions going forward will further the adoption of the commission's blue-print.

Risk assessment and management are well-established practices that are employed in many industrial settings. Our goal is to formalize this process for use throughout the mining industry so that we can identify, eliminate and manage conditions or practices that have the greatest potential to cause injury. In so doing we hope to develop a system that recognizes the MSTTC objective to foster an approach that is "founded on the establishment of a value-based culture of prevention that focuses all employees on the prevention of all accidents and injuries."

Our objective is prevention of accidents, injuries and illnesses and reinforcing a culture of prevention. Decisions will be based upon sound science recognizing technologic limits, where they exist. By developing risk-based safety priorities we will identify and focus resources on conditions that most directly place miners in potential peril. Our goal is to foster industry-wide partnerships among coal companies and equipment and service supply providers for the research, development and commercialization of new practices and technology that will raise the performance bar industry-wide.

CONCLUSION

Some believe we must do something quickly with mining legislation otherwise nothing will change. Mr. Chairman let us assure you that things are changing and will continue to change until we reach our mutually shared goal. We would submit to this committee that legislation without the support of science and facts is not progress. This committee and the public must not rush to judgment on the necessity for additional legislation. We achieve more as a total mining industry to solve a problem, without agendas, when we pool the collective efforts of industry, labor and government representatives.

Today, mine safety and health professionals face challenges far different from those anticipated when the Mine Act was enacted. Today's challenge is to analyze why accidents are occurring at a mine, then use that analysis as a basis for designing programs or techniques to eliminate or manage the accident promoting condition or cause. Where existing technology is not sufficient, mine operators must be afforded the flexibility to use all existing, non-traditional means to protect miners.

Mr. Chairman, once again, on behalf of the members of the National Mining Association, thank you for the opportunity to give our perspective on this vital public policy matter. If you or the other members of the committee require additional information, we stand ready to provide it.

The CHAIRMAN. Thank you, thank you very much.

Let me ask you, Mr. Ferriter, would you go in that mine and mine?

Mr. FERRITER. Having looked at the roof-control plan and having knowledge of the North Barrier pillar, I might make a quick visit to look and see if there are any developing signs of instability in the South Barrier, but I would not work a crew in there. My visit would be very limited and very short.

The CHAIRMAN. OK.

Let me ask Mr. O'Dell, at what points in the approval process do you think mistakes were made?

Mr. O'DELL. I think it's—it's just a matter of looking at the map. I mean, it's very obvious that anybody with any mining experience at all, can look at that map, and when you heard what Mr. Ferriter had said, as far as all the mineable coal had already been gone. That should have set a red flag up as the approval was submitted to MSHA. I mean, that would have been the first thing I looked at, is there's nothing around us to protect them.

So the damage didn't just occur—if you look in the north end, that area wasn't developed, Mr. Murray developed that. So if you look at that, when he developed that, that actually started damage to the area. Then when they started pillaring it out, it became worse. So, I mean, you have coal miners that could look—I represent coal miners, and when they saw this map, they just could not believe that it was approved.

The CHAIRMAN. Well, I think many of us believe that coal miners are really the most knowledgeable about safety conditions. I mean, these are men, some women, who in many instances spent a lifetime in these different circumstances and know, too often, of lost friends or loved ones in these. But they have an accumulated kind of knowledge and sense that certainly ought to be protected.

Let me just ask you finally, maybe the panel, just quickly on this, about outside evaluation. We've had this, Agapito did this evaluation. We looked into it briefly. I guess it's a highly regarded company, but there were important mistakes that were made in this particular evaluation. You get the situation where they're being paid by the companies themselves. I mean, that's the way that the system is done. Are you troubled by that? Should this be something that we ought to be interested in, concerned about? Does this end up being too cozy a relationship? What's your own experience on this? Just from left to right.

Mr. O'DELL. Yes, it troubles me. I mean, you always have heard ever since I was a little kid, that the customer's always right. So whatever they're paying for, they're going to get. So, that pretty much sums it up.

The CHAIRMAN. Mr. Ferriter.

Mr. FERRITER. Yes, I am very troubled about this. I think it's a broken system. We had a consultant that obviously made mistakes on the analysis. That was forwarded by the operating company. The operator should have been very—they have experienced people, they should know this. They should be able to take and make corrections, tell the consultant to change it. And then it was approved by MSHA.

When I was in MSHA, we had a small group of about six people that did this for District Nine. We had about 25 years experience there, geologists, mining engineers. We spent a lot of time in the Utah coal fields. We spent a lot of time reviewing these roof-control plans, we used computer simulations. Quite frankly, I do not know what MSHA does today, but just a simple run of the ARMPS program, NIOSH's ARMPS program, I think would have put a lot of red flags out there that somebody should take a real detailed look at this. I don't know if this was done by MSHA or not.

The CHAIRMAN. Mr. Watzman.

Mr. WATZMAN. Thank you, Senator. It is not uncommon for mine operators to use third-party consultants to assist them in the devel-

opment of mine plans for submittal to the Agency. I would venture to guess that that's probably a common practice in other industries as well, where the company does not have the expertise in-house to do the detailed work itself. That work is submitted to the Mine Safety and Health Administration, who ultimately passes judgment on the validity of it one way or another.

So, I'm personally not troubled by the fact that there are third-party consultants used to assist in the preparation of documents that are submitted to the Agency.

The CHAIRMAN. Senator Enzi.

Senator ENZI. Thank you, Mr. Chairman.

First of all, I want to thank the Mining Association and the United Mine Workers for working together with us on the MINER Act that we passed. I'm hoping that we'll get the same kind of co-operation on anything that comes out of the investigation or ideas that come out of college or ideas that come from inventors, and approaching any solutions that we can come up with in the future.

Dr. Ferriter, I'm an accountant, I'm not an engineer. You mentioned these bumps could happen if the pillar was too small or too large. I can understand too small. I don't understand how too large creates bumps.

Mr. FERRITER. Too large, if it's too big and you want it to yield, you want it to crush slowly, you want it to take and disintegrate in a controlled fashion. If it's too big, then it will not do that and it will store the stress in the pillar and load up, primarily in the core of the pillar. So if you—especially in a gate-row design. You want that to soften a little bit to soften the stresses around the gate-rows. So that's why you have to kind of get that right size in there. If it gets too big, then it will store too much.

Senator ENZI. OK. I didn't realize that that was in the process of removal, that we were talking about there. Thank you.

Mr. Watzman, in addition to the changes that were brought about by the MINER Act, MSHA has recently changed its penalty assessment formula. Could you give us an indication of what the effect of those changes have been, in terms of increases in the size of assessed penalties? Of course, I'm particularly interested in the non-serious and substantial penalties.

Mr. WATZMAN. Thank you, Senator. It must be recognized that MSHA's regulations governing the assessment of penalties does not provide the agency the ability to differentiate between what one would consider a good operator and, on the other hand, a bad operator. They're driven by the size of the operation.

I will share with the committee and submit to the record, the results provided by one of our member companies for the period April 23, when MSHA's new regulations came into effect, and September 26. They compared 2006 and 2007. This is a company that operates solely underground coal mines, many underground coal mines throughout the country.

[The information previously referred to follows:]

Comparison of Citation Results - 2007 versus 2006
Period: April 23rd through June 25th

	2007			2006			Change			
	Qty.	%	Est. Penalty	Qty.	%	Penalty	Qty.	%	Penalty Increase	% Incr.
Non S & S Citations	333	70%	$ 163,836	323	67%	$ 18,760	10	3%	$ 145,076	873%
S & S Citations	145	30%	$ 615,145	162	33%	$ 122,371	-17	-3%	$ 492,774	503%
Total	478		$ 778,981	485		$ 141,131	-7		$ 637,850	552%

Comparison of Citation Results - 2007 versus 2006
Period: April 23rd through September 26th

	2007			2006			Change			
	Qty.	%	Est. Penalty	Qty.	%	Penalty	Qty.	%	Penalty Increase	% Incr.
Non S & S Citations	996	70%	$ 421,431	902	66%	$ 50,271	94	4%	$ 371,160	838%
S & S Citations	434	30%	$ 1,842,047	471	34%	$ 312,293	-37	-4%	$ 1,529,754	590%
Total	1430		$ 2,263,478	1373		$ 362,564	57		$ 1,900,914	624%

2007 Company NFDL Rate 2.1

2007 Industry Average 4.5

Mr. WATZMAN. Their 2007 incident rate was 2.1, that's less than half the industry average. I think everyone would consider this to be a well-run company with a good safety record.

Comparing those two periods of time, their penalties increased 624 percent. Their non-S&S penalties increased 838 percent. So this is nothing more than punitive behavior or punitive action directed toward that company.

This did nothing to improve safety in that company. This company has demonstrated time and time again, that they will do what it takes to improve the safety conditions for their miners. There are many examples of this across the industry. I'm not going to say that this represents the entire industry, it doesn't. But this is just one example of the result that has come about through MSHA's regulatory change.

Senator ENZI. Thank you.

I have a number of questions that I'll be submitting to Mr. Stricklin, that deal with some of the questions about targeted inspections. I'd like all of your opinions on targeted inspections, because effective management of an entity always involves the best allocation of finite resources.

I'm an accountant. When you're doing audits, you pick on those you most suspect of needing auditing. Then you audit others just to see if your evaluation is correct on that. Doesn't it seem like targeted inspection enforcement would be the best use of an agency's resources, instead of requiring that every mine get an inspection on a regular basis? Wouldn't you pick on those that you think need it the most, the ones that there are indications that there are problems? I'm trying to get this from a laymen's perspective here.

Dr. Ferriter.

38173-2.eps 38173-3.eps

Mr. FERRITER. I think MSHA already has that authority, they have what they call a spot inspection. So, if there's a ventilation problem, or a ground-control problem, they can go in that mine and inspect that particular thing. There could be a miner complaint, that would be phoned in or called into the local office, and MSHA could go out there and check that out.

So, I think that mechanism already exists in MSHA.

Senator ENZI. OK, any disagreement, or——

Mr. O'DELL. I would just say, you have to be real careful when you look at how inspections are made at different mines, because you've heard other folks tell you today that, depending on the size of the mine, the number of employees of the mine is going to dictate how many inspection hours are going to be spent at that mine.

You may have a small mine that only has one section, and it may only get four inspections, in a quarter, and then they're done with them. And they may not be back again for another quarter, that's a long time to go without an inspector being back there to see what's going on.

Then, you may have a large mine that has four or five advancing sections, and maybe one or two longwall sections. You may have a couple of inspectors there daily, it's going to take them longer to inspect the area, because there's just more there to inspect.

The other thing that people don't understand is, the inspectors don't always spend inspection hours when they're at the mine. When they write a citation or a violation, they have to go back to look at that same area to make sure it's abated. So, you have to be very careful when you look at—I do believe all mines have to be inspected as they are required under the act today, I think the mandatory standard as it is today, but what I do think is that it needs to be more fair and equal than what it's done.

Mr. WATZMAN. Senator——

Senator ENZI. I have a lot of follow up.

Mr. WATZMAN. Can I just respond very quickly? I'd like to take it one step further than my two colleagues on the panel.

There's a misunderstanding as to how inspections are carried out, the MINER Act says every underground mine must be inspected four times a year. For those outside the industry, that leaves them with the impression that inspectors are there 4 days during the year. Nothing can be further from the truth.

There are mines in this country—some of the safest mines in this country—where to complete the quarterly inspection means that an inspector is there every day the mine is operating, and when that quarterly inspection is closed out, the next one begins. That is not, in our estimation, a good allocation of resources. There has to be a better way to conduct inspections, and manage that program than the way we're currently doing it.

Senator ENZI. Thank you, and I'll have some follow up questions on all of that, and my time's expired. I've got a lot of other questions. I appreciate the expertise of this panel, and the previous one, and we'll make use of it.

Senator MURRAY [presiding]. Thank you, Senator Enzi, Senator Kennedy had to step away for a few minutes, he has asked me to chair in his absence.

Let me start with you, Mr. O'Dell, do you know if any of the miners at Crandall were aware of the conditions at the North and South Barriers that they were mining?

Mr. O'DELL. It would be unfair of me to answer that. I think that's something that the miners themselves would have to answer. But, I think if you take that a step further, you make an important point, and that is that any condition that is at a mine site that management is aware of, they need to educate the workers.

The workers, you know, know certain conditions because of the environment that's around them, but they may not necessarily know what's going on above them, what they can't see. So, I think it's important that any education or any information that can be shared with the workers should be done.

Senator MURRAY. OK, I have heard you say that you believe that the second bump that killed three rescue workers could have been anticipated, how did you come to that conclusion?

Mr. O'DELL. Because we saw a history. We saw a history of what happened in the north end, and then we saw a history of what was going on during the recovery time. I mean, I think most people watching TV at all even saw when CNN was underground, that they experienced a bump that occurred. They had been reporting—even through the general public—that several bumps had occurred. I mean, it was a sign that people needed to pay attention to. I'm not sure that that was the case.

Senator MURRAY. Was it surprising to you, then, that a CNN crew went in?

Mr. O'DELL. I was very surprised by that, yes.

Senator MURRAY. I know that you don't represent any of the Crandall Canyon Miners, but in your past experience and communications you've had with miner families, how do you think communications and updates to miners' families at Crandall Canyon could have been handled more effectively?

Mr. O'DELL. Well, first of all, the communications should have started with the workers when the mine first opened and employees were hired. That's what's important—at mines we represent, and I'm sure there's other mines we don't represent do the same thing, from what I understand they may have done this—to have safety meetings and explain to miners what their conditions are, what their duties are, what citations are existing and what have you.

After the accident occurred, I think the family members should have been taken to a place where they could have had—I don't think their questions were answered, there was a lot of misinformation that was given out from the very beginning. I think that MSHA being the person, you know, as of the MINER Act, who was in charge of the investigation, should have been the ones that was giving the information to the families. I think with the information, they should have been very careful about what they did, and they didn't tell them. Because it's so easy—we saw it at Sago and we saw it again at Crandall Canyon, it's so——

Let me tell you something. I mean, I'm sitting on the edge of my seat while this whole thing's unfolding, hoping and praying—just as everybody else was—that the miners were okay. There was a lot of information that was given out that led us to believe that that

was the case, only to find out, maybe hours later, just for example, the first information we got was that the oxygen was good underground. So, that left us to believe that there was hope, that they had oxygen to sustain their life. But hours later, they tell us it was below 7 percent, and we know that won't sustain life.

So, you know, that up and down roller coaster, you should not put anybody through that, especially the family members.

Senator MURRAY. One other question for you, I heard Dr. Ferriter talk about the regulatory agency being the same one doing the inspection—what is your opinion of that? Or doing the investigation, I'm sorry, MSHA doing both the regulation, and the investigation?

Mr. O'DELL. Are you asking me?

Senator MURRAY. I'm asking you.

Mr. O'DELL. I think MSHA plays a role in investigating what occurs, but when you only have the Agency and the operator doing the investigation, I don't think you get a fair investigation, because those are the two parties with most at risk, just as I had mentioned in my testimony.

So, I think you need an independent source that comes in. That's what we pride ourselves on, the United Mine Workers. We consider ourselves a voice for the miners, because when any investigation I've ever been involved in, we demand answers for our miners, for our family members, and somebody has to be in there that can do that.

So, we say, "OK, there's going to be an independent investigation," according to Ms. Lynn Chao, Secretary Chao, and she hires two former MSHA employees. I don't think that's a fair, independent investigation. I think a fair independent investigation would be, maybe, a mine operator, an MSHA employee, somebody who represents labor, somebody from a government, somebody from academia—I mean, you have to have a well-rounded group of people with some knowledge to do an investigation, but not just in a small group that is investigating themselves, and that's what's going on today.

Senator MURRAY. Thank you, and I'm out of time.

But I did want to ask Dr. Ferriter that—I understand as we progress in mining out a lot of the Nation's coal reserves that conditions for underground coal miners are expected to worsen. Can you give us what recommendations you would have for MSHA to proactively prepare for these increasingly dangerous conditions?

Mr. FERRITER. Yes, in the Utah area, of course, we're now down to about 3,000 feet, which is quite—we have to take in, you know, miner education is another thing that has to be stressed. We have to take and develop new computer modeling techniques, to make sure that we can analyze these conditions. We need to look at different mine designs, because there are obviously, more coal resources left underground to provide additional support, so we have to take and develop some guidelines on that—it's a whole new world that we need to look at and analyze what is going to happen, and what are going to be the dangers down there?

Senator MURRAY. Thank you very much.

Mr. Watzman, we had a chance to meet and talk a short while ago, and I talked to you about my Family Assistance Program thoughts and asked for some response back from any of your representatives. If you could get back with us and share any of their thoughts, I would really appreciate it.

Mr. WATZMAN. We will do so.

Senator MURRAY. Thank you very much.

Senator Hatch.

Senator HATCH. Well, thank you, Senator Murray.

Mr. O'Dell, let me just begin by thanking you for your willingness to participate on the Utah Commission that was ordered by Governor Huntsman to look into the Crandall Canyon Mine disaster, or accident.

I wanted to make you aware that I am currently working with the Department of Labor to see that the government and that the State Commission has access to all documents and any other materials pertaining to that mine. So, we'll continue to work with you to see what we can do to make sure that you have access to these things.

Mr. O'DELL. Thank you, sir.

Senator HATCH. You bet.

Mr. Ferriter, and Mr. Watzman, I understand that there used to be a technology center in Denver to examine new ways for miners to communicate, among other technological advancements, and many other thoughts in the mining industry.

Now, this Center, as I understand it, has now been moved to West Virginia. I'm wondering if it might be useful, once again, to have a Mining Technology Center out West, perhaps even in Utah, because of the peculiar problems that we have in mining like we do, in deep mining. Do you both have an opinion on this? The differences between the Western and Eastern mines?

Mr. WATZMAN. Senator, Dr. Ferriter has talked to that in his testimony, and has recommended the reestablishment of that, and we agree with that. It was unfortunate that Assistant Secretary McAteer decided to close that down and consolidate the Agency's functions at the facility in Beckley, WVA at their Approval and Certification Center. Clearly, there is a need for such a facility in the West.

Senator HATCH. You feel the same way, I'm sure, Mr. Ferriter.

Mr. FERRITER. I feel the same way, when the Center was closed, I was very much against it. There was a lot of expertise lost there. In my ground, you know, with the ground-control conditions that were out in Utah, that expertise was totally lost, there was only one person that stayed with MSHA, the rest of us retired.

I think as Senator Murray has stated here, we're going into a new environment, we're going deeper. I think there's going to be more problems, and we have to investigate those and we have to look at those. So, there's going to be a research and also an operational-type area there that we have to take and address. I would highly recommend reestablishment of a technical group out there.

Senator HATCH. Mr. Watzman, some have tried to suggest that unless mandated by Congress, the mining industry will not invest in new safety technology and equipment. Do you agree with this

view, and if not, could you provide the committee with some background on the industry's voluntary efforts, at least in that regard?

Mr. WATZMAN. No, I don't agree with that view, universally, Senator. There are those who comply with the regulations. There are others who believe that the regulations are just the floor, and that to bring about true safety improvement, to develop a safety culture within your organization, requires much more than just complying with the law and the regulations.

The industry continually works on new technologies, both in terms of productivity and safety, that will bring about improvements in the industry, in the absence of regulatory requirements. Things like proximity-detection devices that are being developed by equipment manufacturers in conjunction with Massey Energy. Those are not mandated by regulation, but the company is investing in that with an outside vendor to develop that technology for introduction into the mines.

There are numerous examples of that, where the industry has gone above and beyond the regulatory requirements to bring about improvements in safety.

Senator HATCH. I'm pretty well aware of the mine safety violations going from almost nothing to very serious violations. I think we need to—you know, one of the things we need to answer is just how serious were these violations there at that mine, and were these miners sent down into a mine that was unsafe. At least, according to the knowledge that existed at that time.

It's always easy in retrospect to blame people and to find fault. On the other hand, if we knew enough about it before, and I think Mr. O'Dell's testimony has been very interesting on that, as well as Mr. Ferriter's testimony has been—we ought to get down to brass tacks on that. Because there's a lot of people that are suffering, as a result of this particular mining accident. I just hope that we get to the bottom of it, and I'll do everything in my power to make sure that our Mining Commission in Utah gets the information that it needs to make careful evaluations.

Because we've got—it is different mining in the mountains than it is mining in Beckley, WVA or Pennsylvania. Sometimes it can be safer, and it can be more dangerous. We need to do everything we possibly can to make sure that this never happens again. In the process, do everything we can to help these families who are left after this mining disaster.

I just want to thank you all, I'll submit some questions, my time is up, but I want to thank you for your testimony and your help in this matter. Thanks.

Senator MURRAY. Thank you very much, Senator Hatch.

Senator Enzi, unless you have further questions?

Well, I want to thank all of our panelists who have been here today, it's been very helpful to this committee. We will leave the record open for the next 10 days for any additional questions, we would ask all of you to respond promptly to those.

To the family members, I again, want to thank all of you for being here. We can not change your tragedy, but we certainly can look at what we are doing to make sure that we're doing everything possible to make sure that no one else suffers what you have suf-

fered. Your being here today helps us do that, and I want to personally thank you.

With that, this committee is adjourned.

[Additional material follows.]

ADDITIONAL MATERIAL

DEPARTMENT OF HEALTH & HUMAN SERVICES,
WASHINGTON, DC 20201,
September 28, 2007.

Hon. EDWARD M. KENNEDY,
U.S. Senate,
Washington, D.C. 20510.

DEAR SENATOR KENNEDY: I am writing in response to your letter of September 19, 2007 requesting an "analysis, using ARMPS and LaModel, of retreat mining in the North and South Blocks, Main West of Crandall Canyon."

Please find enclosed an analysis pertaining to the evaluation and control of coal bumps using the ARMPS and LaModel tools.

If you should have any questions regarding the technical analysis contained in the enclosed, please contact Jeffrey Kohler, Ph.D., at 412–386–5301.

I am also sending the enclosure to Senator Murray who co-signed the September 19th letter with you.

Sincerely,

JOHN HOWARD, M.D., DIRECTOR,
National Institute for Occupational Safety and Health.

[Editor's Note: Due to the high cost of printing, previously published materials are not reprinted. To view the analysis referred to above, please go to http://www.cdc.gov/niosh/mining/NIOSHCrandallCanyonReport.pdf.]

UNITED MINE WORKERS OF AMERICA,
FAIRFAX, VA 22031–2215,
August 21, 2007.

Hon. HARRY REID,
Senate Majority Leader,
U.S. Congress,
Washington, DC.

Hon. NANCY PELOSI,
Speaker of the U.S. House of Representatives,
U.S. Congress,
Washington, DC.

DEAR SENATOR REID AND REPRESENTATIVE PELOSI: I write to urge Congress to appoint an independent bi-partisan committee of coal mine safety experts to investigate the Crandall Canyon disaster. The public needs a reliable way to obtain meaningful information and insights about this horrific tragedy: both the initial trapping of six miners and the subsequent rescue efforts, which resulted in three deaths last week. I do not believe the American public and our Nations' coal miners will be well-served by another instance of MSHA investigating itself in this disaster.

Just last year this Nation was witness to three dramatic multi-fatal accidents beginning with the Sago mine explosion on January 2, 2006, followed less than 3 weeks later by a mine fire at Aracoma, and then an explosion at the Darby mine. Together these three disasters took 19 lives, and devastated entire communities. Since the beginning of last year, 64 coal miners have been killed on the job. That's an average of three each month.

In a demonstration of bi-partisan support for the Nation's coal miners, Congress enacted the MINER Act which President Bush signed into law on June 15, 2006. The MINER Act served as an important first step for improving miners' health and safety. However, it was the first piece of miners' safety and health legislation in nearly 30 years, and did not address all the shortcomings in the laws that are needed to protect miners. One of the many things that bill did *not* accomplish was to change the way mining accidents are investigated.

The problem with the status quo is that the Mine Safety and Health Administration ("MSHA") investigates mine accidents. However, *time and again* MSHA's performance has been found to have had a role in sanctioning the very conduct that developed into subsequent disasters. For example, MSHA must approve mining plans, ventilation plans and roof control plans, not to mention to ensure through enforcement procedures that each operator adheres to all the plans once the respective MSHA District approves them. Yet, after the disasters of 2006, MSHA's Internal Review determined that:

> [At] Aracoma . . . the majority of contributory violations were obvious and should have been identified by MSHA inspectors prior to the fatal fire that killed two miners. The team determined that inspection personnel failed to exercise their authority in a manner that demonstrated an appreciation for the importance of strict enforcement of the Mine Act and failed to conduct inspections in a manner that reliably detected violations.
>
> Inspection personnel also demonstrated a lack of technical know-how necessary to effectively evaluate and address complex safety and health conditions, and failed to comply with MSHA policies and procedures that, if followed, would have significantly improved the scope, quality and effectiveness of mine inspections. The lack of effective management oversight and controls also contributed to enforcement deficiencies at Aracoma. MSHA has referred its findings at Aracoma to the Labor Departments Office of Inspector General for further investigation of employee misconduct.
>
> The Sago internal review found that . . . failure by personnel to follow inspection procedures, coupled with inadequate managerial oversight, resulted in a number of enforcement deficiencies. Among the areas cited as needing improvement was the district's mine emergency response capabilities.
>
> The Darby internal review found that district personnel did not effectively utilize the mine operator's history of repeat violations to elevate the level of enforcement. Failure to follow inspection procedures, along with inadequate managerial oversight, resulted in many of the deficiencies identified in the report.

From MSHA press statement 07–975–NAT, dated June 28, 2007.

Three different MSHA District offices, but all three substantially failed in their primary responsibility of protecting the miners. What makes this MSHA statement especially frustrating is that the Agency came to the *same* kind of conclusions following an explosion that took 13 miners' lives at the Jim Walters Mine #5 in Alabama back in 2001. There is an integral problem at the very heart of the Agency where there seems to have developed a culture of accepting the status quo and not rocking the boat.

MSHA has had many opportunities to correct what is wrong; yet it still has not arrested its well-documented problems. We need an outside group of experts to analyze what happened at the Crandall Canyon mine in Utah, not only on August 6, 2007 and during the subsequent rescue efforts, but also the events that set the stage for the August 6 disaster. We also would welcome the recommendations such independent experts could make about how the Agency should change to better keep all miners safer.

The status quo simply isn't working to protect miners. Miners at Crandall Canyon and their families deserve better. In the same bipartisan fashion that Congress demonstrated on the heels of the three coal mining disasters last year, we urge you to appoint an independent committee of experts to investigate what went wrong for the Crandall Canyon workers.

Respectfully,

CECIL E. ROBERTS.

PREPARED STATEMENT OF JENNIFER JOY WILSON, PRESIDENT AND CEO, NATIONAL STONE, SAND, AND GRAVEL ASSOCIATION, ALEXANDRIA, VA

Mr. Chairman and members of the committee, the National Stone, Sand and Gravel Association (NSSGA) appreciates the opportunity to submit a statement for the record of this hearing on the *Miner Health and Safety Enhancement Act of 2007 (S. 1655)*.

Based near the Nation's capital, NSSGA is the world's largest mining association by product volume according to the U.S. Geological Survey. NSSGA's member companies represent more than 92 percent of the crushed stone and 75 percent of the sand and gravel consumed annually in the United States, and abide by three sets of guiding principles: safety and health of workforce and communities; environmental stewardship and compliance; and sustainability. Nearly three billion tons of aggregates (crushed stone, sand and gravel) were produced in 2006 at a value of approximately $21 billion, contributing over $40 billion to the GDP of the United States. Every $1 million in aggregate sales creates 19.5 jobs, and every dollar of industry output returns $1.58 to the economy.

There are more than 11,000 construction aggregate operations nationwide. Seventy percent of the Nation's counties and virtually every congressional district are home to a crushed stone, sand or gravel operation. Aggregates are used in nearly all residential, commercial and industrial building construction and in most public works projects, such as roads, highways, bridges, railroad beds, dams, airports,

water and sewage treatment plants and tunnels. While the American public may not be familiar with the uses of these raw natural materials, aggregates are the majority ingredient of asphalt and concrete, and also have environmental benefits with erosion control, storm water runoff, flue gas desulpherization, acidity control on land and in waters, and offer many reclaimed benefits to communities. Pulverized aggregates are used in the manufacture of glass, paper, paint, pharmaceuticals, cosmetics, chewing gum, household cleansers, and many other consumer goods.

The first priority of the aggregates industry is and will continue to be the safety and health of its workers. The safety record of the aggregates industry has improved due to the heightened level of effort invested by the industry to sustain an improved performance. The improvement in the aggregates industry safety record is attributable to several factors. The first is that aggregate companies have realized that to stay competitive in today's business environment, companies must provide a safe and healthy workplace or they will not be able to attract the best workforce possible. Companies realize that to remain competitive in America today you must care about your people.

The *Mine Improvement and New Emergency Response Act of 2006 (MINER Act)* was signed into law on June 15, 2006. We believe the *Miner Health and Safety Enhancement Act of 2007 (MHSE Act)* is premature because it comes before MSHA and the industry have had adequate time to fully implement the *MINER Act* and, therefore, could undermine the success that has been achieved. Further, imposing another layer of regulation on an industry that already is highly regulated and has shown continued safety improvements at this time would create confusion and threaten further progress.

The *MHSE Act* takes a one-size-fits-all approach that fails to recognize that mines are unique. NSSGA members have achieved a continuously improving safety performance record. In fact, NSSGA members have never experienced an accident similar to the recent tragedies in the coal sector. Written as a result of these tragedies in the coal sector, the *MINER Act* has impacted the aggregates industry. Further extension of the *MHSE Act* to the stone, sand and gravel industry is not warranted and contradicted by the industry's safety performance.

Notice and comment rulemaking is a precept fundamental to the *MINER Act* and its predecessor statutes. The basic purpose of such rulemaking is to afford stakeholders the due process required by law of providing a reasoned forum that allows all interested parties to comment on proposed regulations. The *MHSE Act* would circumvent this crucial rulemaking process in key areas. The *MHSE Act* would require MSHA, with no opportunity for public comment, to automatically adopt the recommended exposure limits developed by the National Institute of Occupational Safety and Health (NIOSH) as legally enforceable Permissible Exposure Limits (PELs). The bill would also require MSHA to automatically adopt standards, such as the Hazard Communications standard, established by private and quasi-governmental organizations. To impose statutory health standards on the mining industry without benefit of notice and comment rulemaking to develop a rulemaking record that evaluates risk of material impairment of health, as well as technology and economic feasibility, is unwise, unjustified and could be counterproductive.

We are concerned that the *MHSE Act* changes the rules and responsibilities of MSHA and NIOSH in a number of key respects. It also introduces an organization unfamiliar with the mining industry into the safety process which will create regulatory confusion. Under the *Federal Mine Safety and Health Act of 1977*, the role of NIOSH in standard-setting is advisory in nature. The *MHSE Act* would require NIOSH to establish the frequency of dust sampling rather than MSHA. The *MHSE Act* would also require MSHA to adopt technology designed and certified by NIOSH. This would undermine a well-established and effective standard setting regime by mandating that MSHA simply accept NIOSH recommendations. It would circumvent the current approval and certification process.

The *MHSE Act* contains several provisions that are impractical and will be administratively difficult to implement. For example, it would require all mine operators to notify MSHA of a number of incidents that are not likely to cause injury or are otherwise life-threatening. Notifying the agency of a near miss incident or other events that are not clearly defined by the *MHSE Act* will lead to confusion and a waste of valuable time and resources by both operators and MSHA inspectors.

It is imperative that when a serious accident or mine disaster occurs, that a comprehensive and unbiased investigation takes place to prevent a recurrence. The *MHSE Act* would permit a "miner's representative" or a representative of the injured party's family to request a public hearing or special investigation. This process does not lend itself to an objective investigation of the facts. Other motives, such as politics, labor-management issues, or potential future civil litigation should take

a back seat to determining the facts contributing to an incident for purposes of prevention.

The *MINER Act* substantially increased penalties. In addition to proposing more penalty increases, the *MHSE Act* requires the Secretary of Labor (the Secretary) to revise section 104(e) of Federal Mine Safety and Health of 1977, which addresses "pattern of violations," or POV, and restricts the ability of mine operators to contest inappropriate enforcement actions. MSHA published new civil penalty regulations, covering all mines, on March 22, 2007. The new regulations addressed the statutory requirements of the *MINER Act* related to civil penalties. They also revised the agency's formula for calculating assessments related to violations. MSHA estimated that the cost increase of these new penalty regulations would range from 127 percent to 228 percent. Many conservative estimates from mine operators project penalty cost increases of 200 percent to 300 percent. MSHA's new penalty regulations should be given a chance to work before any further statutory changes are made.

The *MHSE Act* would require mine operators to escrow the assessment related to a contested violation pending resolution of dispute. This requirement is clearly designed to discourage mining companies from contesting enforcement actions, thereby forcing many small businesses to choose between placing funds in escrow and meeting payroll for their employees. It also would limit the ability of mine operators to defend themselves against unfair treatment and inappropriate actions. A significant consequence of this provision would place another burden on an individual miner who has a *bona fide* disagreement with a personal citation the miner receives if the miner wishes to contest the citation. By requiring an individual miner to escrow payment when there is simply a difference in opinion, the *MHSE Act* unduly burdens the individual miner that the statute would protect.

If enacted, the *MHSE Act* will result in many mines installing inappropriate or unnecessary technology. The proposed legislation is prescriptive, as opposed to being risk-based in design. Mine operators would be required to adopt technology that is neither proven to be safe nor commercially viable at this time. While the majority of aggregate operations are above ground, there are a significant number of other types, ranging from water-based dredging to underground operations that may require different types of technology.

In addition to increased penalties, the industry continues to endure a lack of consistency from MSHA during inspections and issuance of citations. Lack of consistency also may be due to inadequate training. MSHA inspectors do not necessarily have training facilities which clearly differentiate between the various mining sectors and the different types of product within each sector (i.e., granite mine, limestone mine, sand and gravel operation). Proper training of inspectors ensures an improved consistency in inspection and issuance of citation, and therefore, an improved compliance on behalf of operators. NSSGA strongly supports improving the training capabilities of MSHA inspectors, so they are prepared to conduct consistent and comprehensive inspections of stone, or sand and gravel operations.

Unlike coal, underground stone mines produce material that is non-combustible and non-flammable. No combustible gas such as methane is present, and no underground stone mine is categorized as liberating methane or containing a combustible ore. MSHA-approved ("permissible") equipment is not required in underground stone mines because mine fires or explosions cannot occur due to electrical equipment contacting an explosive gas, since explosive gas is not present. Mining methods create large open spaces for access by large equipment. Large openings accommodate emergency equipment used by non-mine emergency services. More stable mineral formations result in stable mine roofs, minimizing the need for additional roof supports and emergency escape is easier due to the large spaces in the mine. Because of large open spaces and mining methods, mechanical mine ventilation generally is not required since natural ventilation provides an atmosphere in which people can work.

Additionally, while most quarries are mined for decades, some sand and gravel operations move rapidly from one site to another. Also, there is a wide range of climate differences among the 11,000 plus operations nationwide that may make certain safety technologies more feasible than others. Operators should have the flexibility to introduce the types of technology best suited to their mines and specific circumstances. In other words, "one-size-does-not-fit-all."

NSSGA developed and agreed to a set of safety principles to assist member companies in their efforts to understand the importance to their individual organizations, as well as to the industry as a whole. In addition, a safety pledge was developed in 2002 incorporating the safety guiding principles. More than 90 percent of the NSSGA member companies now have agreed to the pledge, signifying the importance of safety and a commitment toward ensuring the safety and health of all their employees.

NSSGA was one of the first organizations that formalized an alliance with MSHA. Subsequently, MSHA has entered into alliances with other industries it regulates, as well as with labor organizations, including the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers and the International Union of Operating Engineers. Important alliances also exist with the National Safety Council and the American Society of Safety Engineers. While some argue that these alliances have aligned the agency too closely with the regulated community, we would argue the opposite. In 2002, NSSGA and MSHA set forth a cooperative agreement to develop programs and tools for the improvement of safety and health in the aggregates industry. The reduced incidence rates that resulted speak for themselves. Through these alliances, individual working miners have gained access to more educational materials from their companies, and MSHA has been able to enhance its mission of protecting worker safety and health.

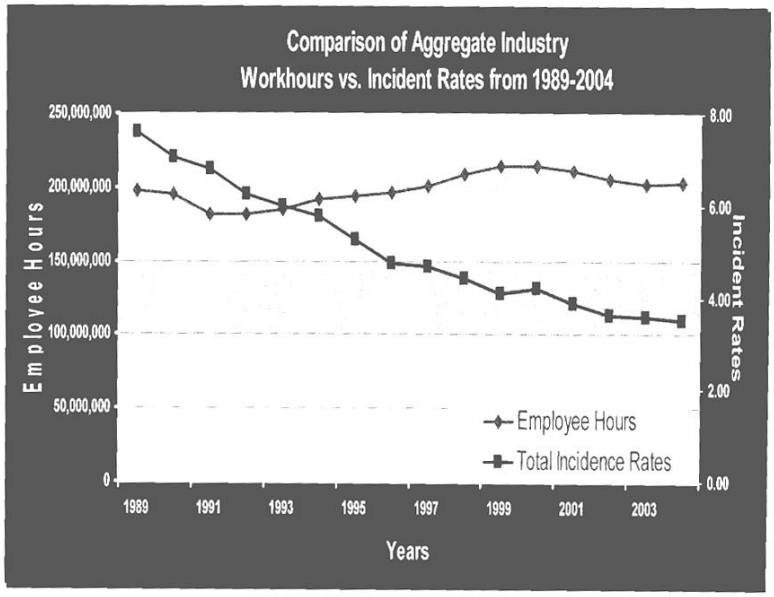
Another collaborative effort resulted in the MSHA Part 46 "Training and Retraining of Miners" regulation in 2000. This effective regulation ensures every miner knows and understands how to perform their job safely by covering the important safety and health information prior to starting work and annually thereafter. This regulation was developed collaboratively, with input from both labor and industry groups, guaranteeing support of the rule by all involved stakeholders and assuring their commitment to the ultimate goal of injury reduction. The Coalition for Effective Miner Training included many industry groups working in a joint industry/labor arrangement in conjunction with MSHA to develop an effective standard for the aggregates industry, and the part 46 miner training resulted from the group's combined efforts.

Another example of an effective collaboration between MSHA and NSSGA is a cooperative workplace-based training program of noise and dust monitoring workshops. Agency and association leadership developed and signed an agreement, and the training workshop program launched on December 1, 1997. These workshops have been given every year since 1997, and training specialists from the Mine Safety Academy have educated miners in dust and noise issues. The joint venture aimed at reducing hearing loss and silicosis through a program of recognition, evaluation and control of workplace hazards has won two awards from Innovations in American Government.

The NSSGA/MSHA Alliance does not interfere with the compliance program of the agency, but instead enhances communications and understanding of risk for improved education and training. MSHA has an important role in ensuring that aggregates mines and quarries maintain safety standards that protect employees. The MSHA enforcement program operates independently of any of the cooperative industry alliances. Unlike any other safety and health enforcement agency enabling legislation, the act requires complete inspections of every mine property two or four times per year depending on whether it is surface or underground, respectively.

It is imperative that Congress allow the original *MINER Act* to be fully implemented in order that the overall impact of it can be comprehensively measured. Congress should exercise caution before rushing to impose another layer of regulations on the already highly-regulated mining sector so as not to jeopardize the progress being made in enhancing the safety of miners. Congress must look to MSHA to develop a model that combines enforcement with incentives for safety performance and with education and training and assistance on best safety practices rather than penalties as the sole motivator.

The first priority for the aggregates industry is and will continue to be the safety and health of its miners. The industry recognizes that its employees are its most valuable asset, an asset that must be protected for the well-being of the industry now and in the future.



RESPONSES TO QUESTIONS OF SENATORS ENZI, MURRAY, ISAKSON, AND HATCH BY DENNIS O'DELL

SENATOR ENZI

Question 1. Like you, I would prefer, during a situation like the disaster at Crandall Canyon, that there was no public comment by anyone not in possession of all the facts, or anyone attempting to advance their own agenda in the wake of such a tragedy. That would include not only a mine owner, but the media, outside commentators, and all others, as well. However, I am sure you recognize that there are serious practical and constitutional issues implicated here. In a situation such as Crandall Canyon should the Federal Government impose limitations on the free speech rights of individuals? Should the Government limit freedom of the press by placing restrictions on news reporters? Would UMWA be opposed to Government action that would limit its speech rights in these circumstances?

Answer 1. The Government should not limit freedom of press on news reporters.

Question 2a. The availability and utility of communication equipment in particular is routinely misrepresented to the public. Mandating equipment that does not work does absolutely nothing but create false confidence and waste resources that could be better utilized in achieving real technical progress to enhance miners' safety. There is no question that we share that common goal. With this in mind I would ask: What exactly, by name or operational description, is the communication/tracking technology you claim should have been required at Crandall Canyon, and would have survived and been usable post-accident?

Answer 2a. If approached correctly, possibly the PED, see response 2d. Also see attached MSHA report.

Question 2b. Again, exactly, by name or operational system, what is the wireless technology that can accomplish one or two-way communication through substantial amounts of solid material?

Answer 2b. Again, though the earth could have been established with the use of the boreholes drilled, the experts needed to think outside of the box.

38173-1.eps

Question 2c. I'm sure you are aware that some have advocated that we mandate so-called "leaky feeder systems" as underground communication "gold standard." However, virtually every expert agrees that a leaky feeder system at Crandall Canyon would have been inoperable post-accident. Do you agree? And, if not, why not?

Answer 2c. See attached MSHA report.

Question 2d. As you know, many argued that the so-called PEDs tracking system was the way to ensure the ability to locate a lost or trapped miner. I'm sure you're aware that there was a full PEDs system in place at Crandall Canyon, however, it was wiped out by the collapse, and immediately ceased working. What is the tracking system that you believe should have been installed and would have survived the collapse?

Answer 2d. If the agency would have thought outside the box, they could have overcome the problem of the limited use of the PED's caused by the mine collapse. If the UMWA would have been a part of the command center where the decisions were made, we would have suggested that the agency drop a receiver down the various boreholes that had been drilled to see if they could have detected any response from the PED's. Because this was not done we really aren't sure if these devices failed or not.

Question 3. Could you detail the specific evidence on which you rely to support your claim that the investigatory panel named by Secretary Chao to investigate the Crandall Canyon accident is "*not* independent." As I read your testimony, the sole basis for that claim is that two of the panel members were once employed by MSHA. Is everyone who has previously worked for MSHA. for example, another witness on the panel Dr. Ferriter, not independent or impartial?

Answer 3. The United Mine Workers of America is the only true independent voice for miners.

Question 4. I gather from your testimony that UMWA believes it should be present and should participate in MSHA's interview of all witnesses and have immediate access to all documents pertinent to MSHA's accident investigation, is that correct? Are you aware of any other situations in which a labor organization has the right to be involved as a virtual partner in the Government's law enforcement functions? Does Section 103(f) of the Mine Act on which you appear to rely say anything about post-accident investigations? Isn't it limited to *inspections*, and *inspection conferences held at the mine*?

Answer 4. The United Mine Workers of America has always been a part of MSHA's investigations where we have been designated as Representative of the miners. The union and MSHA have always been able to work collectively through this process because they (MSHA) recognize that we have a lot to offer during these types of investigations. Responsible operators have also encouraged this type of co-operation between all parties. It is usually the bad operators that have something to hide that tries to keep this joint co-operation from occurring.

Question 5. The Secretary of Labor and the Solicitor of Labor have both noted that allowing access and participation by non-government entities in the investigatory process could "compromise the integrity of the investigation and potentially jeopardize MSHA's ability to enforce the law." In your testimony, you say that UMWA is skeptical of the validity of these claims. What is the factual basis for UMWA's skepticism?

Answer 5. This has nothing to do with MSHA's ability to enforce the law or compromising the integrity of the investigation. It is all about accountability. If there is no honest broker to hold the parties accountable, then a fair investigation may not take place. In many cases, the agency, MSHA, is glad that we are a part of their investigations because we support them by testifying on behalf of the agency when the operators challenge them in court.

One example is the Jim Walters Resource #5 case where we were a party to the agency in the hearings against the company. There are many more examples where MSHA relies on the union to support them from mine inspections, violation conferences, accident investigations, to comments on rulemaking. In this statement where you quote that the Secretary of Labor and the Solicitor of Labor has noted that allowing access and participation by non-government entities in the investigatory process could compromise the integrity of the investigation and potentially jeopardize MSHA's ability to enforce the law. . . . rather than you asking what is the basis for the UMWA's skepticism, you should be asking MSHA, if they did everything that they should have done and have nothing to hide, then why would they deprive a designated representative such as us, the same access that they have given us at every union operation that we represent.

[News Release-U.S. Department of Labor, Office of Public Affairs, Jan. 31, 2008]

(Contact: Amy Louviere 202–693–9423 or Matt Faraci, 202–693—9406; Release Number: 08–126–NAT)

MSHA APPROVES FIRST WIRELESS TRACKING SYSTEM

New technology represents significant progress under MINER Act

ARLINGTON, VA.—The U.S. Department of Labor's Mine Safety and Health Administration (MSHA) announced it has issued its first official approval of a wireless tracking system for use in underground mines. The approval was issued by MSHA's Approval and Certification Center to Venture Design Services Inc. for the MineTracer Miner Location Monitoring System.

"Since the Sago Mine disaster, MSHA has received dozens of proposals from manufacturers and distributors of emergency communication and tracking systems," said Richard E. Stickler, acting assistant secretary of labor for mine safety and health. "This approved system provides a wireless means for mine operators to track miners underground both before and after an emergency event." The system components normally will be interconnected with low-voltage DC power cables; however, in the event of an emergency, the power cables become de-energized, and the system will resort to battery power and can remain operational wirelessly. Although not yet incorporated in the design, Venture Design intends to add text messaging and gas detection to the system in the future.

Since 2006, MSHA has issued 36 new or revised approvals for communications and tracking systems, including a hand-held portable radio, several leaky feeder systems and several radio frequency identification (RFD)) tracking system components. MSHA currently is examining 41 additional communications and tracking approval applications, including several wireless communications and tracking systems.

The Mine Improvement and New Emergency Response (MINER) Act of 2006 requires that each mine evacuation plan include provisions for tracking the pre-accident location of all underground miners. Furthermore, the MINER Act requires that mine operators adopt wireless communications and electronic tracking systems by June 2009.

MSHA's Approval and Certification Center tests a wide range of mining equipment, components, instruments and materials to ensure that they meet government standards for safe design and construction. This work helps to ensure that the various products will not contribute to an explosion, fire, electrical failure, vehicle crash or other kind of accident. The center, located near Wheeling, WV, houses laboratories, explosion galleries and offices that perform administrative work and recordkeeping.

***

(*U.S. Department of Labor releases are accessible on the Internet at www.dol.gov. The information in this news release will be made available in alternate format (large print, Braille, audio tape or disc) from the COAST office upon request. Please specify which news release when placing your request at 202-693-7828 or TTY 202-693-7755. The Labor Department is committed to providing America's employers and employees with easy access to understandable information on how to comply with its laws and regulations. For more information, please visit www.dol.gov/compliance.)*

MSHA APPROVED COMMUNICATIONS & TRACKING TECHNOLOGIES

(Updated 01/25/2008)

Handheld Two-Way Radios

Manufacturer	Model Number	Approval #
Kenwood USA Corporation	TK-290, TK-390	23-A060002-0

Leaky Feeder Communication Systems

Manufacturer	Model Number	Approval #
Mine Radio Systems	Flexcom Communications Systems	9B-219
Varis Mine Tech.	Model IS Leaky Feeder Communication System	23-A050001-0
DAC	Type RFM 2000 Radio System	9B-201
EL-EQUIP, INC	Model VHF-1 Radio System	9B-196

Leaky Feeder Communication Systems—Continued

Manufacturer	Model Number	Approval #
Tunnel Radio of America	Model UltraComm Distributed Antenna Communication System	23-A070005-0

Mine Page Phones

Manufacturer	Model Number	Approval #
Comtrol Corporation	''Loudmouth'' Page Phones	9B-71
Gai-Tronics	Model 491-204 Mine Dial Page Phone	9B-221
Gai-Tronics	Part Nos. AM7011, AM7012, AM7021, AM7022 Loudspeaking Telephones.	9B-155
Pyott Boone	Model Nos. 112 and 112P, 118 and 119 Page Phones	9B-102, 9B-163
Pyott-Boone	Model 128 Mini Page Boss	9B-158
Mine Safe Electronics	Model IIA Mine Phone	9B-164
Mine Safety Appliances (MSA)	Pager III	9B-85

Radio Frequency Identification (RFID) Tracking Systems

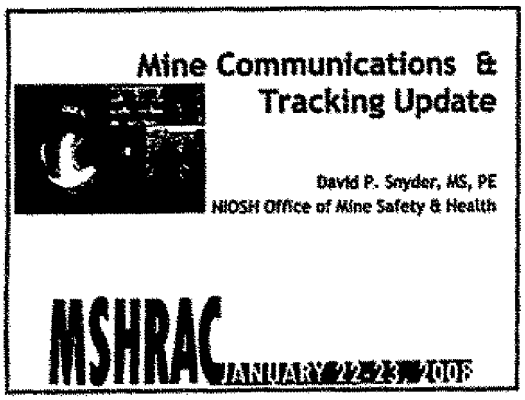
Manufacturer	Model Number	Approval #
Mine Site Technologies	Model TAG IV Transmitter	2G-4162-0
Mine Site Technologies	ICCL Integrated Communications Cap Lamp with Optional Tracker	23-ISA080001-0
Marco	Model PRIM Model PTT-1	23-A060001-0
Matrix Design Group, LLC	Model MatrixTracker T1000 RFID Tag	23-A060003-0
NL Technologies	Model Standalone WiFi RFID Tag	23-A070001-0
NL Technologies	Cap Lamp with RFID Tag	23-ISA070001-0
Venture Design Services	MLT Mobile Location Transponder Tag	23-A070003-0
Wholesale Mine Supply	Model i-Q8X rfid Tag	23-A070004-0
Koehler-Bright Star	Model TAG5 Tracker Tag Module	23-ISA07000-2
Koehler-Bright Star	Model MultiTAG TP1 Transmitter TAG PCB Assembly	23-ISA07000-3
Mine Radio Systems	Model TP2/ISPT	23-A070006-0
American Mine Research, Inc.	Mine Net Tag	23-A070007-0

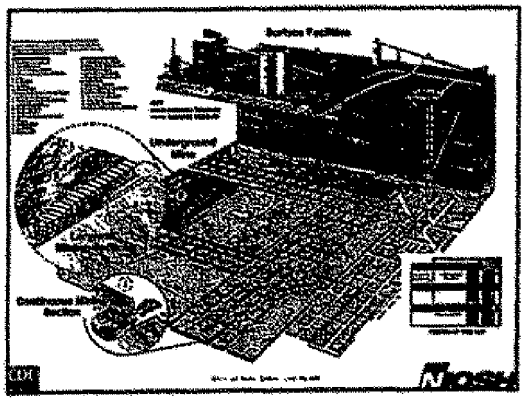
Paging/Text Messaging Systems

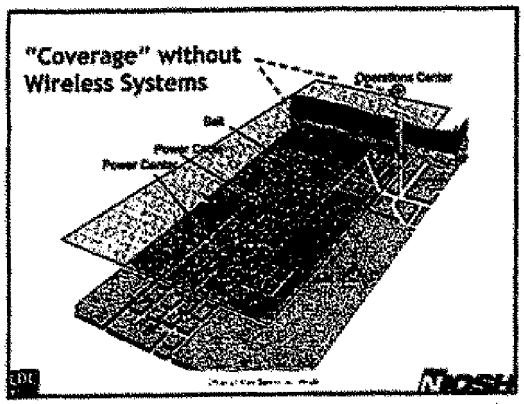
Manufacturer	Model Number	Approval #
Mine Site Technologies	Model PED1	6D-46-0
Mine Site Technologies	ICCL Integrated Communication Cap Lamp with Optional PED	23-ISA080002-0
NI Technologies	Model Gil Cap Lamp with Messenger Circuit	23-ISA070004-0
Stolar Horizon	RGU104-001 Remote Graphical User Interface	23-A070002-0

Wired Intercom Systems

Manufacturer	Model Number	Approval #
Con-Space Communications	Model CSI-2000 Confined Space Intercom System	9B-199-0


Mine Communications &
Tracking Update
David P. Snyder, MS, PE
NIOSH Office of Mine Safety & Health
MSHRAC




"Coverage" without
Wireless Systems

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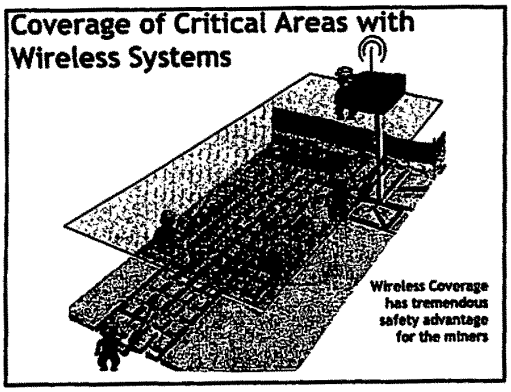
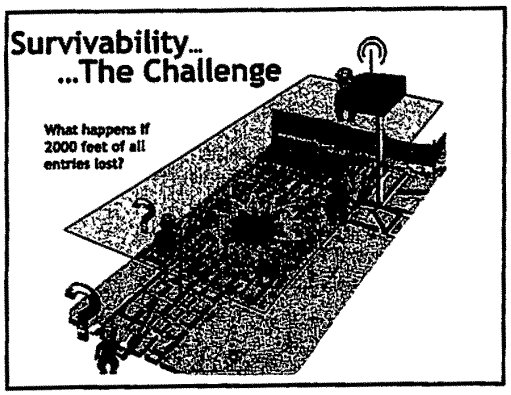
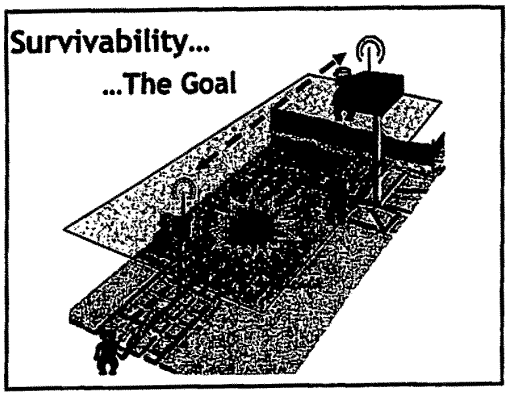

Coverage of Critical Areas with Wireless Systems
Wireless Coverage has tremendous safety advantage for the miners


Survivability...
...The Challenge
What happens if 2000 feet of all entries lost?


Survivability...
...The Goal

38173-5.eps

Wearable Devices

- For two way voice systems, results of development prototypes and focus groups with miners and mine operators:

  Wearable Devices = Conventional Radio Frequencies

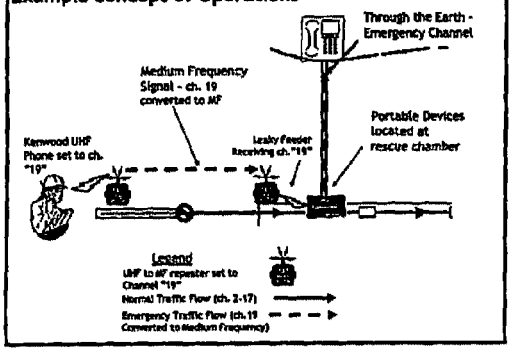
- Analysis and test data results of radio coverage in the mine environment:

  Conventional Radio Frequencies = In-mine Infrastructure

In-Mine Infrastructure

- In-mine infrastructure is required to support two functions:
  - Distribution of the radio signal in the mine (coverage)
    - Support of the radio link from the miners' radio to the fixed antenna system
  - Provide a communications path out of the mine (backhaul)
    - Support of the path from the surface to the base station radio or amplifier that is providing the radio signal to the fixed antenna system.

Example concept of Operations



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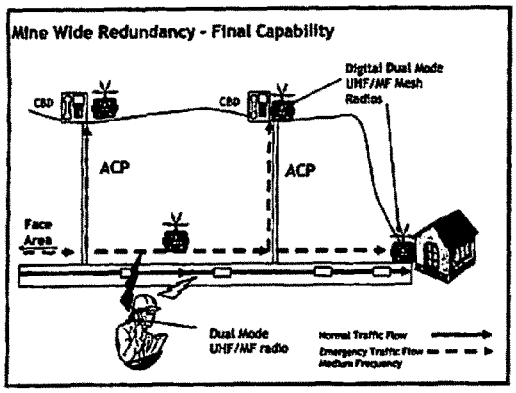

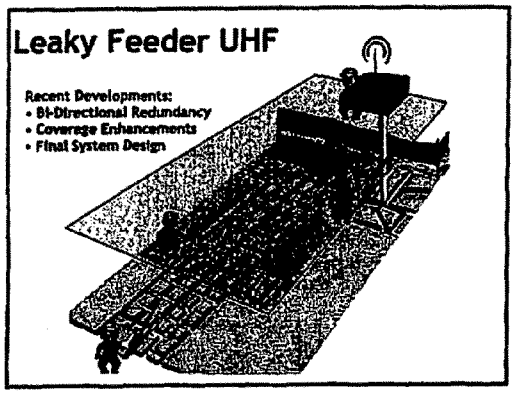

Contractor:

- Pillar Innovations
  (Subsidiary of Beitzel Corp.)

Subcontractors:

- Becker/Varis
- Wholesale Mine Supply

Award Date: March 15, 2007

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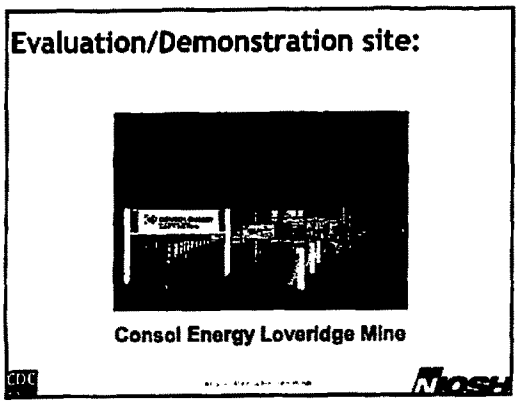
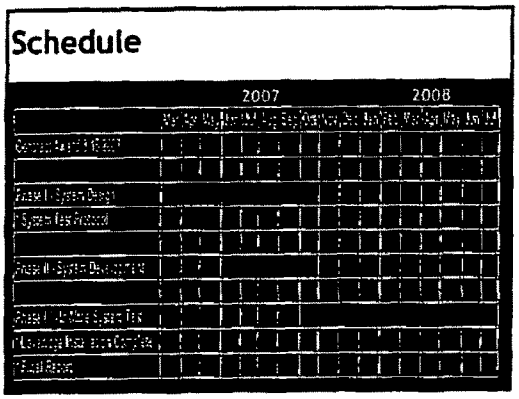
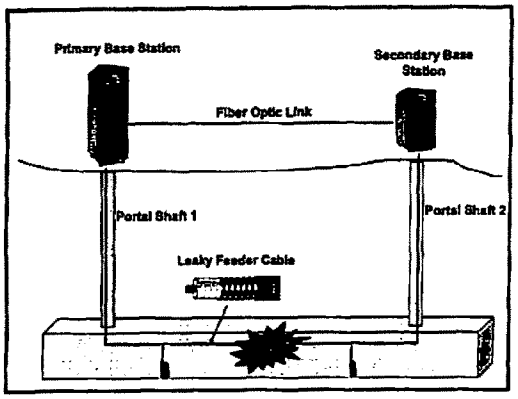

Evaluation/Demonstration site:
Consol Energy Loveridge Mine
CDC
Niosh


Schedule
2007
2008


Primary Base Station
Secondary Base Station
Fiber Optic Link
Portal Shaft 1
Portal Shaft 2
Leaky Feeder Cable

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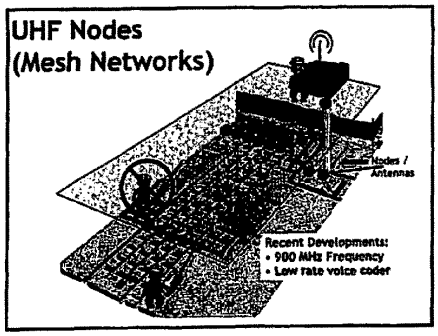


- L-3/SYColeman
  - System Integration
  - Hawk Situational Awareness System
- Innovative Wireless Technologies
  - Mesh Node Design
- Alion
  - Miner Mesh Radio (MMR) Handset
- Pyott-Boone
  - Site Visits
  - Power Supplies
- Marshall Miller & Associates
  - Mine Safety Consultants
- Virginia Tech
  - Research Consultants
- ICG Sentinel Mine
  - Installation site
  - Cooperator (not subcontractor)

Some Wireless Mesh Implementations

- WiFi Wireless Networks
- Soldier Warrior Radio
  - Mobile Ad-hoc Network (MANET)
- Zigbee Network
  - Low power, lower data rate for Wireless Personal Area Networks (WPAN)
- L3 SYColeman is developing a Zigbee variant mesh system under contract with NIOSH

38173-9.eps

NIOSH Wireless Mesh Contract Phases

- Phase I System Design
  - Radio propagation/coverage tests
  - Survivability through Redundancy
  - MSHA permissibility
  - 24 hour battery backup
- Phase II Prototype Demonstration
  - Verify voice, data, and tracking functions
  - Submit MSHA permissibility application
- Phase III Full Scale Pilot Operations
  - Field trial of fully deployed system
  - Leaky feeder interface

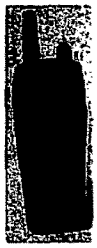
IWT's mPros™ ad hoc mesh networking solution

- Enables true peer-to-peer (P2P) mesh topologies in autonomous energy-constrained networks.
- The protocols were researched and developed for stringent military requirements, but have the flexibility built-in to support a wide range of applications

Photo courtesy of US Army ARDEC

Miner Mesh Radio (Alion/IWT)

- Two - 900 MHz mProm™ transceivers
  - One mProm™ as a transceiver
  - One mProm™ as receive only
  - Digital Voice Systems Incorporated (DVSI) Voice Codec chip at 2400 bps
  - Half duplex - Push-to-talk for voice
  - Canned text messages
  - 48 character display



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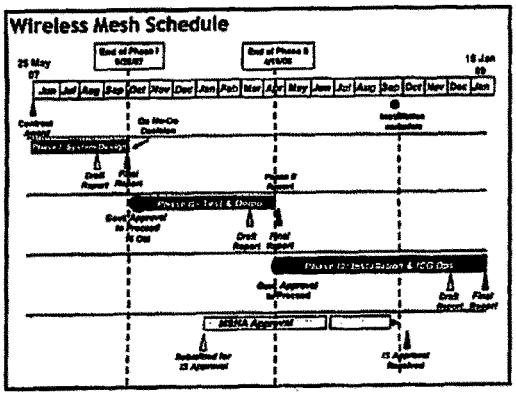
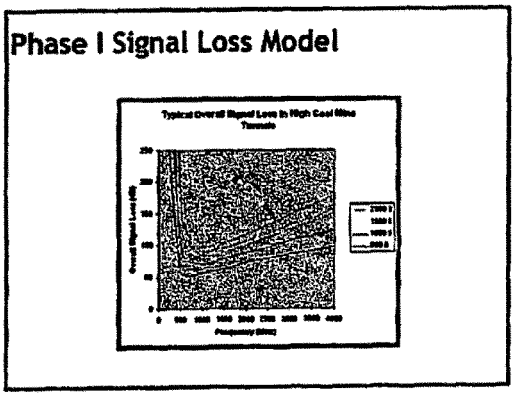
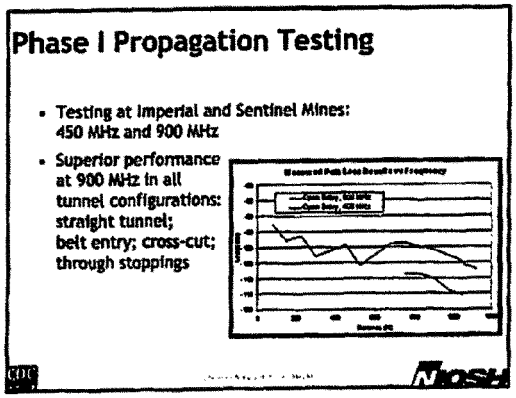

Wireless Mesh Schedule
25 May 07
16 Jan 09
Jan Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
Draft Report
Final Report
Draft Report
Final Report
Draft Report
Final Report
Draft Report
Final Report
MSHA Approval


Phase I Signal Loss Model


Phase I Propagation Testing
• Testing at Imperial and Sentinel Mines: 450 MHz and 900 MHz
• Superior performance at 900 MHz in all tunnel configurations: straight tunnel; belt entry; cross-cut; through stoppings
NIOSH

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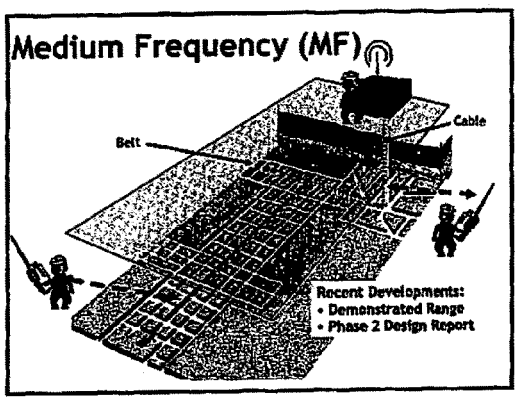


Adaptation of US Army "Kutta" System

- Contractor - Kutta Consulting
- Develop a medium frequency portable mine radio system
- Develop a medium frequency analog and digital repeater system

SBIR STTR CERDEC

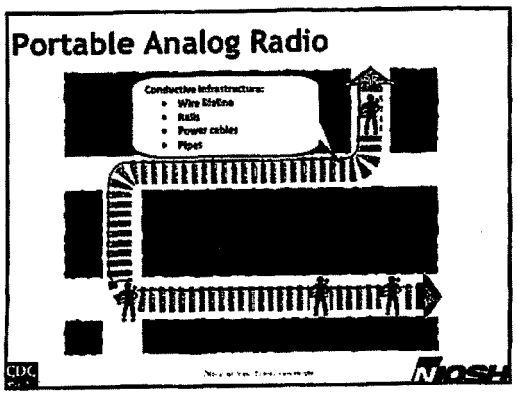
CDC NIOSH

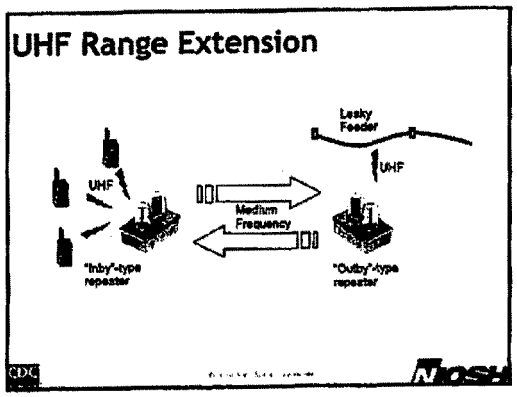
Analog Communication Modes

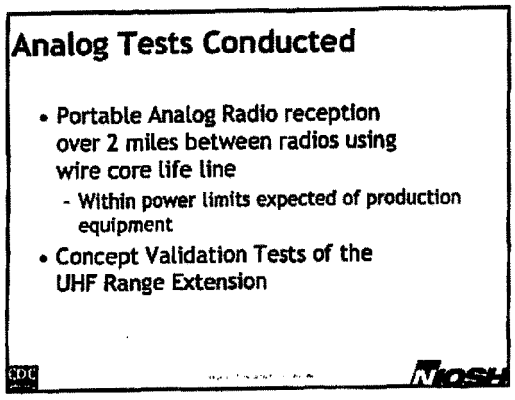
- Analog Voice, UHF/VHF interface
  - Portable Analog radio provides radio to radio communications (MF only)
  - Analog repeater provides range extension to leaky feeder and analog radios (UHF/MF)
- Initial Product Deliveries Analog Medium Frequency
  - PAR - Portable Analog Radio
  - Analog Repeater (UHF/MF)

CDC NIOSH

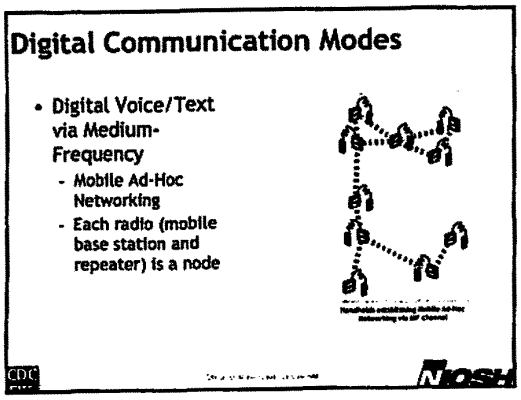
38173-12.eps

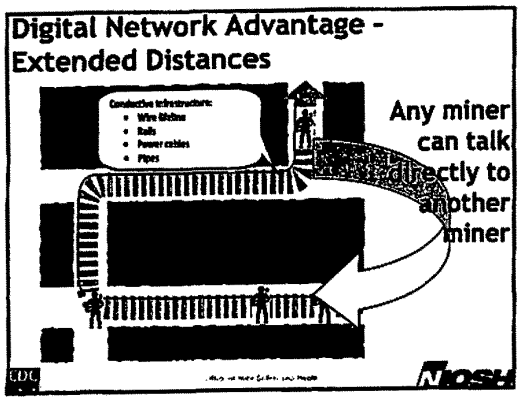

Portable Analog Radio
Conductive Infrastructure:
Wire lifeline
Rails
Power cables
Pipes
CDC
NIOSH

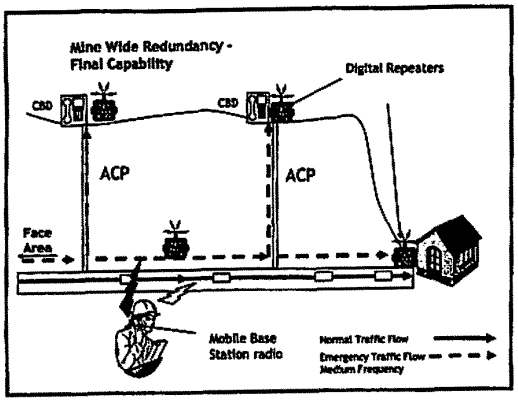

UHF Range Extension
Leaky Feeder
UHF
UHF
Medium Frequency
"Inby"-type repeater
"Outby"-type repeater
CDC
NIOSH


Analog Tests Conducted
• Portable Analog Radio reception over 2 miles between radios using wire core life line
- Within power limits expected of production equipment
• Concept Validation Tests of the UHF Range Extension
CDC
NIOSH

38173-13.eps

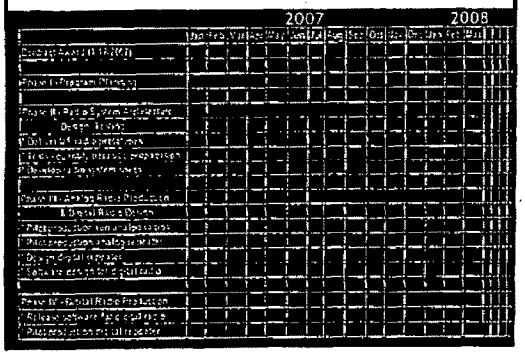

Digital Communication Modes
• Digital Voice/Text via Medium-Frequency
- Mobile Ad-Hoc Networking
- Each radio (mobile base station and repeater) is a node
CDC
NIOSH


Digital Network Advantage - Extended Distances
Any miner can talk directly to another miner
CDC
NIOSH


Mine Wide Redundancy - Final Capability
Digital Repeaters
CBD
CBD
ACP
ACP
Face Area
Mobile Base Station radio
Normal Traffic Flow
Emergency Traffic Flow
Medium Frequency

38173-14.eps

Kutta Consulting Schedule



Deliverable Summary Table

Description	Frequency of Operation	Mode of Operation	Production Category	Quantity	Timeframe (contract month)
Handheld	[illegible]	Analog	Prototype	2	7
Portable Analog Radio	[illegible]	Analog	Production	4	13
Analog Repeater	[illegible]	Analog	Production	3	13
Mobile Base Station	[illegible]	Digital	Production	12	14
Digital Repeater	[illegible]	Digital	Production	3	14

What's next?

- Develop Propagation Model to understand factors that affect range
- Perform bore hole and buried cable tests to validate hardening assumptions
- Develop Digital Mesh Protocol
- Identify Network Interface Support
- Accept delivery of initial analog products, early 2008

CDC NIOSH

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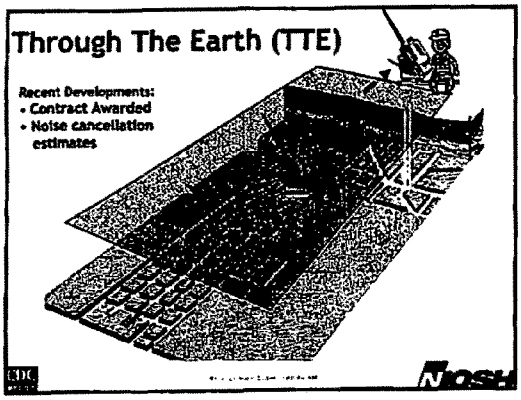

A Magnetic Communication System for Use in Mine Environments

- CDC Contract #200-2007-22843
- Lockheed Martin Corporation
  Syracuse, NY

CDC NIOSH

Objective

- To develop and demonstrate a two-way through-the-earth communication system for mines

CDC NIOSH

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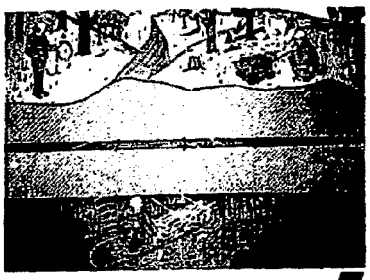
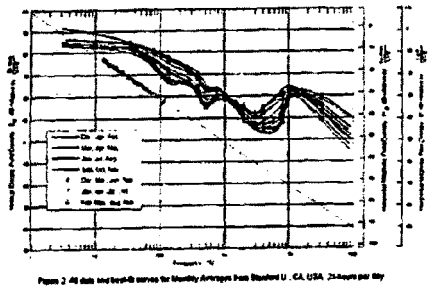
Through-the-Earth Communications



Through-the-Earth Transmission Distance is Affected by:

- Transmitter power
- Earth conductance
- Receiver Sensitivity
- Data Rate
- Noise



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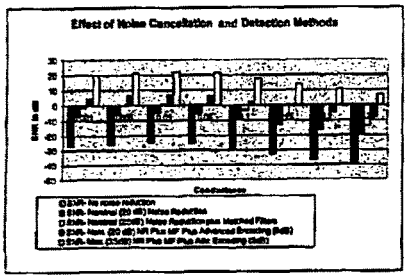
Noise Cancellation

- Achieve 20 dB with conventional techniques
- Up to 40 dB with correlated noise reduction

Correlated Noise Reduction

- Used in radar to eliminate environmental noise
- Used in Very High-Speed DSL (VDSL) communications to remove common-mode noise

Projected Performance vs. Rock Conductance



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Transmission Rates

- 2.5 Kbps - Real time digitized voice
- 500 bps - Voice mail with data & text
- 100 bps - Digital data & text
- 10 bps - Text @ 1 keystroke per second

Underground Transceiver

- Through-the-earth and parasitic propagation modes
- Low power (12 Watts, 12 Volts)
- Briefcase-size hardware
- At fixed location
- Beacon mode

Project Status

- September, 2007 - Contract award
- Software development
- Laboratory hardware integration

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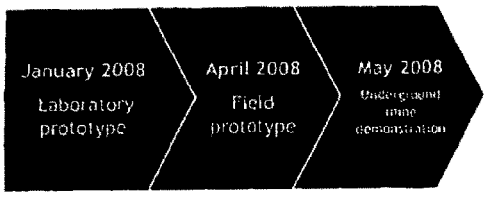
Project Milestones

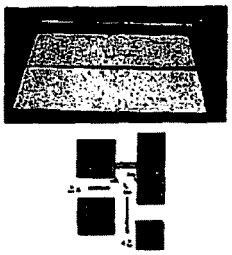


Coverage Enhancements

- Coverage Enhancement testing is being conducted to determine methods to achieve "mine wide coverage"
  - Reflectors
  - "Traveling wave" antennas
  - Supplemental Antennas

RF Reflector Testing

- Reflector testing conducted using alternate reflector locations: side, center, corner of entry
  - Reflectors provide > 10 dB signal improvement
  - Performance varied by location with center providing best results, but side reflector location also showed significant improvement
- RF reflectors improve cross-cut coverage and assist in optimum node placement for 100% coverage



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Hardening

- Research is planned to relative to hardening techniques
  - RIO mine buried conductor and cable testing
  - Joint testing project with CSIRO of a buried fiber system
  - Various projects being formulated to determine forces and other factors that systems need to withstand during disasters

NIOSH Tracking Objectives

- Investigation of accuracy achievable with different types of systems
- Investigation of requirements and suitable means for getting location information out of the mine
- Development of tracking systems
  - Zone or proximity based systems (includes RFID tags)
  - Radio location "node" based technologies
  - Infrastructure "autonomous"

Tracking System Contract - Goals

- Wearable tracking system for each miner
- Independent of mine infrastructure
- Continues to operate post-accident
- 50-foot accuracy
- Miner location data available at surface

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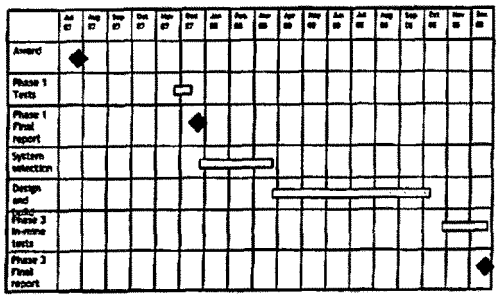
Tracking System Contract

- Phase 1 (5 mo.)
  - Develop and demonstrate a prototype tracking system
  - Feasibility report
- Phase 2 (3 mo.)
  - System design
  - MSHA approval
- Phase 3 (6 mo.)
  - Manufacture system
  - Long term test and evaluation in a coal mine

Schedule



Tracking System Contract

- Two phase 1 awards:
  - Inertial navigation sensor

    Extreme Endeavors, Philippi, WV
  - Reverse radio frequency identification system

    SYColeman, Fairfax, VA
- One system proceeds to phases 2-3

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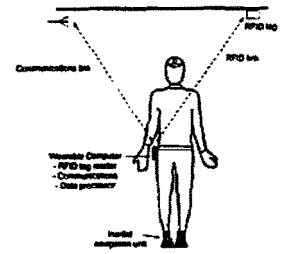
Inertial Navigation

- Extreme Endeavors
- U.S. Army CERDEC

Inertial Navigation with RFID Correction

- Sensor tracks miner's position based on movement or gait
  - Dead-reckoning using accelerometers and gyroscopes in an INU by CERDEC
  - Micro-electro-mechanical systems (MEMS) allow for small size, low cost
- RFID tags placed in known locations allow for system correction

Inertial Navigation with RFID Correction



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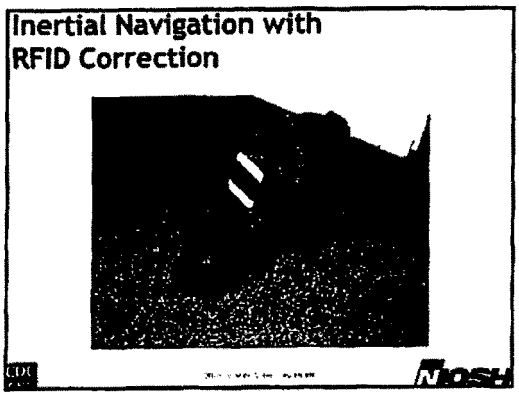
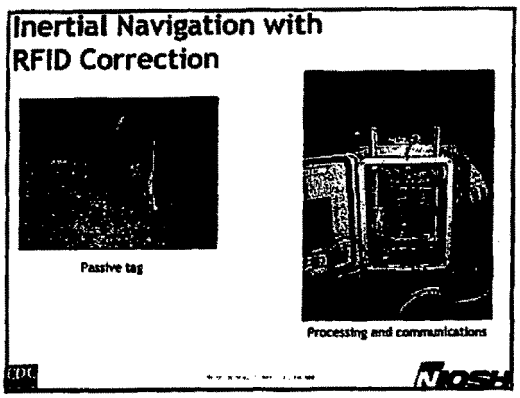
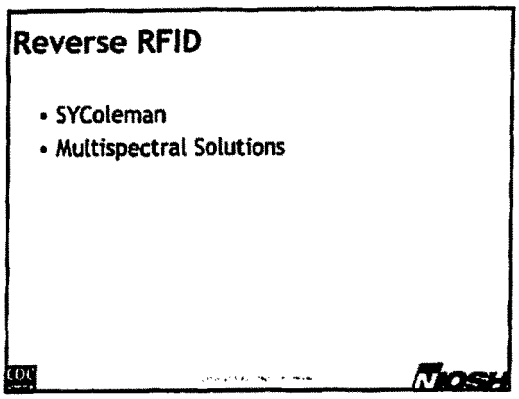

Inertial Navigation with
RFID Correction
CDC
NIOSH


Inertial Navigation with
RFID Correction
Passive tag
Processing and communications
CDC
NIOSH


Reverse RFID
• SYColeman
• Multispectral Solutions
CDC
NIOSH

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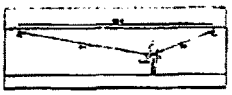
Reverse RFID

- Active RFID tags installed at regular intervals throughout mine
- Tag reader worn by miner
  - Tags encoded with location
  - Reader determines distance to nearest tags
- Location data stored on wearable computer and transmitted to communications system

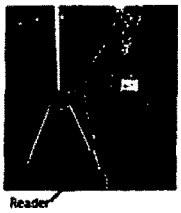


Reverse RFID

- Ultra-wideband communications scheme
- Accurate ranging
- Longer range than passive tags
- Extremely low tag transmit power (8 yr battery life)
- Tags are automatically geo-registered using centralized tag detection and ranging system

Reverse RFID

Ultra-wideband RFID tag



Reader

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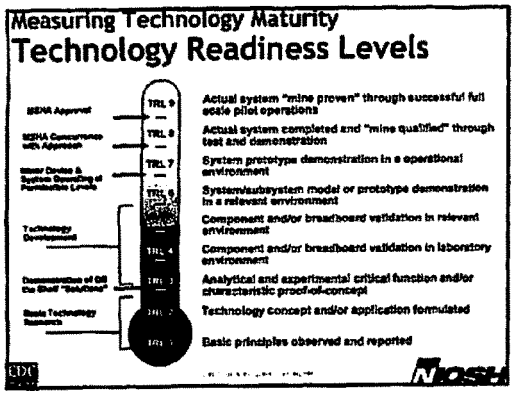

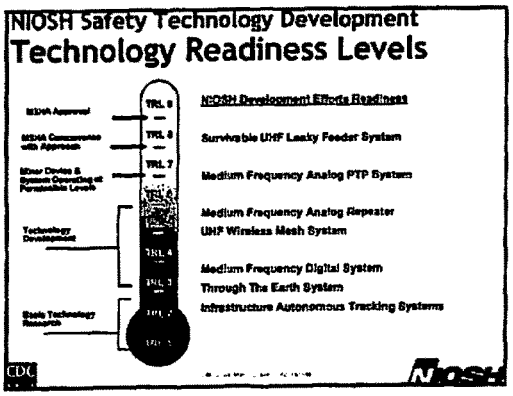

On the Horizon

Additional projects are being planned or considered for 2008 and beyond:

- Acoustic communications research
- CRADA with Rockwell International for adaptation of soldier radio EPLRS
- IAA with NIST for developing simulation models
- CRADA with SPRINT/NEXTEL to investigate IDEN DAS
- IAA extension with JSC for computational support relative to RF hazards and modeling

CDC NIOSH

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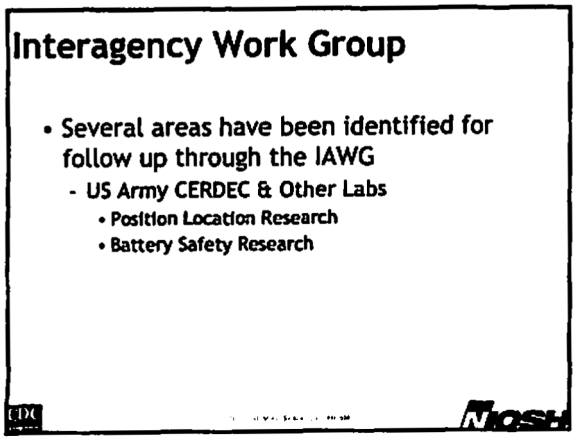

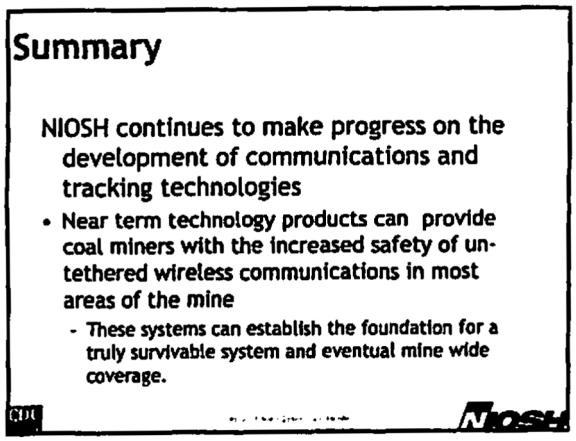

SENATOR MURRAY

Question 1. After reviewing the details of the Mine Disaster Family Assistance Act, how helpful do you think this initiative could be to the families of mine victims and mine operators? Do you have any recommendations?

Answer 1. I am hopeful that this can be a valuable tool for families that lose their loved ones as a result of a tragic disaster. For many years, families have been placed aside and not dealt with in a respectful and proper manner.

SENATOR ISAKSON

Question 1. Have you had a chance to review the official MSHA investigation reports from Sago, Darby, and Aracoma mine disasters? If so, do you believe these reports were done in a biased manner? Similarly, do you believe these reports were done in a careless or hasty manner?

Answer 1. Yes and to a certain degree yes. They could have gone farther.

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Question 2. Do you believe that MSHA's resources are allocated properly? How would you recommend MSHA target their enforcement efforts?

Answer 2. All miners have ever asked is that the agency enforce the laws that they have on the books. If this were to be done across the board, miners would be safer today. Is there room for improvements? Yes. Hopefully with the passage of the Miner Act, and now the S-Miner Act that Congress just passed, additional protections will be put into place along with the hiring of additional inspectors to better protect our miners in the future.

SENATOR HATCH

Question 1. Are you aware of effective policies implemented at the State level to promote mine safety? What areas of State involvement have been the most effective in promoting safer mines?

Answer 1. Although they may not have gone far enough, I am hopeful the recommendations sent to the Governor from the Utah mining Commission will help the State to be more pro active towards protecting miners health, safety, and training.

Question 2. Do deep underground mining operations in Utah require special safety measures in the areas of communications, miner tracking, air supply, and rescue chambers?

Answer 2. All operators should be required to comply with the Miner Act, as all mines in the country are required. Each mining State has its own uniqueness that needs to be dealt with. Although the recommendations of the Utah mining Commission may not have gone far enough, hopefully the Governor will take it to the level it needs to overcome any roadblocks of conditions that exist in Utah that other States don't have.

Question 3. Do the mining plans for deep underground mining operations in Utah require a higher level of scrutiny for safety than other operations?

Answer 3. No all mining operations across the country deserve a high level of scrutiny for approving plans.

Question 4. In addition to MSHA, what parties, including the State, should be involved in reviewing of the mine operators' overall mining plan for the purpose of promoting mine safety?

Answer 4. The miners.

Question 5. Do miners who are employed in Utah mines require specialized training due to the deep underground conditions in which they work?

Answer 5. No, but hopefully more detailed training will occur.

Question 6. Do mine rescue teams and other emergency responders need special training and additional emergency response support for the risks posed by deep underground mining in Utah?

Answer 6. This should be covered under the passage of the Miner Act.

Question 7. Is the current MSHA regulatory structure designed and staffed to address the safety issues associated with the underground mining technique known as retreat mining?

Answer 7. No response until I have had a chance to review MSHA's final investigation results of Crandall Canyon.

Question 8. Are there areas of technical expertise that are especially well-suited to address the unique safety issues associated with deep underground mining in Utah?

Answer 8. Current law provides this if properly enforced. Before budget cuts took place, MSHA had experts in the field of roof control specialist as well as other areas that dealt with their areas of expertise only. Because of the lack of manpower, they are taken away from these duties to help finish regular inspections at the mine sites, therefore spending less time on their primary duties.

Question 9. Are there safety benefits in having the State involved with MSHA in the review and approval of mine operators' emergency response plans?

Answer 9. Yes.

Question 10. What role should State and local government play in the emergency response to a critical incident involving an underground coal mine?

Answer 10. Hopefully the Utah mining Commission recommendations will help spell this out. We found this was of great importance based on testimony before the Commission.

Question 11. What are the areas of greatest potential for effective partnerships involving Federal, State, and local government in promoting mine safety? (E.g., training, inspection, accident prevention, accident response)

Answer 11. All of the examples given in the question plus communication.

Question 12. Do you have any specific recommendations for Utah State Government that would increase mine safety and help prevent an incident like the Crandall Canyon Mine disaster from ever happening again?

Answer 12. I have addressed these with the Utah Mining Commission. I think that it is of great importance that the State of Utah establishes a division or office of miners health safety and training.

RESPONSE TO QUESTIONS OF SENATOR ENZI BY ROBERT FERRITER

Question 1. Would overall mine safety benefit from re-ordering our priorities, and in a world of finite resources, devoting an increased share to research, the acquisition of more technical expertise and the development of better safety equipment?

Answer 1. Overall mine safety, especially in western coal operations would clearly benefit from admitting mistakes were made beginning in 1995 as part of Federal budget cuts and re-ordering funding priorities. As mentioned in my testimony and as evidenced by the Crandall Canyon tragedy, arguably the most significant impact on western coal mine bump remediation occurred when MSHA closed its Denver Safety & Health Technology Center and the Bureau of Mines was abolished. These two budget actions eliminated competent bump control experience within MSHA and forward looking research conducted at the BOM's Denver Research Center. In spite of valiant efforts to save these organizations, the impact of the decisions to eliminate them were somehow justified, rationalized and minimized by arguing that their functions could be easily handled from eastern offices or from the existing NIOSH office in Spokane, Washington. In reality, these offices appear to have shown little interest and may not have received the proper resources to provide the necessary technical support to western coal operators. Now, years later, we see the impact of these decisions.

The more pressing question that needs an answer is . . . how could the Crandall Canyon tragedy occur? I offer the following observation. MSHA's District 9 in Denver does not maintain the technical expertise to review high-risk mine design plans. MSHA requires an operator to justify (prior to approval) the safety of any proposed roof control plan. Various consultants are retained by the operator to perform risk analyses. Problems arise because MSHA often lacks adequate technical support. Having only past experience and common sense, the approving official in MSHA's District 9 office may primarily rely on the consultant's report as the basis for a decision. The operator of course is concerned about the safety of the workforce, but at the same time is concerned about production. The operator may not be willing to spend a lot of money on engineering analyses. So the operator is able to justify, rationalize and minimize the importance of a more thorough assessment in a high risk bump prone area to get his roof control plan approved by MSHA. The consultant is somewhat caught in the middle. The consultant will only run the amount of analyses required to satisfy the operator (his boss) or he will not be retained. The problem is not of any one entity, but of the system. As I see it, the solution is to fix the approval system by re-establishing technical expertise, both office and field experience, in close proximity to where bump problems occur, and encouraging additional research of the conditions which contribute to the occurrence of bumps, and developing mining techniques that reduce the probability of these occurrences. The $1 million seed money recently provided to NIOSH by the committee to study retreat mining at depths greater than 1,500 feet is a good start, but not the final solution.

Question 2. Is there any comprehensive research currently available that has studied pillar stress levels as a predictive factor in coal mine bumps?

Answer 2. Prior to the abolishment of the U.S. Bureau of Mines in 1996, two significant references were published: IC 9315—Proceedings of the Workshop on Coal Pillar Mechanics and Design (1992); and Special Publication 01–95 Proceedings: Mechanics and Mitigation of Violent Failure in Coal and Hard-Rock Mines.

The papers published in Special Publication 01–95 (noted above) were presented at a U.S. Bureau of Mines technology transfer seminar, and describe the causes of violent material failure in U.S. mines (rock bursts and coal bumps), measurement techniques for monitoring events that result in violent failure, and mitigation techniques for controlling failure. Specific factors contributing to violent failure are identified on the basis of geotechnical monitoring in 16 U.S. hard-rock and coal mines and on the statistical analyses of 172 coal bump events. New monitoring and anal-

ysis techniques developed as tools for assessing violent failure; geo-tomography methods that provide new capabilities for the study of material failure and stress changes over large areas; and seismic methods for determining source locations, calculating energy release, and determining source mechanisms are described. Fair correlations have been established among seismic parameters, elastic stresses, face support load, and violent events. USBM studies identified the advantages using both yielding and stable pillars for coal mine bump control, and the practical aspects of implementing a de-stressing program to mitigate coal mine bumps.

Since the abolishment of the USBM and the transfer of MSHA's Denver Safety and Technology Center positions to eastern locations, a limited amount of new research in this area has been produced. The state-of-the-art essentially remains at the 1996 level. It should be noted, however, that extensive research has been done on this topic in South Africa, Canada, and possibly other countries, e.g., Russia. At present, coal mine bumps and rock outbursts cannot be predicted, but the seismic activity associated with changing stress levels can be monitored to estimate the increased level of risk for entering impacted work areas. The case studies documented in NIOSH's computer code called ARMPS (Analysis of Room and Pillar Systems) do embrace, to a limited extent, the pillar stability factors in the bump prone areas of Colorado and Utah, and give a lower limit for a stability factor (0.85), beyond which the risk for a coal mine bump increases significantly. The ARMPS software plots pillar stresses that can be expected as well.

In summary, although minimal new research into the coal bump phenomena has been conducted since the closing of the USBM, the above-noted publications provide a substantial body of information on conditions which have contributed to coal mine bumps, and the techniques to mitigate their occurrence. NIOSH's ARMPS program was updated in 2003 to include mines located at great depths (generally 1,500 feet or deeper). In addition, the LaModel stress analysis tool has been available for quite some time to assist mining operations in assessing their site specific conditions. Although, a substantial body of knowledge is available, research needs to continue to ensure safer mining conditions as coal reserves extend under deeper cover. New researchers and engineers need to be trained to apply the research and correctly interpret model results. As of this date, to my knowledge, no focused effort has been made to reestablish the expertise lost following the closure of MSHA's only western technology center, or the coal mine bump research program at the USBM's Denver Research Center. If knowledgeable researchers and engineers experienced in coal mine bump mitigation were available to the Crandall Canyon mine operator and MSHA for consultation, the mine planners would have been cautioned against initiating the proposed mining plan.

Question 3. Is there any way to reliably predict seismic activity?

Answer 3. To my knowledge, seismic activity cannot be accurately predicted, although it certainly increases with mining activity extending deeper than 1,500 feet. Seismic monitoring can be used to get a sense of increasing seismic activity in an area of a mine, and the related risk it represents.

Prior to the closure of the USBM's Denver Research Center, significant advances were made in studies conducted to monitor micro-seismic activity surrounding active coal mine workings. These studies were coupled with static pressure cells installed in pillars to monitor pressure buildup in individual pillars just prior to failure. To my knowledge, this research was minimized with the closing of the U.S. Bureau of Mines.

Question 4. Could you explain in a bit more detail what you mean by a "risk-based sensitivity analysis?"

Answer 4. Risk-based sensitivity analysis involves assessing the impact of different parameters on mine safety. Using a single or very few runs of any structural analysis computer modeling program does not properly frame the risk (probability of failure). Rather, varying the values of input parameters over their practical ranges is important. Geotechnical modeling should address at least best-case, average-case, and worst-case scenarios in assessing the stability in active mining areas. These input parameters should include, but not be limited to:

a. coal strength (unconfined and confined)
b. peak strain in an element of the model
c. coal, roof and floor modulus of elasticity
d. Poisson's ratio (ratio of lateral/longitudinal strain of compressed rock)
e. angle of internal friction
f. depth of cover
g. progressive mining steps from initial entry development through the completion of retreat mining

By performing multiple analyses, a practical range of stability factors can be calculated under various scenarios of mining (mining entries and crosscuts in the barrier pillar, as well as, full or partial retreat of the pillars created in the barrier).

For illustration purposes, if one uses NIOSH's ARMPS program and if one-half of the calculated stability factors are above 0.85 and one-half are below 0.85, then intuitively, there is a significant risk (possibly as high as 50 percent) for pillar failure in a region prone to coal mine bumps.

A consulting firm does only the analysis required in the scope of work sanctioned by the mine operator, who pays for the analyses. If a risk assessment with a sensitivity analysis is not requested by the mine operator, then it will not be done, i.e., it costs more money to run many more analyses (varying parameters). If MSHA would require a more thorough risk-based sensitivity analysis (or perform these analyses themselves), then the company would be required to do it in order to gain approval of the proposed mining plan. Requiring a sensitivity analysis with varying parameters would frame the level of risk when mining in bump-prone mines.

RESPONSE TO QUESTION OF SENATOR ISAKSON BY JEFFREY L. KOHLER

Question 1. Last time you were here, we discussed "piggy-back" technology whereby a trapped miner can replenish his oxygen supply underground. What is the status of that research?

Answer 1. The research has made good progress and should be completed early in 2008. We expect to receive the first commercial products resulting from this research later in 2008.

The goal of the research is to develop a new generation of belt wearable self-contained self-rescuer (SCSR) respirators, and the most important feature is the "docking" or "piggy-back" capability that would allow a fresh oxygen cartridge to replace the spent one without the need for the miner to remove his mouthpiece. This new device would include other improvements as well.

NIOSH awarded a contract to Technical Products, Inc. (TPI) in February 2007 to design and fabricate an oxygen-supplying SCSR respirator with "piggy-back" technology to allow a trapped or escaping miner to replenish his oxygen supply while underground. The new SCSR design includes a docking port mechanism that allows the user to plug in additional oxygen units without opening the breathing circuit to the potentially poisonous atmosphere. The docking port requires that a second oxygen unit be plugged in before the valve can be repositioned to the alternate port. Other innovative materials and design features will make the SCSR easier to manufacture and more comfortable to wear and use.

Researchers completed testing of the prototype on August 8, 2007. The device met the requirements of the contract and regulations for SCSR certification. However, a subsequent focus group of industry representatives, assembled in August 2007, provided recommendations for making the device easier for the miner to wear. A contract for the Ergonomically Enhanced Self Contained Self Rescuer (E2SCSR) was awarded in November 2007, and the first production units should be delivered to NIOSH for initial testing by March 2008. In-mine testing is expected to begin by May 2008. Commercial versions of the new SCSR should be submitted to NIOSH for certification testing by the fall of 2008.

RESPONSE TO QUESTIONS OF SENATOR ISAKSON BY ROBERT FERRITER

Question 1. Have you had a chance to review the official MSHA investigation reports from Sago, Darby, and Aracoma mine disasters? If so, do you believe these reports were done in a biased manner? Similarly, do you believe these reports were done in a careless or hasty manner?

Answer 1. I have read in detail the MSHA investigation report on the Sago mine; however, due to pressing work demands, I have only conducted a cursory review of the Darby and Aracoma investigation reports. Based on these reviews, I believe that the reports were done in an honest, forthright manner and basically documented the disasters and the rescue efforts in a deliberate, factual manner. MSHA should be commended for these reports.

However, that said and to draw your attention to the more important issue of an independent investigative panel for mine disasters, I would like to comment on the MSHA initiated Internal Review Reports issued on the Sago Mine, the Aracoma Alma No. 1 Mine, and the Darby No. 1 Mine, all issued on June 28, 2007. These reports severely criticize MSHA's enforcement of mandatory regulations written to safeguard underground coal miners. Although the writers of the reports, indicate in all three reports, and specifically state in the Darby report, that "Although the internal review team identified significant deficiencies in MSHA's actions, the team did not find evidence that these deficiencies cause or contributed to the fatal explo-

sion." (Refer to MSHA Internal Review Report on Darby No. 1 Mine Explosion on May 20, 2006, Harlan County, KY.) This report was issued on June 28, 2007.

A random selection of enforcement deficiencies noted in a cursory review of these internal review reports reveal:

ARACOMA MINE—MSHA DISTRICT—4

• Inspectors at Aracoma failed to notice absent stoppings, failed to act on chronic accumulations of coal dust, and failed to discover mis-marked escapeways, non-functional firefighting equipment, a deficient carbon monoxide monitoring system, and other hazards.

• "Inadequate supervision and management contributed greatly to the failure of the MSHA personnel to provide an adequate level of enforcement" at Aracoma.

• Inspectors at the mine disproportionately made required spot inspections at fans and portals on the surface, rather than traveling underground.

DARBY MINE—MSHA DISTRICT 7

• Inspectors apparently failed to notice numerous missing entries in the required safety examination books.

SAGO MINE—MSHA DISTRICT 3

• Inspectors performing regular inspections neglected to inspect SCSR's, observe or discuss fire drills, travel with pre-shift examiners, check the carbon monoxide monitoring system and cover some other aspects of a complete regular inspection.

In my 26 years of employment with MSHA, I have never seen such harsh internal reviews of MSHA actions, and Assistant Secretary Richard Stickler deserves great credit for "blowing the whistle" on his own agency and establishing the new Office of Accountability. I sincerely hope that this office will enhance MSHA's enforcement programs for the safety of our miners. In my career in MSHA, I can remember instances where such criticisms would never have been published, and in fact were removed from final reports.

With respect to the Crandall Canyon disaster, MSHA is even more involved, as it has presumably technically reviewed, inspected the area and approved the mine operator's inadequate mining plan (retreat mining of massive barrier pillars). As you will note in the NIOSH Critique of the Agapito report recommending "full pillar extraction" in the North and South barrier pillars, NIOSH states that the calculated stability factors were substantially below recommended values and both of the ARMPS and LAMODEL analysis programs were incorrectly used. However, MSHA accepted and approved the mining plan. MSHA was the last line of defense between life and death for the mine's miners and the rescuers killed in the Crandall Canyon disaster. MSHA failed to provide that defense. Therefore, I stand solidly behind my recommendation:

> "Accidents involving multiple fatalities should be investigated by a Federal entity independent of the regulatory Department. To protect the validity of the investigation and to ensure impartiality in fact finding, an independent entity needs to conduct these disaster investigations. This will allow an unbiased determination of process errors and misjudgments by all involved parties, and speed any requirements for corrective actions to further improve workplace safety for our Nation's most valuable resource—the miner."

Even though the recent internal reviews are admirable, the tendency to absolve the Agency of any misconduct, or staffing or technical review inadequacies still exists. Therefore, only an outside, independent investigation will convince miners, unions and the public that MSHA is committed to improving its enforcement activities and protecting the safety and health of our Nation's miners. An outside, independent investigation of the Crandall Canyon disaster would be a major step in restoring MSHA's severely damaged public image. This investigative entity should be focused on investigating disasters at industrial facilities (e.g. refineries, manufacturing facilities, mines, etc.), and should be structured similar to the National Transportation Safety Board. Only in this manner can miners, unions and the public be assured that the Federal oversight Agency is doing the job it is mandated to do, and that problems that may require corrective actions can be quickly and fairly corrected.

MSHA's involvement in the Crandall Canyon disaster is undeniable. MSHA's questionable approval of a reckless mining plan must be investigated and explained in an open and honest manner. Some will say that we are already seeing an attempt to direct the outcome of any investigation by the appointment of two former MSHA employees (Earnie Teaster and Joe Pavlovich) to conduct the Department of Labor's

(DOL) investigation of the incident. Although these gentlemen may be the most honest people in the world, the mere fact that anyone from MSHA was chosen to conduct a DOL oversight investigation breeds thoughts of insuring the outcome (favorable to MSHA and DOL) of the investigation. I believe many people would see a conflict of interest here. Only by an outside, independent investigation and necessary corrective actions can miners, unions, operators and especially the public regain their trust and respect for MSHA.

Question 2. Do you believe that MSHA's resources are allocated properly? How would you recommend MSHA target their enforcement efforts?

Answer 2. In my opinion, MSHA's resources are poorly allocated and geographically distributed. If one was to conduct an unbiased and factual study of the location of the Nation's coal and metal and nonmetal mines and compare the number of inspectors servicing the various centers of mining activity with the number of operating mines at these locations, I believe the study would show a dramatic difference in the number of MSHA inspectors at eastern locations, while western mines are serviced by a significantly lower number of inspectors per mine. Accentuating this presumed inspector deficiency at western mines is the significantly greater dispersion of western mines (eastern inspectors can generally travel to several mines in 1 day and be back home that night; whereas, western inspectors may need to travel 1 whole day just to get to a mine). Thus, western inspectors most likely spend considerably more time traveling, and less time inspecting, than their eastern counterparts.

A glaring example of poor resource allocation is the existence of two technical centers within approximately 40 miles of one another near Pittsburgh, PA while no technical support group exists outside of this area. Therefore, little, if any, technical support is readily available to western enforcement districts or mine operators.

Earlier in my answers to your first question, I cited MSHA's internal reviews of the Sago (District–3), Aracoma (District–4) and Darby (District–7) mines which indicated staffing deficiencies in technical areas such as ventilation plan reviews, electrical specialists, and other technical specialists. With two technical centers within a 1 day's drive to any of these eastern coal districts, one wonders why MSHA management did not attempt to assign some of the technical center's specialists to temporarily fill the staffing shortages at the District level. Is this a reflection on MSHA management's ability to maximize the use of scarce resources? I consider this an enlightening example of MSHA's poor resource allocation.

To more effectively target MSHA enforcement efforts I would strongly urge Congress to reduce the mandatory four (4) underground inspections per year to two (2) mandatory underground inspections per year. This would free-up thousands of underground inspector hours per year to address safety issues in the less safe mines. Another way to accomplish this increased emphasis on poor performers without increasing inspector resources would be to allocate more inspector hours during each of the four quarters to poor operator inspections by cutting inspector hours at good operations with proven records (based on Pattern of Violation analysis). Then, I would reinforce to industry that it is their primary responsibility to safeguard their work force and comply with all safety regulations. If these measures prove ineffective, I would raise the monetary penalty significantly at all levels.

I would use the pattern of violation program to target mines with poor safety performances, and expend a large portion of the inspection hours gained from reducing the four (4) mandatory underground inspections per year, or reallocation of inspection hours to these mines. In other words:

> "If management is actively addressing safety issues and holding accident occurrences to a minimum, they will see less of MSHA. If management is not addressing safety issues and the mine is experiencing a high number of accidents, they can expect to see a lot of MSHA inspectors."

Give MSHA District Managers the flexibility to manage their limited resources.

However, to use the pattern of violations program as a tool to target poorly performing mines, some modifications to the existing program would probably be required, and, in all fairness, give the operator a better understanding of how he is being evaluated. The program's general formula should be modified to adjust the index number by a mine's major hazards experience, as gleaned from reported data on fires, explosions, roof falls, bumps, etc., and violations related to the major hazards, such as citations on fire fighting systems, rock dusting, combustible material accumulations, roof falls, escapeways, mine inspections for major hazards, ventilation and methane control plan, roof and rib control plan, etc.

In addition to these actions, I would anticipate scheduling more spot inspections of critical items such as ventilation stoppings, roof control and ventilation plan compliance, rock dusting in coal mines, accumulation of combustible materials, and

other hazardous occurrences as identified from MSHA's accident and citation data bases.

I would encourage more interaction with the miner's representatives and union safety committee men at all mines. These miners know their mines and the hazards being confronted.

I would incorporate into the law a requirement that all mines spend 1 day per year reviewing accidents that occurred at that mine during the previous year, the cause of the accidents, and the corrective actions taken by the mine. If the mine accumulated less than five (5) lost-time accidents, per year, the allotted time could be spent on other applicable safety and health training.

I believe these actions would send a strong message to the industry, and give MSHA the ability to apply its resources to the "problem mines" and the most significant safety problems in a timely manner; thus improving safety and health conditions industrywide.

RESPONSE TO QUESTIONS OF SENATOR HATCH BY DR. JEFFREY L. KOHLER

Question 1. Are you aware of effective policies implemented at the State level to promote mine safety? What areas of State involvement have been the most effective in promoting safer mines?

Answer 1. A number of States, including Pennsylvania and West Virginia, have mining agencies that provide oversight and guidance for promoting miner health and safety. We are not aware of evaluations investigating the effectiveness of these State activities, but the State agencies may have conducted or funded evaluations of their own activities.

Question 2. Do deep underground mining operations in Utah require special safety measures in the areas of communications, miner tracking, air supply, and rescue chambers?

Answer 2. Underground mining operations have some conditions that need to be dealt with on a mine specific basis, and there are also conditions of particular concern across a certain region or within a specific coal basin. For example high gas content, and subsequently high methane emissions, are of particular concern in the underground coal mines in Alabama and Virginia. While all underground coal mines have to deal with methane emissions, these mines have to provide additional engineering solutions to prevent the accumulation of explosive concentrations of methane. The underground coal mines in Utah, because of the topography, the depth of mining operations, and the coal characteristics, face high stresses and the potential for coal bumps. Bump-prone mines also exist in Colorado, Virginia and West Virginia, and mines in those areas have to be designed and operated accordingly. Each mine must conduct major hazard risk analyses and plan to manage their principal risks, such as gas explosions or coal bumps.

Question 3. Do the mining plans for deep underground mining operations in Utah require a higher level of scrutiny for safety than other operations?

Answer 3. All underground coal mining operations require a high level of scrutiny. The level of risk associated with each particular hazard may differ for mines in different parts of the country but risk assessment and management are important for every mine. Each mine plan should be scrutinized with a particular emphasis on the highest risk hazards of that mine. For example, the ground control plan for a deep mine in Utah would address the bump hazard, and the ventilation control plan for a deep mine in Alabama would address the hazards associated with high-methane liberation rates. Nonetheless, a mine in Utah would also address explosion hazards and a mine in Alabama would also address failure-of-ground hazards.

Question 4. In addition to MSHA, what parties, including the State, should be involved in reviewing of the mine operators' overall mining plan for the purpose of promoting mine safety?

Answer 4. Mining plans should be reviewed comprehensively and rigorously. Any system of safety review, such as in mining, should include safeguards commensurate with the risks, but NIOSH does not have a view regarding the extent to which such safeguards should be internal to MSHA or should involve additional reviews by other agencies.

Question 5. Do miners who are employed in Utah mines require specialized training due to the deep underground conditions in which they work?

Answer 5. Each specific mining operation has training requirements that address concerns and issues that are particularly relevant to that particular site. These training topics are generally developed as part of the MSHA-mandated training re-

quirements and are covered during annual refresher training. Thus, Utah miners should be given specific training on coal bump hazards as part of the MSHA-mandated training course.

Question 6. Do mine rescue teams and other emergency responders need special training and additional emergency response support for the risks posed by deep underground mining in Utah?

Answer 6. All mine rescue teams should be trained to deal with the hazards and operational issues specific to the mine designs and the geological and geotechnical conditions of the types of mines where they would be responding. Training at the mine site is optimal and the mine rescue team members should be composed of experienced miners.

Question 7. Is the current MSHA regulatory structure designed and staffed to address the safety issues associated with the underground mining technique known as retreat mining?

Answer 7. The current MSHA regulatory structure provides the means to address safety issues associated with retreat mining. For example, 30 CFR Part 75, Subpart C, "Ground Control" addresses the principal hazards associated with retreat mining. Moreover, 30 CFR 75.220, which requires an approved roof control plan for each mine, requires that the particularly relevant conditions and attendant hazards are addressed.

NIOSH is not an expert on staffing at MSHA but is aware that MSHA employs some recognized and respected ground control engineers who evaluate ground control plans, including those for retreat mining operations.

Question 8. Are there areas of technical expertise that are specially well-suited to address the unique safety issues associated with deep underground mining in Utah?

Answer 8. Specialized ground control expertise would be particularly important to address the safety challenges posed by the high stress and bump-prone mines in Utah. Ventilation expertise is also particularly important.

Question 9. Are there safety benefits in having the State involved with MSHA in the review and approval of mine operators' emergency response plans?

Answer 9. In the case of emergency response, there is often involvement by State and local agencies. Thus, presumably the State agency would provide input and concurrence on their role as it is written into a mine's emergency response plan.

Question 10. What role should State and local government play in the emergency response to a critical incident involving an underground coal mine?

Answer 10. State and local agencies can be invaluable to MSHA, as was demonstrated during the Quecreek Inundation, the Sago Mine Explosion, and the Crandall Canyon Mine Collapse. State and local officials worked closely with MSHA during these rescue efforts providing operational support, technical expertise, and a wide range of services including security, equipment, food, water, medical, and spiritual support. The value of these local and State efforts has been documented in hearing testimony and State reports. There are also, however, important coordination issues that arise with the involvement of multiple agencies. We believe that the primary goal at the mine site during the crucial incident is the safe rescue of trapped miners. Accordingly, MSHA should have ultimate control of the site. The ancillary roles of the various State and local agencies should be planned, understood by all, and documented as part of the mine's emergency planning activities.

Question 11. What are the areas of greatest potential for effective partnerships involving Federal, State, and local government in promoting mine safety? (E.g., training, inspection, accident prevention, accident response)

Answer 11. Partnerships can be important for accident response, as discussed above. MSHA has used an "Alliance" concept with its stakeholders to promote safety in a range of areas, which it can address in more detail. NIOSH has partnerships to address specific high-priority health and safety needs of the mining community. These include partnerships on dust monitoring, mine emergency communication systems, coal and metal and nonmetal diesel emissions control, and rock shield systems. These partnerships have been instrumental in expediting advancements in these areas. These partnerships include representatives from labor, industry, Federal and State agencies.

Question 12. Do you have any specific recommendations for Utah State Government that would increase mine safety and help prevent an incident like the Crandall Canyon Mine disaster from ever happening again?

Answer 12. NIOSH is not likely to be aware of all ongoing activities but MSHA has a State grants program that might be used to improve the safety of mining operations in Utah. The MSHA accident investigation on the Crandall Canyon Mine disaster, once completed, should be useful for identifying opportunities for State involvement in improving mine safety in Utah.

[Whereupon, at 12:10 p.m. the hearing was adjourned.]

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