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**COMMENTS OF**  
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**PRESENTED AT**  
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SUBMISSION

Good morning. My name is Tony Bumbico. I'm the Corporate Safety Director for Arch Coal, Inc (Arch). Arch is the second largest coal producer in the United States. Our corporate office is in St. Louis, Missouri. We have over 3,500 employees and operate mines in Colorado, Kentucky, Utah, Virginia, West Virginia, and Wyoming.

With me today is Wendell Christensen. Wendell is a Maintenance Electrical Coordinator. He supports our underground operations in Utah and Colorado.

We're here today in response to the Mine Safety and Health Administration's (MSHA) Request for Information (RFI) on mine communication and tracking technology. Our specific objective today is to share our experience with the Personal Emergency Device, or PED, system. We appreciate the opportunity to comment, and hope that our experience will assist MSHA in future decisions related to this subject.

### **PED DEPLOYMENT**

PED systems are installed at two of our underground mines, Dugout Canyon and Sufco. Both operations are large longwall mines with excellent safety records.

Dugout is located near Wellington, Utah. It has 223 employees, and is projected to produce 4.6 million tons of coal in 2006. Sufco is located near Salina, Utah. It has 320 employees and is projected to produce 7.6 millions this year.

The PED system at Sufco was installed in 1998 at a cost of \$169,000. Dugout installed their system in 1999-2000. Both systems were purchased from Mine Site Technologies (MST). At both mines, the PED was installed as a secondary communication system, as a back-up to the primary mine pager system. Our relative success with the PED system at these two operations is best described as mixed.

At Dugout, the PED system was initially deployed on a limited basis. It has since been expanded to the current state, in which approximately 50% of the workforce at Dugout carries a PED cap lamp battery with a PED screen. The system at Dugout has been fairly reliable. There are ongoing issues related to interference with the mine pager phone system that require continual

maintenance. Overall, communication coverage has been good up to distances of 5,000-6,000 feet from the underground antenna loop.

Dugout plans to install a Leaky Feeder Radio System this year. They also plan to maintain their PED System until a better alternative is available. In addition, Dugout is reviewing alternative “miner tracking” technologies. We plan to test MST’s tracking system, and other similar systems, at Dugout later this year.

Sufco has had less success with the PED system. As a result, they have deployed the PED on a more limited basis. At Sufco, PED units were initially issued to supervisors, electricians, fire bosses, Emergency Medical Technicians, and miners working in out by areas.

The PED system at Sufco has not been reliable. The system interferes continuously with the mine pager phone system and their mine monitoring system. To date, efforts by the manufacturer and Sufco to resolve these problems have not been successful. As a result, Sufco discontinued the use of their PED system when they installed their Leaky Feeder Radio System in 2004.

## **COMMON ISSUES**

Our experience with the PED has identified some common issues. I will offer some brief comments on a few of the more significant problems we have encountered with the PED. I’m sure there are reasonable solutions to some of these issues. Others present more significant technical challenges.

### **Infrastructure Maintenance**

One common PED issue is infrastructure maintenance. As an underground mine advances, you have to continually extend the antenna system. Large mines like Dugout and Sufco have to install thousands of feet of antenna in order to maintain the loop.

Dugout has installed approximately 45,000 feet, and Sufco has installed approximately 50,000 feet, of underground antenna cable. Failure to maintain this infrastructure results in “dead spots” in coverage. We have encountered “dead spots” at both operations.

This is more than just a maintenance issue. It has potential enforcement implications. We know from experience that periodic “dead spots” will occur. We’re concerned about how MSHA will treat these incidents from a compliance standpoint.

If regulations required a PED system to be installed at all underground mines:

- Would MSHA issue violations if we encounter a “dead spot”?
- Would we have to evacuate the mine?

Given the recurring nature of this problem, these are issues that our operations are concerned about. We need more reliable alternatives.

### **Infrastructure Vulnerability**

Another issue related to the PED, as well as other communication or tracking systems, is the vulnerability of the underground infrastructure. As MSHA is aware, this hardware is susceptible to damage from explosions, fires, and roof falls. In addition, the explosive atmosphere in a mine following a disaster may render the system inoperable for safety considerations.

In one respect, the PED system is more vulnerable to damage than other underground communication systems. In order for the system to operate, the PED antenna must form a complete loop. It requires twice as much cable as other underground communication systems. As a result, it’s twice as vulnerable to damage from an explosion, fire, or roof fall.

Some have proposed surface loop antennas as the answer to this dilemma. In some cases a surface antenna may work. They are not the universal answer, however, because at mines like Dugout or Sufco the depth of cover may exceed 2,000 feet. Many mines, particularly those in the Western States, would have to deal with surface rights issues, and installation complicated by rugged terrain, to consider installing a surface antenna.

### **Interference with Other Systems**

Our experience indicates that the PED system tends to interfere with other communication systems. This problem has been more significant at Sufco

than Dugout. At Dugout, the mine pager phone occasionally experiences a “feedback” noise when the PED is operated. This problem is normally a grounding issue that’s created when the loop antenna comes in contact with the wire mesh used to support the roof and ribs. When this occurs, they have to turn off the PED system after they send a message.

At Sufco, the “feedback” problem has been more persistent. It affects not only their mine pager system, but also the mine monitoring system. We’re not sure what causes the “feedback” problem at Sufco. It may be the result of the PED antenna running near high voltage cables or electrical cables that aren’t shielded. Since we’ve been unable to resolve this issue, the PED system is currently inoperative at Sufco.

### **Pick-up Trucks**

We’ve also experienced problems at both mines using the PED to communicate with employees in pick-up trucks. As you’re aware, the PED system alerts the miner to a problem by causing the cap lamp to flash off-and-on. It also has a secondary alarm that alerts the miner to a message.

At many underground mines, miners travel to/from their work place in pick-up trucks. If a miner leaves his/her cap lamp on in a pick-up truck, it creates a glare that obstructs their vision. To avoid the glare, the cap lamps are turned off while they’re in the truck. Consequently, the miner isn’t aware when the light flashes on/off to alert them to a PED message. Often, the secondary alarm on the PED is not loud enough to be heard over the noise generated by the pick-up truck and other mining equipment. A possible solution to this issue may be a more effective secondary warning system to alert the miner to a PED message.

### **Seam Height**

Seam height is another key factor in the effectiveness of the PED and some other underground communication systems. The seam height at Dugout averages 8-9 feet. At Sufco, it normally exceeds 10 feet. As a result, the PED systems would tend to be more effective at these operations, as opposed to mines with lower coal seams.

## **System Limitations**

The most significant issue we have with the PED is that it's only a one-way system. You can send a message, but you never know whether it's been received by the miner. The PED System represents an improved emergency notification technology, but it's limited. We feel that underground coal miners need and deserve a better emergency communication option.

## **GENERAL COMMENTS**

We feel that MST is a good company with a good product. Their PED system was clearly a major factor in the successful evacuation of the Willow Creek Mine in November 1998. The PED alert sent by the Willow Creek supervisor helped to safely evacuate 45 miners in 45 minutes.

We plan to continue to evaluate the use of the PED system at Dugout and Sufco. In addition, we are evaluating MST's PED and Tracker systems, as well as similar technology designed by other companies, at a number of our other mines.

The PED represents an improvement in emergency communication technology. In the final analysis, however, it's not good enough. We need to identify, test, and install better communication and tracking technology. We need technology that can provide:

- Two-way communication with miners underground,
- Precise tracking of the miner's location, and
- Infra-structure capable of surviving a fire or explosion.

We are encouraged by recent research initiated by MSHA in this area. In our opinion, the Agency has identified several new communication technologies with the potential to achieve our objective. (Many of these technologies have been used by the military and in other industries.) In particular, we are encouraged by the promise of systems such as the:

- Rajant Breadcrumb System
- Time Domain UWB Radar System
- Vital Alert Canary 2-Way Mine Messenger
- Transtek Partnership

- Geosteering TG Miner Tracker
- Nautilus “Buddy” Tracking System
- CEREC Subterranean Wireless Electronic Communication System

## **CLOSING**

Arch supports the research efforts initiated by MSHA in this critically important area. We are also willing to offer our mines as possible test sites for these new, promising communication technologies. We are willing to work with MSHA, NIOSH, and other interested parties to develop and implement improved emergency communication options for our employees.

However, we want to stress the importance of testing these new technologies in “real life” mine environments. Underground mines come in many shapes and sizes. Geological conditions vary significantly from region to region. Issues such as seam height, depth of cover, and surface terrain, all have an impact on how well this technology will work. What works at one mine, may not work at another.

The final solutions proposed by MSHA need to recognize that one-size doesn’t fit all. In order to improve emergency communication for our miners, we need a flexible approach that recognizes the unique characteristics of each mine. It’s imperative that we identify the “best available” technology, and test it in real mine environments to make sure it’s reliable.

We appreciate the opportunity to appear and offer comments. We’re available for any questions.