

MINE SAFETY

PA Department of Environmental Protection

January 31, 2006

OVERVIEW

The deaths of 14 miners in two separate accidents in less than a month in West Virginia have been stark reminders of how dangerous coal mining can be. But “dangerous” should not mean “unsafe.” Mine safety has improved dramatically. In Pennsylvania, enactment of various mine safety laws over the last 130 years set the stage. But these laws are now in need of substantial modernization and updating, as Governor Edward G. Rendell has stressed. Legislative changes are needed to enhance safety and protect miners.

Aside from proposing these sweeping legislative reforms, the Governor also ordered that an extensive set of mine safety improvements be implemented administratively. These changes, which are detailed in full later in this report, include: revising mine permitting and inspection procedures so DEP’s mine safety experts have a direct role in the decision-making process; putting in place stringent requirements concerning validation and verification of underground mine maps; launching a major effort to collect and digitize mine maps; and revising training protocol for the department’s Bureau of Mine Safety staff and mine workers.

With these actions, every recommendation made in the aftermath of the July 2002 accident at Quecreek Mine No. 1 in Somerset County has been acted on by this administration. The Department of Environmental Protection continues to ensure the highest standards and best protections for miners. New laws combined with the safety culture adopted by Pennsylvania’s miners, coal operators and labor organizations, such as the United Mine Workers of America, as well as intensive inspection and training programs administered by DEP, can ensure that this dangerous business remains safe.

BUREAU OF MINE SAFETY

The Department of Environmental Protection’s Bureau of Mine Safety is responsible for the enforcement of anthracite, bituminous and industrial minerals mine safety laws. The bureau performs mandated health and safety inspections to ensure the health and safety of mine workers throughout the commonwealth. The bureau reviews and approves various mining plans and mining equipment, certifies miners and mine officials, investigates all serious mine accidents, provides emergency response to mine emergencies and conducts training programs.

INSPECTIONS

DEP analyzed data over a five-year period running from 2000 to 2004. (The final numbers for 2005 will not be compiled until late winter.) Each year, DEP’s Bureau of Mine Safety inspects

approximately 200 facilities --- that includes bituminous and anthracite mines and all related facilities, as well as industrial mineral mines and all related facilities.

Under state law, underground bituminous mines must be inspected quarterly; the electrical equipment used in those mines must be checked every six months. Anthracite underground mines must be inspected every two months; the electrical equipment used in those mines also must be checked every six months. Industrial mineral mines are inspected every quarter.

For bituminous mines, the department employs 14 mine safety inspectors, seven electrical inspectors and three individuals for equipment approvals. For anthracite mines, DEP employs five mine safety inspectors and two electrical inspectors. The department has two inspectors for industrial mineral inspections. DEP's six District Mining Offices inspect surface mines.

An inspection can last anywhere from a single day at smaller mines to three months at larger mines. Department inspectors don't come and go. Instead, they often stay at a mine for extended periods, and then do this same inspection process over again on a regular basis.

During the course of a normal inspection, mine inspectors review all documents, maps and plans; inspect mining machinery (electrical and diesel-powered) and elevators; associated preparation plants, tipples and other loading facilities; outdoor substations; ventilation systems; roof control systems; explosives storage and usage; hoists, hauling systems and belt lines; electrical installations; fire protection systems, materials and equipment; haulage roads; entrances to abandoned areas; every working area and travel area; and more. All equipment used underground must be approved and have a tag which shows the approval number attached.

DEP inspectors provide annual reports of their work in mines over the course of year. Those reports conclude that mines in Pennsylvania are operating at or above required levels in all respects. Excerpts from inspectors' 2003 and 2004 annual reports follow:

- “The mines and support facilities meet or exceed the requirements for ventilation, roof control, drainage and the general health and safety needs of the employees in compliance with the Bituminous Coal Mining Act of 1961.”
- “All mines in district are being operated in accordance with the PA Bituminous Coal Mining Laws.”
- “In all of the mines in the 11th District, the air is being well coursed to all the necessary areas throughout the mines in the ample quantity that is required. The roof control plans that have been approved for each operation are being complied with. The drainage associated with each mine is adequate and the sanitary arrangements provided at each mine are in good condition.”
- “During the year, the mines in my district were found to be in compliance, relative to ventilation, roof control, drainage, and general sanitary arrangements.”
- “All are in compliance with Act 339, Section 122 and Act 345, Section 127.”

Here is a snapshot of annual underground inspections between 2000 and 2004. **The numbers show, for example, that DEP underground mine inspectors spent 3,333 days conducting 1,185 inspections at those approximately 200 facilities in 2004.** Details follow:

Year	Number of Inspector Days	Number of Inspections
2000	3,922	1,376
2001	3,666	1,277
2002	3,850	1,369
2003	3,326	1,237
2004	3,333	1,185

Both the number of inspection days and the number of inspections are decreasing in Pennsylvania because there are fewer miners mining more coal in fewer mines with newer, safer technology than ever before. In other words, there are fewer facilities to inspect. We presently have 24 mine, electrical and approval inspectors in the bituminous division and nine mine, electrical and industrial minerals inspectors in the anthracite and industrial minerals division.

On the number of facilities: The total number of bituminous producing mines (surface and underground) was 876 in 1990, 411 in 2000, and 393 in 2004. The total number of anthracite producing mines (surface and underground) was 248 in 1990, 97 in 2000, and 109 in 2004. The total number of producing bituminous underground mines was 88 in 1990, 48 in 2000, and 46 in 2004. The total number of producing anthracite underground mines was 87 in 1990, 23 in 2000, and 20 in 2004. The total number of producing industrial mineral underground mines was 11 in 2004. In 2004, there were a total of 77 active underground mines in Pennsylvania.

It is important to note that these state efforts are complemented by a second set of eyes that oversee mine safety. The U.S. Department of Labor’s Mine Safety and Health Administration operates under the Federal Mine Safety and Health Act of 1977. The act requires MSHA to make at least four complete inspections of all underground operations yearly and at least two surface mine inspections a year. Other provisions call for issuing detailed regulations on basic safety and health training for miners, upgrading and strengthening many existing mine safety and health laws, changes in the civil penalty system applying to rules violators, and greater participation of miners or their representatives in lawful safety activities.

All miner and mine official certifications in Pennsylvania are carried out by DEP, not MSHA. While MSHA requires miner training, DEP performs a good portion of that training. Miners receive emergency response training through DEP’s rescue stations. The state requires emergency medical technicians in mine rescue operations; MSHA does not. Other aspects of DEP training include: apprentice program for new miners; two-week and annual re-training for miners; and continuing education classes for emergency medical technicians.

There are differences between DEP and MSHA related to equipment approvals. DEP approves all equipment used underground, including elevators, slope hoists, ventilation fans, diesel equipment, electrical equipment, surface substations feeding underground, power distribution equipment and escape capsules. MSHA only approves permissible equipment that is used at the face of the mine in hazardous areas.

VIOLATIONS

It is important to note that a mine inspection is not the same as a safety inspection at a factory or warehouse, where the work area remains more-or-less static. Mines constantly change. Surface air is constantly forced into and circulated through the mines, making each day as different as the weather outside. Seasonal changes determine levels of dampness and dryness. Work areas are constantly moving at a rate of several feet per hour in many mines. Consequently, the condition of the floors, ceilings and walls, and even the air itself, is constantly changing as well.

These changing conditions make safety a culture, where inspectors, miners and operators are vigilant in monitoring their surroundings to identify and correct any hazards to prevent accidents from happening. Just like cars need constant maintenance to run well, so do mines. Mine inspectors are like full-time mechanics. Inspectors are trained to look at everything and document every detail, even if the problem is corrected as the mine inspector stands and watches.

Mine inspectors have substantial authority when they are on site at a mine and see something that they believe to be dangerous. For example, inspectors who find hazardous conditions, especially ventilation and roof control, can shut down all or part the mine until the problem is fixed and miner safety is ensured. There are two types of actions mine inspectors can take during an underground mine inspection: notices of violations (NOVs) and compliance orders. NOVs are issued when the violation can be corrected before the mine inspector leaves the site. Compliance orders give the facility a specific time frame to correct the violation, and this correction is verified by a follow-up inspection by the DEP mine inspector.

Year	Number of Notices of Violation (NOVs)	Number of Compliance Orders (COs)
2000	2,217	1,058
2001	2,257	1,158
2002	2,211	1,189
2003	1,810	809
2004	1,407	689

Building off the example used above for inspections and incorporating violation statistics: **DEP underground mine inspectors issued 2,096 violations in 2004 as part of the 3,333 days they spent conducting 1,185 inspections at those approximately 200 facilities.**

Again, inspectors are trained to write down everything, but they are finding less. The number of NOVs is down 37 percent and compliance orders have dropped 35 percent since 2000. The number violations is declining for several reasons: There are fewer workers in fewer mines that

are more modernized and employ technological advances, and miners and mine operators are working more safely.

ACCIDENTS, INJURIES & FATALITIES

One of the most important data sets in occupational safety is the Lost Time Accident Frequency Rate (LTAR). A lost-time accident identifies when an employee is injured on the job and is unable to return to work on his or her next regularly scheduled shift, or when an employee is unable to work at a later date as a result of a previous accident. Lost-time accidents must be reported to the Bureau of Mine Safety within 10 days of occurrence. This reporting requirement applies not only to mine employees, but also to all contractors working on mine property.

LTAR is an important occupational measurement because reductions in the rate correlate to systematic improvements in processes or the enhancement of protective measures. **In mining in Pennsylvania, the number of lost-time accidents is down 30 percent since 2000.** Fewer miners are being injured on the job today compared to four years ago.

Lost Time Accident Frequency Rate (Bituminous Underground Mines):

	2000	2001	2002	2003	2004
Bituminous	7.50	6.63	5.43	5.51	5.20

Number of Lost Time Accidents Statewide:

	2000	2001	2002	2003	2004
Bituminous	351	348	272	230	243
Anthracite	10	5	8	4	6
Industrial Minerals	5	12	4	8	6
Totals	366	365	284	242	255

DEP inspectors investigate only those lost-time accidents associated with certain incidents and operational accidents. These include roof falls, explosions, fires, inundations, entrapments of 30 minutes or more, ventilation disruptions, hoistings, machinery and electrical issues. DEP's Bureau of Mine Safety is responsible for conducting investigations of these incidents whether injuries occur or not. **Over the last five years, the number of accidents triggering investigations in Pennsylvania mines has decreased.**

Accidents Investigated:

	2000	2001	2002	2003	2004
With Injury	29	20	16	49	12

Without Injury	96	80	86	30	62
Totals	125	100	102	79	74

Technology and automation --- as well as enhanced safety measures --- have greatly reduced mine deaths overall in the United States. The nation averages some 30 mining deaths per year now, compared to some 8,000 in China.

In 1907, 3,242 American miners were killed. Of the 1,514 who died in Pennsylvania, 708 were in anthracite mines and 806 were in the bituminous coal fields. This was the highest fatality total on record in Pennsylvania. The number of miners who have died on the job in Pennsylvania since 1870 totals 51,504, which breaks down to 31,116 in anthracite mines and 20,388 in bituminous mines. Even a single death is one too many. No injury or death should be minimized. Still perspective is important.

Today, more people are killed trespassing at abandoned mines and quarries than operating active mines and quarries in Pennsylvania, which is why DEP partners with other local, state and federal entities on the Stay Out/Stay Alive program. There is no requirement to report accidents at abandoned mines, so many may go unreported. There were 26 fatalities at abandoned mines and quarries in 17 different Pennsylvania counties between 2000 and 2005. There were 17 fatalities at active mines and quarries over the same period.

Year	Fatalities at Abandoned Mines and Quarries	Fatalities at <u>ALL</u> Active Mines (Surface & Deep) and Quarries
2000	6	3
2001	2	2
2002	5	3
2003	2	1
2004	6	3
2005	5	5

The number of mining fatalities above represents miners who died on the job at all active underground mines and surface mines, as well as noncoal mines, such as quarries, which DEP regulates. The discussions over mine safety in the wake of Quecreek and the two accidents in West Virginia have focused solely on underground mines. **There have been eight fatalities in underground mines in Pennsylvania since 2000.** Five fatalities occurred underground; three happened in surface operations supporting those deep mines.

Fatalities at Active Underground Mines:

	2000	2001	2002	2003	2004	2005
Bituminous Underground	1	1	1	0	0	2
Bituminous Surface	0	0	0	1	0	0
Anthracite Underground	0	0	0	0	0	0

Anthracite Surface	0	0	0	0	1	0
Industrial Mineral Underground	0	0	0	0	0	0
Industrial Mineral Surface	0	0	0	0	1	0
Totals	1	1	1	1	2	2

There have been two years without a recorded fatality in bituminous mining: 1998 and 2004. (Although there were two fatalities at bituminous mines in 1991, this was the first year in the history of bituminous mining in Pennsylvania that no fatalities occurred underground. Both fatalities occurred on the surface.) There have been 10 years without a recorded fatality in anthracite mining: 1982, 1984, 1987, 1992, 1996, 1997, 2000, 2001, 2002 and 2003.

INDUSTRY COMPARISONS

As noted, coal mining is safer than ever before. Regrettably, injuries and deaths still do occur. But when compared with other industries, the numbers and rates of these incidents show that mining can be done safely despite the dangers.

According to the Pennsylvania Department of Labor and Industry's 2003 Workplace Illness and Injury Report for 2003 --- the latest year for which comprehensive statistics are available for all industries --- trade transportation and utilities, educational and health services, manufacturing and construction all had much higher numbers of injuries on the job than did mining. These four industry sectors accounted for 67.7 percent of the more than 99,000 workplace injuries in Pennsylvania during 2003. Coal mining accounted for less than one-half of one percent of all work-related injuries in Pennsylvania in 2003.

None of the 140 workplace fatalities in Pennsylvania in 2003 occurred in underground mining. One surface mining fatality was recorded that year, while 40 Pennsylvanians died on the job working in trade, transportation and utilities, and 23 died in manufacturing occupations.

The U.S. Occupational Safety and Health Administration states that 152 mineral-related fatalities were reported across the United States in 2004. Of these, 28 occurred in coal mining. OSHA's Bureau of Labor Statistics reports that in 2004, mineral industries had a fatality rate of 28.4 per 100,000 workers. OSHA reports other occupations with high fatality rates per 100,000 workers in 2004 as:

- logging workers, 92.4
- aircraft pilots and flight engineers, 92.4
- fishers and related fishing workers, 86.4
- structural iron and steel workers, 47.0
- refuse and recyclable material collectors, 43.2
- farmers and ranchers, 37.2
- roofers, 34.9
- electrical power line installers and repairers, 30.0
- mineral industries, 28.4
- driver/sales worker and truck drivers, 27.6

TRAINING

As noted, the culture of miners working safely is a major factor in dealing with the dangers inherent in mining. DEP's Bureau of Mine Safety is responsible for training underground miners and aspiring mine officials in health and safety procedures. This DEP division also is responsible for developing new training initiatives and monitoring statewide program goals and objectives, utilization of new technologies and training methods.

According to state law, to obtain a miner's certificate, an individual must have at least one year of experience working in an underground mine as an apprentice. For the machine runner certification, an individual must possess a miner's certificate; show to DEP evidence of fitness and competency to handle the equipment, which requires testing; and have six months experience as helper to a machine runner. Certifications for higher mining positions, such as foreman or other officials, require additional underground mining experience as well as additional training and testing.

For new miners, the U.S. Department of Labor's Mine Safety and Health Administration requires 40 hours of training --- 32 hours in the classroom and eight hours in a mine. MSHA also requires eight hours of re-training annually for all miners. DEP provides a good portion of this training so mine operators can meet the MSHA training requirements.

On Jan. 19, MSHA announced Pennsylvania's receipt of \$495,284 to help run these programs. While Pennsylvania's federal grant was the second highest allocation for any state except West Virginia, which received \$535,860, the amount represents level funding. Several states received funding as part of a \$7.9 million package for health and safety training that the agency issued for the 2006 fiscal year. MSHA for years has been authorized by the U.S. Congress to provide \$10 million annually to the mining states for these training grants, but the agency has not fully appropriated those resources, as the allocation for 2006 indicates.

Every miner in Pennsylvania receives extensive training and re-training. Pennsylvania had some 890,000 miners in 1902. In 2004, Pennsylvania had 4,652 underground bituminous coal miners, 130 underground anthracite coal miners and 314 underground industrial mineral miners --- **and DEP's Bureau of Mine Safety trained more than half of them that year.** Safety and health training in Pennsylvania, by year:

Year	Classes Conducted	Hours of Training	People Trained
2000	209	1,289	1,610
2001	305	1,845.75	3,436
2002	707	2,001	3,207
2003	637	2,174	3,464
2004	277	2,149	3,292

Rising energy prices make it more economical to mine coal, and more companies are examining opening new mines or re-opening closed mines in Pennsylvania to meet the increased demand. At the same time, the current workforce is aging or retiring. The upswing in production means many coal companies are looking in vain for trained miners. Greater demand for coal coupled with hiring shortages and the reopening of older mines means opportunity for Pennsylvanians (on average, underground mining is one of the state's highest-paid jobs). But new hires require quality safety training.

Initiated through a partnership between DEP and the mining industry, Penn State's Fayette Eberly Campus on Jan. 10, 2006, conducted its first class in its two-year associate degree program in mining technology. DEP uses the federal money from MSHA in part to contract with Penn State University, Indiana University and the Schuylkill Technology Center for additional training for surface and deep miners throughout the state.

MINE RESCUE

DEP's Bureau of Mine Safety is responsible for the training, deployment, and supervision of the activities of mine rescue teams during underground mine emergencies and disasters; and the development and implementation of emergency planning procedures and operations for all underground mines.

The Pennsylvania Bituminous Coal Mine Act of 1961 directed the state to establish mine rescue stations and provide mine rescue equipment, mine rescue training and oversight of the state's mine rescue program. Subsequently, MSHA promulgated rules in 1980 requiring underground mine operators to equip and train two mine rescue teams to provide round-the-clock mine rescue coverage at every underground mine. Crews, which are paid by operators, must be able to respond to mine emergencies within two hours.

To meet MSHA requirements, the commonwealth would need only two teams in the western bituminous part of the state and two teams in the eastern anthracite part of the state. But Pennsylvania's mine rescue efforts far surpass what is federally required. Our commonwealth has 13 mine rescue teams stationed throughout the state for emergencies.

DEP's Bureau of Mine Safety operates the State-Trained Mine Rescue Teams program, which provides the necessary training and equipment to mine rescue teams made up of certified miners from active underground mines. The total number of state-trained teams and their bases are as follows:

- Uniontown, Fayette County --- Two six-person teams
- Ebensburg, Cambria County --- Four six-person teams
- Tremont, Schuylkill County --- Two three-person teams

From these locations, the rescue teams can respond within two hours to emergencies at all underground coal and industrial minerals mines in Pennsylvania. These teams complement others at Pennsylvania's two largest mining companies: Consol Energy and Foundation Coal

equip and train five mine rescue teams --- three and two, respectively --- at their five mining operations in Greene and Washington counties.

For the state-trained mine rescue teams, each member must complete 20 hours of initial training when joining the team, and is contractually obligated to attend mandatory monthly training sessions and two underground training sessions each year. Team members must pass annual physical examinations to standards set by the federal Mine Safety and Health Administration.

The state program is vital because training and equipping mine rescue teams is too expensive for many of the smaller underground mine operators. Additionally, not all miners can meet the strict federal physical standards to qualify to become a mine rescue team member. To address this, participating mine operators must provide one team member for every 50 underground miners employed by the company to participate in the mine rescue program.

The Bureau of Mine Safety also employs emergency response and training specialists to staff and maintain the mine rescue station and its equipment, and conduct mine rescue training. Personnel also provide initial miner training and annual re-training for the mining industry, including other specialized training as required. Mine rescue team members are trained in advanced first-aid, confined-space rescue, rappelling, fire-fighting and other rescue techniques. Rescue teams respond to emergencies at active and abandoned mines, and have on occasion helped with rescues of recreational cavers.

Equipment located at each station includes rescue trucks; self-contained breathing apparatus to outfit all team members; gas detection equipment, headlamps, stretchers and baskets; medical equipment; and lifelines and other rescue and recovery equipment. The Bureau of Mine Safety recently purchased 48 new Drager BG-4 SCUBA units at a cost of \$415,000 for use by underground mine rescue teams. The new units replace aging breathing units that were purchased more than 30 years ago.

DEP also maintains a Special Medical Response Team (SMRT) of medical doctors and paramedics with special skills to provide emergency medical command to remote locations, including underground mining. SMRT maintains a rescue vehicle that serves as medical command, features facilities for emergency surgery and contains supplies, communications equipment, personal protective equipment and extraction equipment for use in rescue operations. Formed in 1983, SMRT at one time was a state/federal partnership. It now receives \$55,000 in state funds each year to ensure this expertise is available for mine rescues. SMRT's work during Quecreek was integral to the success of that rescue operation.

MINE MAPS

There are approximately 100,000 underground mine workings in Pennsylvania, based on historical records and other data. (There were 77 active deep mines in Pennsylvania in 2004.) After the Quecreek Mine accident in July 2002, DEP began aggressively scanning underground mine maps from its repositories as well as those belonging to outside organizations to create a database to record the exact location of underground mine voids.

DEP and the Pennsylvania Historical and Museum Commission (PHMC) held two free workshops in 2003 inviting all parties who had or knew of maps depicting the location of abandoned mines to help create the abandoned mine map database. The workshops enabled those who attended to bring a list of all such maps in their possession so DEP staff could input the locations of those maps into the database.

DEP, PHMC and the Department of Conservation and Natural Resources (DCNR) also are partnering to establish a central mine map repository and institute procedures to treat the maps as historic resources. These historical mine maps currently are scattered among both public and private holders.

MSHA awarded \$1 million to Pennsylvania in December 2003 as part of \$4 million in grants to 13 states to help pay for systems to digitize maps of abandoned mines. Other states receiving the funds were West Virginia (\$1.2 million); Kentucky (\$1 million); Virginia (\$317,000); Ohio, Utah, Illinois and Indiana (\$52,000 each); Colorado and Alabama (\$51,000 each); Maryland and New Mexico (\$50,000 each); and New York (\$25,000).

DEP is creating a database for entering mine production data collected from hard-copy mining reports over the past 130 years to enable searches that will allow comparisons with known maps to get a more accurate picture of mine voids and mine workings. DEP also has a partnership with Indiana University of Pennsylvania to improve miner safety and preserve mine maps. On Jan. 19, IUP showcased a \$125,000 digital camera funded through the state's portion of federal grants that will scan and then digitize the large-format maps to create a statewide database available to businesses, local officials and the public.

To date, DEP has scanned about 43,000 maps from its repositories and outside sources, with 25,700 maps scanned since Quecreek. The department still has some 16,000 maps to scan. Here are details about the scanning effort:

- 10,000 anthracite maps held by DEP's the Bureau of Abandoned Mine Reclamation in Wilkes-Barre, with 8,000 scanned since Quecreek.
- 6,000 anthracite maps held by DEP's Bureau of Deep Mine Safety in Pottsville, with 500 scanned since Quecreek.
- 3,000 bituminous and anthracite maps held by DEP's Bureau of Mining and Reclamation, with 1,300 scanned since Quecreek.
- 12,000 bituminous maps held by DEP's California District Mining Office, with 10,000 scanned since Quecreek.
- 12,000 bituminous maps held by DEP's Bureau of Deep Mine Safety in Uniontown, with 6,000 scanned since Quecreek.

KEY ACTIONS SINCE QUECREEK

Nine miners working in Quecreek Mine No. 1, thinking they were a safe distance from mine voids, accidentally broke through to the abandoned Saxman Coal & Coke Co.'s Harrison No. 2 Mine at approximately 8:50 p.m. July 24, 2002, flooding Quecreek and trapping the nine miners for nearly 78 hours. In the wake of that near catastrophe and successful rescue, the Department of Environmental Protection undertook a number of initiatives to enhance mine safety. Among those key actions are the following:

- Require all bituminous and anthracite mines operating near known abandoned mine voids to provide credible evidence --- in the form of accurate maps, drilling or other means --- that they know for certain where the actual mine void is located. Bituminous mine operators must provide hard data as to the location of mine boundaries once they reach 500 feet of an abandoned mine void. Anthracite operators have to provide this information at 300 feet. The previous distance for both was 200 feet.
- Revise mine permitting and inspection procedures. DEP mine safety experts now have a direct role in the decision-making process in permit reviews.
- Launch a Web site to provide access to historic annual production reports that may offer clues on coal production in older mines. The site already contains more than 25 years of historic annual production reports, with the goal of including a report for every year as far back as 1870. For years when no report is available for scanning, the Web site will include contact information to outside parties that have those reports available for review.
- Scan electronically mine maps, many of which were held in department repositories, into a database that is easily accessible to DEP staff and industry officials. During a map search aided by academia, private companies and residents who stepped forward and provided information after Quecreek, DEP collected at least 12,000 maps held by outside parties for inclusion in the database, as well as contact information for many additional maps that DEP can access during the permit review process to determine whether abandoned mine voids are nearby a proposed active mine. **(See details above in “MINE MAPS” Section.)**
- Put into place extensive procedures concerning the validation of underground mine maps and procedures for establishing barrier pillars that included mapping requirements. These requirements were in Technical Guidance Document 563-2000-610: “Validating Abandoned Underground Mine Maps and Establishing Barrier Pillars.”
- Conduct training to address site-specific situations that occur during the operational life of the mine, such as the presence of low, flood-prone areas along escape ways that may hamper mine evacuation in inundation emergencies.
- Develop and implement a protocol for hazard-specific inspections of mines advancing towards abandoned underground mine workings, including; a) procedures when mining near abandoned mine voids, b) ensuring that mine inspectors understand the limits of mine maps, and c) verifying and documenting that approved plans for locating old works are implemented properly.

- Incorporate the lessons learned from the Quecreek Mine accident in training protocol for the Bureau of Mine Safety staff and mine workers. As part of these training elements, in partnership with DEP, Penn State's Fayette Eberly Campus on Jan. 10, 2006, conducted its first class in its two-year associate degree program in mining technology. DEP contracts with Penn State University, Indiana University and the Schuylkill Technology Center for additional training for surface and deep miners throughout the state.

PENNSYLVANIA LEGISLATIVE CHANGES

Pennsylvania's deep mine safety laws for bituminous mines were written in the late 1880s and last updated in 1961. The commonwealth's mine safety efforts remain a national model, but revisions in the law are urgently needed to enhance safety and keep pace with a changing industry. Currently, all changes to mining operations in Pennsylvania must be done through statute --- the department lacks the authority to develop safety regulations. The legislative package developed by DEP at Governor Rendell's direction and introduced by Sen. Richard Kasunic and Rep. Bob Bastian at the administration's request would accomplish the following:

- Eliminate obsolete language in Pennsylvania's mine safety statutes to remove references to animals and stables in mines, signals to "turn steam to the pumps" and "substituting approved gas detection devices in lieu of "flame safety lamps," and references about transporting miners into the mines on conveyer belts.
- Create a three-member Mine Safety Board with the authority to promulgate regulations to keep pace with changing mine safety technology. The board could act more quickly to put in place necessary improvements and precautionary measures to keep miners safe as the industry continues to advance rapidly.
- Make the mine operator/owner primarily responsible for safety compliance at the mine, and allow the department to assess fines and penalties for noncompliance. Currently, only individual certified employees or supervisors, such as foremen, can be held responsible for an accident, not the mine company or its executives.
- Strengthen DEP's Bureau of Mine Safety's role in the mine permitting process to review the application to ensure no health or safety threats exist (DEP enacted policy changes that accomplished this same goal shortly after the accident).
- Increase to 500 feet from 200 feet the distance from which a bituminous underground operator must conduct advanced drilling when approaching an adjacent mine which may contain water or gas (this same requirement was put into effect through an executive order shortly after the Quecreek accident).
- Strengthen the permit application review process to require the operators to demonstrate that all maps being presented are reliable (the department enacted policy changes that accomplished this same goal shortly after the accident).

- Grant the department statewide authority to copy all mine maps and increasing measures to ensure final mine maps are submitted in a timely manner.
- Authorize the department to seek from a mine operator reimbursement for expenses incurred in responding to a mine emergency and other costs incurred as a result of a failure to submit an accurate certified, final map.
- Authorize the department to use emergency contracting provisions to pay for mine rescue and other mine safety activities.

Pennsylvania has a rich mining history. But we have learned the hard way that safe mines are a reality only when the miners, the mine operators and government make safety a priority every minute of every day.

WEST VIRGINIA ACCIDENTS

Investigations continue into two fatal accidents that killed 14 miners at two separate West Virginia mines since the beginning of the year. West Virginia lawmakers on Jan. 23 approved measures aimed at improving safety by passing legislation that would better track miners underground, prompt faster emergency responses and stockpile oxygen for stranded miners.

Prior to the overhaul of West Virginia law, one aspect that had been highlighted in the Sago Mine accident was the company's compliance history and repeated violations. Without the legislative changes proposed by Governor Rendell, DEP cannot take into account a company's compliance history when reviewing permit applications.

West Virginia's new law prompts faster emergency responses, requires stockpiled oxygen for stranded miners and seeks to better track underground miners. The provisions aim to safeguard miners involved in an underground accident and offer additional tools to rescuers trying to reach them. DEP has examined how the newly enacted West Virginia law relates to Pennsylvania's mine safety program and the changes proposed by Governor Rendell.

- **Accident Notification:** Governor Rendell's plan strengthens notification and accident response requirements, mandating that DEP be notified within one hour of an incident. This time frame ensures that notifications do not interfere with the initial response during those crucial first minutes. Current law requires the department to be notified "forth with," a vague standard that could hinder timely notice of serious accidents. Although the West Virginia law requires notification within 15 minutes, it is our understanding that the time limit is not triggered until mine operators know exactly what type of emergency they face. Our mine safety revisions actually define "accident," removing any guessing, and provide an extensive list of events that require notification because they either immediately or potentially threaten the health and safety of miners. Current law refers to fatal and "serious" accidents, an ambiguity that has led to confusion in the past as to when to notify the department. DEP works directly with mine operators to develop emergency response and notification plans to deal with situations that may arise similar to what occurred in West Virginia. Mine operators have emergency notification numbers

for staff with the Bureau of Mine Safety and access to a 1-800 number that is manned 24-hours a day, seven days a week.

- **Stockpiled Oxygen:** The U.S. Department of Labor's Mine Safety and Health Administration requires miners to carry self-contained self-rescuers (SCSRs) that can provide an hour of oxygen in a mine emergency. The second part of West Virginia's new law requires additional SCSR's to be stockpiled throughout the mine. At least one mining company in Pennsylvania --- Foundation Coal, at its Cumberland and Emerald mines --- already takes this initiative. Others have said publicly that they will install oxygen stockpiles in their mines in the wake of the West Virginia accidents. Pennsylvania should make this a requirement for all mines here. SCSR's should be placed along escape routes and other strategic locations throughout the mine. In addition to stockpiled SCSR's, Pennsylvania should examine requiring mines to install "lifelines" that miners can grab and use as a guide to safety if they are ever trapped in an area that fills with smoke or debris. The lifelines should be placed in escape ways with access to stockpiled SCSR's.
- **Communications & Tracking:** West Virginia also acted to require miners to be equipped with communications and tracking devices. The department supports this requirement but would caution that care is needed in the identification of appropriate equipment. Though wireless, many such devices still require cable and power sources in the mine --- just the type of auxiliary equipment that may not be available in an emergency. The department would recommend that a date be identified in our proposed legislation for the identification and installation of the best technology, but that the specific technology to be required be identified by the department in consultation with the Mine Safety Board that our legislation creates.

DEP also has begun an analysis of locating safe places in the mines for workers to seek refuge in case escape routes are blocked. These safe places could be permanent or portable. Similar systems were put in action as recently as Sunday when some 70 miners in central Canada retreated to these emergency refuge rooms stocked with oxygen and supplies after an underground fire ignited. A mandate with respect to this matter in the legislation proposed in Pennsylvania also would be appropriate.

Just three weeks after 12 men died at the Sago Mine, two miners were killed at Aracoma Coal's Alma No. 1 after a fire ignited on a conveyor belt system. In Pennsylvania, a similar incident occurred without injury at 84 Mining Co.'s Mine 84 in Washington County on Jan. 6, 2003, when a fire ignited near belt haulage equipment shortly after 8 a.m. A massive roof fall occurred some five hours later where the fire was centered. This Mine 84 case provides an example about how Pennsylvania responds when a mine accident first occurs.

Ten mine rescue teams (five company teams from Pennsylvania and five out-of-state teams) were involved in the fire fighting efforts in Washington County. By the evening of Jan. 7, 2003, the fire was contained. Four vertical boreholes were drilled from the surface into the fire area to facilitate water dumps. An additional water pipeline was installed and pressurized water was applied through horizontal boreholes. It was not until Jan. 27, 2003, that the fire was deemed extinguished and recovery operations commenced. Had the fire reached the longwall face and

gob area, a catastrophic methane explosion or uncontrolled gob fire could have resulted. Several violations were issued as a result of the fire.

Pennsylvania's proposed legislative changes establish new procedures to determine whether belt material is "fire resistant," and a new requirement that all belts have an early warning fire detection system.

MINING MILESTONES

Some regulatory milestones and important dates for underground mine safety in Pennsylvania are as follows:

- 1758** – Bituminous Coal mined from an outcrop on the Monongahela River by troops of General John Forbes; used for winter heat after the capture of Fort Duquesne.
- 1768** – First recorded use of Anthracite Coal by blacksmiths in Wilkes-Barre area.
- 1775** – First underground mine in PA opened near Pittston, Luzerne County.
- 1808** – Brothers Abijah and John Smith begin first known out-of-state shipments of Anthracite Coal, via Susquehanna River barges originating from Wilkes-Barre.
- 1815** – Mine-Safety lamps introduced in England by Humphry Davy (Davy Lamp) and George Stephenson (Geordie Lamp), allowing miners to test for both the lack of oxygen and the presence of explosive gasses in mines. The Davy Lamp's lower cost and simpler design resulted in its widespread use until the advent of handheld electronic sensors in the 1980s.
- 1869** – First Mine Safety Legislation in PA (P.L. 852 of 1869) entitled "An act for the better regulation and ventilation of mines, and for the protection of the lives of the miners in the county of Schuylkill." The act defined the roles and responsibilities of mine inspectors, giving them authority to enter and report on conditions in mines, and to issue annual reports on accidents and production in Anthracite mines in Schuylkill County. The act also defined the roles and responsibilities of Mine Foremen. Between 1869 and 1961, 25 separate Mine Safety laws governing Bituminous and/or Anthracite coal were passed by the Pennsylvania Legislature.
- 1869** – Avondale Mine Disaster near Plymouth, Luzerne County on September 6. This was the deadliest mine disaster in the Anthracite coal fields. 108 men and boys die as a fire on the surface blocks the only exit from the mine. Two rescuers also die after being overcome by gas. The disaster leads to laws requiring multiple exits at underground mines.
- 1869** – The first "Report of the Inspector of Mines" was presented to Governor John W. Geary by John Eltringham, Inspector of Mines for Schuylkill County.

- 1870** – Statewide Mine Safety Legislation - P.L. 3 - expanded the provisions of P.L. 852 to include all mines in all Pennsylvania counties.
- 1870** - 211 fatalities reported in Pennsylvania’s Anthracite Mines.
- 1880** – First formal Mine Rescue teams formed in England – Team members received training in First Aid and mine rescue procedures.
- 1883** – Pennsylvania Bituminous Mine Law – providing rules strictly relating to Underground Bituminous Coal Mining. The Act required creation of accurate mine maps, and established requirements for adequate ventilation, safety and construction of hoist shafts, and removal of mine gasses in working areas. The law also described the duties and responsibilities of mine foremen and mine inspectors, and set standards for mine supplies and materials.
- 1885** – P.L. 202 prevented, by law, the “employment of female labor in and about coal mines and manufactories thereof” in Pennsylvania.
- 1889** – P.L. 154, enacted in response to the 1885 Susquehanna Coal Company’s Nanticoke mine disaster when 26 miners were entombed by an inrush of quicksand, and rescuers were unable to recover the bodies. The Act described the process by which families of miners can petition the court to have a miner declared to be dead when the recovery of the miner’s body is impossible.
- 1891** – First federal Mine Safety legislation – established minimum ventilation requirements and prohibited children under 12 from working in underground mines.
- 1896** – Annual mine fatalities exceed 500 in Anthracite Mines for the first time (502).
- 1897** – Creation of PA Bureau of Mines to oversee regulation of all coal mines.
- 1900** – First formal Mine Rescue Teams organized and trained in Anthracite region.
- 1901** – P.L. 97 regulated storage and use of black powder in mines.
- 1902** – Employment in Pennsylvania’s Mines (Coal and Non-Coal) reaches 840,178 persons – 13 percent of the state’s population.
- 1903** – PA Department of Mines created as a cabinet-level state agency by Governor Samuel Pennypacker – replaces Bureau of Mines.
- 1904** – Annual mine fatalities exceed 1,000 in Pennsylvania’s mines for first time (1131). Annual mine fatalities exceed 500 in Bituminous Mines for the first time (536).

- 1907** – Deadliest Year in US and Pennsylvania Mining History. 3,242 miners died nationwide, 1514 in Pennsylvania (708 Anthracite miners/806 Bituminous miners). Two of the three most deadly mine disasters in U.S. history occurred in December:
- Dec. 6 – A series of explosions and roof collapses killed 362 miners in the Monongah #6 and #7 mine in Monongah, WV
 - Dec 19 - A dust and gas explosion claimed the lives of 239 miners in the Darr Mine in Van Meter, Westmoreland County.
- 1907** – The Darr and Monongah disasters marked the first use of self-contained breathing apparatus in a deep-mine rescue in the United States.
- 1908** – The US Geological Survey created the Mine Accidents Division and opened a station devoted to research of mine rescue techniques in Pittsburgh. Branch stations were established in Illinois, Tennessee and Washington over the next two years.
- 1908** – First formal Mine Rescue Teams organized and trained in Bituminous region.
- 1908** – Electric Headlamps replace open-flame headlamps in Anthracite Mines.
- 1910** – The US Bureau of Mines was established by an act of Congress.
- 1915** – PA Governor Martin Brumbaugh signs the Compensation Law of 1915 to provide workmen's compensation income to injured miners. This was the first Workmen's Compensation law in Pennsylvania and one of the first in the nation. A tax of 2 ½ cents on every ton of coal mined raised \$6.2 million annually for the compensation fund.
- 1923** – Rail-mounted steam shovel digs first reported strip mine in Clearfield County, ushering in the age of mechanized surface mining, allowing coal miners to extract coal reserves without tunneling underground.
- 1941** – Congress empowers Federal Mine Inspectors to enter mines.
- 1943** – Pennsylvania's mine officials certification act (P.L. 848) made all mine officials – Foremen, Assistant Foremen, Electricians and Examiners – officials of the Commonwealth and gave the Department of Mines the authority to withdraw their certifications and remove them from these positions.
- 1952** – Federal Coal Mine Safety Act – provided for annual inspections in certain underground mines, provided limited enforcement powers to Bureau of Mines.
- 1954** – Underground Mine Fatalities in Pennsylvania fall below 100 for first time since recordkeeping began in 1870.
- 1961** – Enactment of Pennsylvania Bituminous Coal Mine Act – Legislative consolidation of all previous acts and amendments to Pennsylvania's Bituminous Mine Safety laws. Directed

state to establish and equip mine rescue stations, to train mine rescue crews, and to oversee the state mine rescue program.

1965 – Enactment of Pennsylvania Anthracite Coal Mine Act – Consolidation of all previous acts and amendments to Pennsylvania’s Anthracite Mine Safety laws.

1966 – First federal legislation covering non-coal mines - minimal enforcement authority.

1969 – Federal Coal Mine Health and Safety Act – included safety rules for underground and surface mines; increased enforcement powers; established health standards for coal miners.

1973 – Mining Enforcement and Safety Administration – MESA - created as a new department separate from the Bureau of Mines – responsible for safety and health enforcement.

1977 – Federal Mine Safety and Health Act – amended 1969 Coal Act and consolidated all federal health and safety regulations for both coal and non-coal mining operations. Authority to enforce and enact new law transferred to newly-created Mine Safety and Health Administration (MSHA).

1991 – First year on record with no fatalities in Pennsylvania’s underground coal mines.

1996 – Amendments to Pennsylvania’s Bituminous Coal Mine Act establishing standards for use of Diesel-Powered Equipment in underground mines. The amendments expanded upon federal law, setting strict standards for emissions, fuel mixtures and storage, maintenance and operation of diesel-powered equipment.

2002 – Quecreek Mine Accident captures the attention of the nation when nine miners from the Black Wolf Coal Company are trapped 250 feet below ground for 77 hours after breaking through into the abandoned Saxman mine on July 24, and unleashing a torrent of 70 million gallons of water which flooded all escape routes. The mining company’s maps showed the abandoned mine to be at least 300 feet away from the Quecreek mine when the accident happened. All nine miners were rescued.

2002 – Governor Mark Schweiker on July 29 creates the Governor’s Commission on Abandoned Mine Voids and Mine Safety to investigate the causes of the Quecreek accident.

2002 – DEP and MSHA begin an investigation into the Quecreek accident in August.

2002 – Bituminous underground mine operators on Aug. 28 ordered not to depend on old mine maps to locate abandoned mines, but to drill test holes 500 feet in advance of mining to locate possible unmapped water-filled voids. This order increases the drilling distance in advance of mining in areas near abandoned mines by 300 feet.

2002 – Attorney General Mike Fisher convenes a grand jury to investigate the Quecreek accident to determine if the accident was the result of any criminal wrongdoing. U.S. Attorney

Mary Beth Buchanan, who represents the Western District of Pennsylvania, joins the investigation, and federal and state prosecutors present their cases before the grand jury.

- 2002** – Mining is permitted to resume at the Quecreek mine on Nov. 21 following exploratory drilling in advance of proposed mining.
- 2002** – The report by the Commission on Abandoned Mine Voids and Mine Safety is issued Nov. 25. The report makes 48 recommendations including making coal operators, as well as miners, responsible for mine safety, requesting the legislature to give DEP authority to change mine safety requirements by regulation, and directing DEP to create and maintain an electronic database of historic and current mine maps.
- 2003** – Governor Edward G. Rendell on Feb. 28 directs the Pennsylvania Office of Inspector General to assist DEP with its ongoing investigation of the Quecreek accident.
- 2003** – DEP receives Quecreek Mine accident report from the Pennsylvania Office of Inspector General, concluding no wrongdoing by DEP staff but identifying areas where policy and communications need to be clarified.
- 2003** – DEP on July 22 releases final report on the Quecreek Mine Accident. Report underscores the hazards of inaccurate maps, and recommends some of the most significant changes in decades to Pennsylvania’s outdated mine safety laws.
- 2003** – MSHA issues its report in August and states that the primary cause of the water inundation was use of an undated, uncertified mine map.
- 2003** – U.S. Attorney General and Pennsylvania Attorney General offices say joint grand jury found insufficient evidence to recommend criminal charges on the part of any individual, entity or organization involved in the Quecreek accident, but recommended “significant improvement” to the methods by which underground mining is regulated in Pennsylvania.
- 2003** – DEP on Aug. 1 submits for public comment Technical Guidance Document 563-2000-610: “Validating Abandoned Underground Mine Maps and Establishing Barrier Pillars.”
- 2003** – DEP and the Pennsylvania Historical and Museum Commission conduct workshops in August and September in Westmoreland and Schuylkill Counties to gather historic mine maps and to solicit the public’s assistance in locating maps stored in libraries, offices and private homes.
- 2003** – DEP receives \$1 million grant from US Mine Safety and Health Administration (MSHA) on Dec. 22 to purchase equipment to scan and digitize mine maps, and create an electronic database of mine maps in Pennsylvania.
- 2004** – On Feb. 22, the Technical Guidance Document 563-2000-610: “Validating Abandoned Underground Mine Maps and Establishing Barrier Pillars,” takes effect. This puts into

place extensive procedures concerning the validation of underground mine maps and procedures for establishing barrier pillars that included mapping requirements.

- 2004** – DEP Secretary Kathleen McGinty on July 21 proposes new Bituminous Coal Mine Safety legislation that will repeal antiquated and outdated portions of the law and significantly enhance the safety of underground miners. The proposed legislative initiatives incorporate recommendations made by DEP, the U.S. Mine Safety and Health Administration, the Governor’s Commission on Abandoned Mine Voids and Mine Safety, and a Grand Jury investigating on behalf of the Pennsylvania Office of Attorney General and the U.S. Attorney’s Office.
- 2005** – Governor Rendell on Sept. 26 announces the introduction of the Bituminous Mine Safety Legislative Package by Sen. Rich Kasunic and Rep. Bob Bastian whose districts encompass the site of the Queecreek mine.
- 2005** – With administrative changes in place and legislation introduced, the administration has acted on every recommendation made in the wake of the Queecreek accident.

###