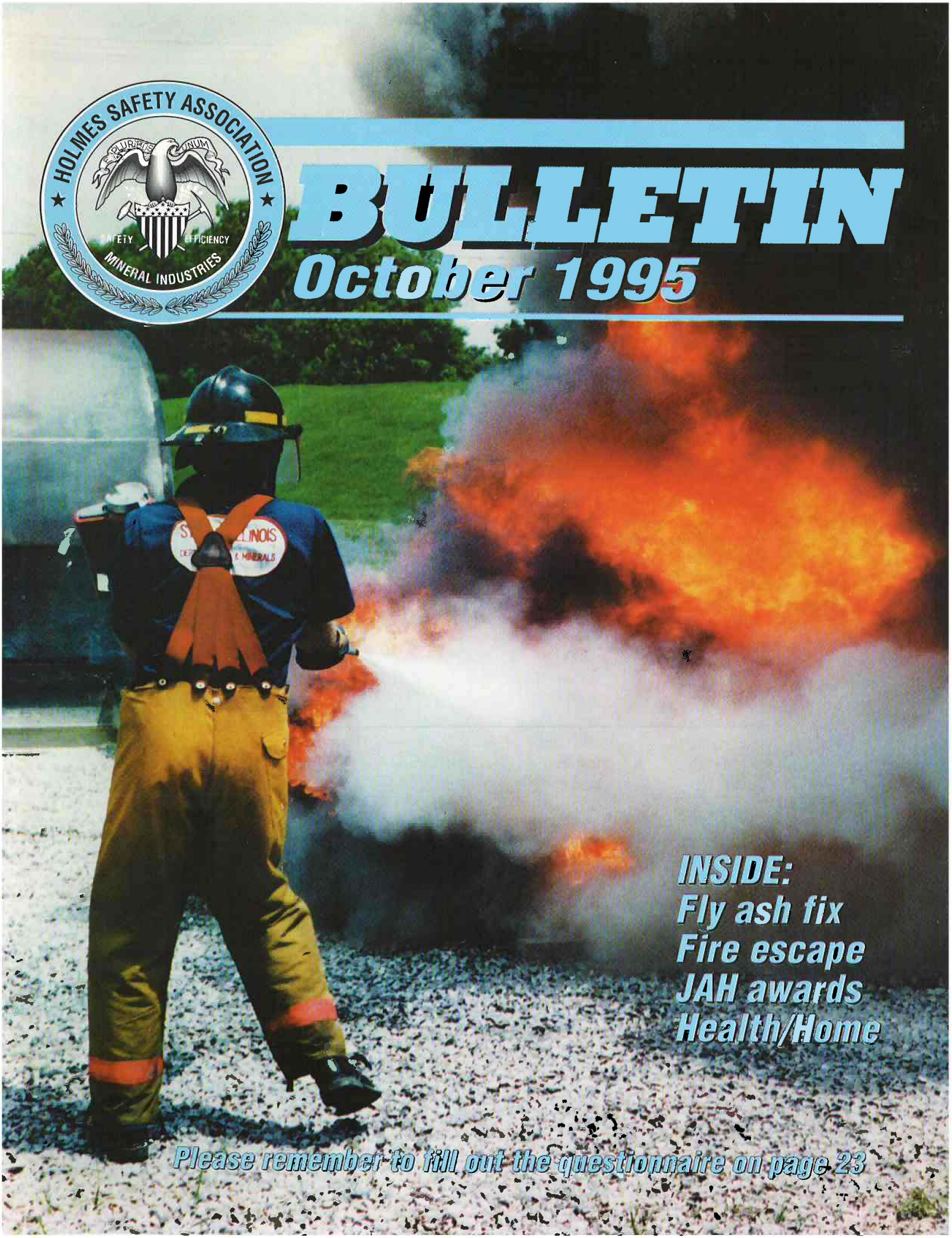

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Please remember to fill out the questionnaire on page 23

Joseph A. Holmes Safety Association
Awards Criteria

Type "A" Award – For Acts of Heroism
The award is a medal with a Medal of Honor Certificate.

Type "A" Award – For Acts of Heroic Assistance
The award is a Certificate of Honor.

Type B-l Award – For Individual Workers
(40 years continuous work experience without injury that resulted in lost workdays)
The award is a Certificate of Honor, a Gold Pin, and a Gold Decal.

Type B-2 Award – For Individual Officials
(For record of the group working under their supervision)
The award is a Certificate of Honor.

Type C Award – For Safety Records
(For all segments of the mineral extractive industries meeting adopted criteria)
The award is a Certificate of Honor.

Other Awards – For Individual Workers
(For 10, 20, or 30 years without injury resulting in lost workdays)
The awards are 30 years - Silver Pin and Decal, 20 years - Bronze Pin and Decal, 10 years - Decal bearing insignia.

Special Award – For Small Operators
(Mine operators with 25 employees or less with outstanding safety records)
The award is a Certificate of Honor.

For information contact: Secretary-Treasurer, Joseph A. Holmes Safety Association (703) 235-8264

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The *Holmes Safety Association Bulletin* contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters, and other health and safety-related topics. This information is provided free of charge and is designed to assist in presentations to groups of mine and plant workers during on-the-job safety meetings.

PLEASE NOTE: The views and conclusions expressed in *Bulletin* articles are those of the authors and should not be interpreted as representing official policy or, in the case of a product, represent endorsement of the Mine Safety and Health Administration.

KEEP US IN CIRCULATION—PASS US ALONG

Using a mine emergency simulation in annual refresher training

(a safe way to develop critical decision making skills in non-routine situations)

By John Howard

On December 19, 1984, a fire broke out in the Wilberg Mine in Emery County Utah. Twenty-eight miners were in the affected area; twenty-seven of them died. According to MSHA's final report, the fire originated at a defective air compressor that ran unattended for sixty-nine hours. How could such a tragedy occur? What went wrong? Why didn't someone check to see why the compressor was running? Did the miners have no warning? Were there no self-rescue devices? The answers to these questions only make the disaster seem more tragic.

From the time the fire was first reported until the fire was confirmed, approximately five minutes passed. During that time, the MSHA report states that "no attempt was made to assemble the miners or gather the SCSRs." In fact, only after smoke arrived at the headgate was any concerted effort begun to evacuate the section—another two or three minutes after the confirming telephone call. All twenty-eight miners had a filter-type self rescuer on his/her belt. And there were fifty-four self-contained self-rescuers on the section—two SCSRs for each victim.

How could such tragedies occur? Unfortunately, quite easily. When the unthinkable happens in an underground mine, most people assume (usually erroneously) that everyone will recognize the situation as serious; that everyone will know what to do; that the best decisions will be made; and that everyone will be purposeful, calm, and collected. But is this a realistic assumption?

Probably not. Miners prepare for mine emergencies in a variety of traditional ways: lectures, discussions, videotapes, true/false quizzes, etc. But do these common annual refresher-training activities really prepare individuals to make the quick and proper decisions in life-threatening situations?

Again, the answer is probably not. None of us would dream of teaching a 16 year-old to drive using lectures, discussions, videotapes, or quizzes. Why, then, are we comfortable training miners to make critical, life-or-death decisions using those techniques? Perhaps it's because there is no better way to teach them. But then again, maybe there is...

For two years, some of Illinois' underground miners have been learning about mine emergencies

in high school and community college gymnasiums. Using a simulated mine made from PVC pipe and black plastic sheeting, miners can experience a wide variety of mine emergencies in the safety and comfort of an annual refresher training class. It's all the brainchild of Gary Wangler, former Training Manager for Old Ben Coal Company.

Ten-foot sections of plastic pipe form the skeleton of the mine. Shorter pieces serve as "legs" and provide appropriate roof height. The plastic sheeting is taped to the pipe to form the ribs, pillars, and faces. Brattice cloth becomes stoppings and curtains.

Conference tables become mining machines. Trouble lights indicate power to the machines. A simple power strip or surge suppresser serves as the power center. Blue plastic sheeting represents standing water. Dry-erasable placards, like those used in mine-rescue contests, provide site-specific information (i.e., 1.8% CH_4). A couple of walkie-talkies simulate mine phones. Once the "raw materials" are gathered, a half dozen people can assemble the simulation in six hours or less. For added realism, turn off most of the gym lights, provide a dozen hared hats and cap lamps and PRESTO... the basketball court is transformed into a fairly realistic "underground mine".

To be most effective, the groups should be comprised of regular work crews so that everyone knows that the others' normal duties and responsibilities are. Similarly, the simulated section should approximate their normal work location: make the Number 1 entry intake air if that's how their unit is ventilated; put the belt conveyor in the Number 2 entry if that's where their section belt is located. The closer the approximation, the less time it take for the trainees to orient themselves to the simulation—and the more mine-specific the exercise becomes.

With the simulated mine ready to go, each group of trainees is briefed with minimal start-of-the-shift information. An overhead transparency of the mine layout is helpful, even if the simulation is based on actual working. Methane and water accumulations, roof conditions, and other potential problems can mirror those of their normal environment, or less typical conditions can be substituted. With that, the miners are ready to enter the mine and start "loading coal."

Typically, the foreman will check the faces while the crew finds there way around the section. Almost immediately, the pager telephone (walkie-talkie) comes to life. "Hello Unit 2, anybody in Unit 2... Hello Unit 2!" The outside communications center provides preliminary information about the mine emergency. For example, there could be smoke reported at their belt head or a methane ignition at a nearby set of seals. To complicate matters, there could be trouble with one or more people who stayed over from the last shift: a missing mechanic who has been injured in a roof fall; a person who has wandered off without telling his/her co-worker where he/she was going.

The messages coming onto the section vary depending on how the trainees react. If no one remains by the telephone, the

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outside communications center can attempt to relay important developments about the emergency. If no one is assigned to be a "runner"—the one who delivers messages from the person manning the phone to those in the working section—the outside communications center can run the legs off the inside communications man. The goal is not to frustrate people, but to emphasize that it is vitally important that the flow of information, both into and out of the section, is uninterrupted.

The problems can compound or remain constant, depending on the trainers' goals and the amount of time available. Let's assume that the mechanic who worked over from the last shift sustained a broken leg from the roof fall. If the crew does not do a head count before evacuating the mine, an emergency can result in tragedy when he/she is left behind. If a head count is done and the injured person is located, the incoming smoke puts pressure on the trainees to get the first-aid supplies to the accident scene and to treat the victim effectively—yet quickly.

The simulated mine presents trainers with almost unlimited possibilities for Part 48 topics. Additionally, it requires the trainees to become involved in annual refresher training. Immediately after the exercise, trainee performance is critiqued and other possible approaches are evaluated. With a good facilitator, the discussions that result are almost as useful as the activity itself. And it doesn't end there. Instructors can refer to the simulation throughout the refresher-training day's topics: first aid, mine gases, ventilation, hands-on SCSR training, etc. More importantly, trainees are afforded opportunities to practice "critical decision making skills in non-routine situations in a non-threatening environment."

Does this activity ensure that a future emergency won't result in tragedy? Unfortunately, there are no such guarantees. Each situation is unique. The number of variables are infinite. Peoples' reactions to any situation are unpredictable. Can it be guaranteed to help miners should a real emergency occur? This may be as close a guarantee as one can get. Everybody learns something, including the trainers who go through the simulation repeatedly with different groups.

One can be reasonably certain that after completing the exercise, everyone will know the value of good communications. Someone will "man" the telephone. Someone will serve as a message "runner." A head count will be made to make certain everyone is assembled. Similarly, it's a safe bet that in one trip, all the first aid supplies will be brought to the accident scene. The list goes on and on.

And there is even better news. Miners like it. Of the hundreds of people who have experienced the simulated emergencies, the complaints could fit on a page from a pocket notebook. Comments are overwhelmingly positive. "This is the best retraining we've ever had. I wish we'd done this every year."

Any time two instructors get together, it's only a matter of minutes until one of them asks, "Got any new ideas for refresher training?" Haven't tried this one? Then say, "As a matter of fact, I do." You won't be sorry.

John Howard is Associate Dean for Coal Mining Technology at Wabash Valley College, Mt. Carmel, IL

Fly ash fix

Penn State researchers and environmental regulators look to power plant waste to abate acid mine drainage

By Ted J. Clutter

Like killing two birds with one stone, Penn State researchers, a waste hauling firm and the Pennsylvania Department of Environmental Resources (DER) have teamed up to curb one ecological problem while helping solve another.

Pennsylvania Bureau of Mining and Reclamation

DER's Camp Run Acid Mine Drainage Abatement Project injected 4,000 cubic yards of cement-like grout made with highly alkaline power plant fly ash to seal "hot," acid forming overburden at an old surface mine site in Clinton County. At left, a volunteer worker sets perforated PVC pipe in one of 650 drill holes at the site that were later pressure injected with the low-cost but highly effective grout mixture.

Though under stringent regulatory controls today, Pennsylvania's long history of coal mining prior to 1977 left some 250,000 acres of land that doesn't measure up to modern reclamation standards, while some old underground and surface sites produce acid mine drainage (AMD). Yet at the same time, Pennsylvania utilities produce some 10 million tons of fly ash from coal-fired boilers every year—a residual waste product now buried in vast landfills under strict—and expensive—environmental regulations.

With the need for low-cost ways to abate water problems at mine sites and the burgeoning issue of waste disposal as utilities increasingly scour their emissions under the mandates of the Clean Air Act, researchers are looking to power plant fly ash as a way to stop production of AMD at its source from both abandoned and active mine sites.

"It's a win-win for everybody," says Barry Scheetz, a scientist at Penn State's Materials Research Laboratory who has designed a process that deploys fly ash to fill underground mine voids and entomb acid-forming materials at old surface mine sites. "Using a waste product like fly ash to encase acid-producing materials and neutralize AMD will help the power industry offset their disposal costs, while cleaning up abandoned mine land and streams for public use."

And that concept is now being tested at a handful of old coal mine sites in western Pennsylvania.

At the northern edge of the bituminous coalfields, DER's Camp Run Project lies within Pennsylvania's Sproul State Forest in Clinton County. According to DER Project Engineer Joe Schueck, the site was surface mined in the mid- 1970s, with "excellent reclamation" under environmental regulations at the time, fostering a thick blanket of grasses, tamaracks and pines. But in the process, he explains, "The operator buried 40,000 tons of coal refuse and pit

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According to the Pennsylvania Department of Environmental Resources, acid mine drainage affects 2,500 miles—or about six percent—of waters in the state. Fish, like the brown trout pictured at right, are especially vulnerable to such pollution—but with remining, innovative government agreements and constructive input by concerned citizens, Pennsylvania surface coal operators can provide the equipment and expertise to reclaim abandoned mine lands, and in the process help recover stream habitats.

Ted J. Clutter/Pennsylvania Coal Association

cleanings in the backfill -and there lies the problem."

Rainwater and oxygen percolating through the replaced rock and soils now chemically react with pyritic materials once sealed by Nature, creating sulfuric acid "plumes" that exit the site to nearby streams. Four acidic discharges with a total flow of 35 gallons per minute surfaced soon after the job was complete, flowing into nearby Camp and Rock Runs. The mine operator started water treatment, but eventually went broke.

The discharges have since killed trout along five miles of Cook's Run, but with a $150,000 research grant from the U.S. Environmental Protection Agency and $50,000 from the coal industry- supported Coal Refuse Disposal Fund, Scheetz and DER volunteers completed a major fly ash injection project at the Camp Run site in 1993 that promises to stop those acidic discharges at their source.

The team started with extensive geophysical mapping to reveal the exact locations of about 20 "pods" of coal refuse within the reclamation backfill that are the site's major AMD sources. Averaging 30' x 50' across and up to 30 feet thick, these areas were then drilled with 4-inch holes on 10-foot centers to the old mine pit floor. Workers ultimately set 13,000 feet of perforated PVC pipe into 650 holes, preparing them for injection with a slurry of fly ash and water.

But not just any fly ash would do for the Camp Run Project. Scheetz chose waste material from a fluidized bed combustor—a utility boiler system that mixes coal with limestone, chemically absorbing most sulfurous pollutants from the coal as it burns. Not only is FBC ash available at low cost, says Scheetz, "Its high alkalinity (pH 12) provides a neutralization effect to acid." And when mixed with water, he says, "FBC ash offers qualities not unlike a low-strength Portland cement, making it perfect for isolating pyrites within the spoil that create the acid to begin with."

Beneficial Ash Management (Morrisdale), which supports Scheetz' research at Penn State, supplied FBC ash to the site from a boiler in Fort Drum, NY. Workers used a conventional cement truck for mixing and transporting some 4,000 cubic yards of grout to the wells, where it was pressure injected directly into and around the pods below. Scheetz and DER officials hoped the grout would not only coat the acid producing materials deep within the reclaimed backfill, but seal fractures in the pit floor suspected of leaking AMD directly into the water table and creating a toxic base flow into Rock Run.

The injection wells took up to 83 cubic yards of grout before overflowing, but some accepted very little. These were capped and trenched with grout to divert ground water and prevent rain water from percolating through the soil to the "hot" pods of mine spoil below. Once the grout hardened (72 hours), workers backfilled and regraded the capped areas while mulching and seeding the site. DER plans further plantings to encourage wildlife.

To determine the effectiveness of the grouting operation, researchers will monitor water quality in Rock and Camp Runs and at a number of on-site wells for years to come, but so far the results are encouraging. "We see a 40-percent improvement in water quality on the site." says Schueck, "and a 90 percent improvement into Rock Run."

With work complete at Camp Run, a looming question is how long will it last? "The chemistry of sulfate-based fly ash grout is similar to that of Roman cement," says Scheetz, who is confident from dissolution tests that his mixture will last thousands of years—like the coliseum and the aqueducts in Italy. "And if it does degrade, it will be like a time release capsule, giving Nature time to heal itself."

Scheetz' fly ash remediation process is now being employed at two other sites in western Pennsylvania, filling AMD-producing voids in a long-abandoned underground mine

in the Moshannon State Forest and paving acidic overburden at a 70 acre Clearfield County site. "We're very excited about using fly ash to abate AMD problems," says Scheetz. "There are hundreds of mine sites that could benefit from the millions of tons of fly ash that is now disposed of in power plant landfills. "

DER currently allows only limited use of fly ash in land reclamation, principally to neutralize the AMD potential of overburden during remining of abandoned sites. The agency's Bureau of Mining & Reclamation is working with the Bureau of Waste Management to develop a new fly ash disposal policy that will allow broader use of this potential tool in reducing the chance that AMD will form at active mine sites as well.

Reprinted from the July 1995 issue of the Pennsylvania Coal Association's ***Pennsylvania Coal Monthly.***

Taking inventory

Since the 1849 Gold Rush, millions of prospectors and miners have combed public lands in the West looking for minerals. They left behind thousands of prospect holes, mines, and mills—many undocumented and most unreclaimed.

No one knows exactly how many abandoned mines the Nation "owns." Nor do we know which sites threaten public safety or the environment.

But geologists and mineral experts at the U.S. Bureau of Mines (USBM) are helping Federal land managers begin to answer these questions.

"The first problem is to get an accurate inventory," explained USBM geologist Twila Frieders. "We can locate many sites on Federal lands using our automated databases and mineral property files."

"We've also developed a screening methodology that can be used to assess a site's relative potential for environmental problems," Frieders said.

The methodology pulls together information on the specific site (production history, commodity toxicity, the presence of a mill or of acid-forming minerals) and its geographic setting (factors such as proximity to populated areas, watersheds, or sensitive habitat). It anticipates potential environmental problems and gauges their probable severity.

"Land managers need a screening approach so they can identify the most hazardous sites and set priorities for field work," Frieders said.

The USBM has helped the U.S. Forest Service and the Interior Department's Bureau of Land Management inventory abandoned mines on public lands in Alaska, Colorado, Illinois, Nevada, Washington, Wyoming, and several other states.

"Unfortunately, there are limits on how much information you can obtain from databases and literature. At some point, you've got to go into the field to see whether a physical hazard or environmental problem actually exists," Frieders said.

The USBM has developed a step-by-step handbook to guide land managers through the mine inventory and hazard evaluation process. It shows the user how to gather information, interpret data, screen sites, and rank them for field study. The handbook also includes guidelines for conducting initial field investigations.

Reprinted from the U.S. Department of the Interior's Bureau of Mine's July 1995 issue of ***Tipsheet****, a monthly publication of the Office of Public Information, Mail Stop 1040, 810 Seventh Street, N.W., Washington, DC 20241*

Workshops on miners' exposure to diesel particulate

Health studies have found diesel particulate matter to be a suspected carcinogen creating concern about the potential health risk to miners exposed to diesel exhaust.

These workshops will bring together in a forum format the U.S. organizations who have a stake in limiting the exposure of miners to diesel particulate. These will include mine operators, labor unions, trade organizations, engine manufacturers, fuel producers, exhaust aftertreatment manufacturers, and academia.

These workshops will provide useful information and stimulate informed discussions about possible approaches to limiting the exposure of miners to diesel particulate. Topics range from "Exposure and Risk" to "Engine Design."

The workshops will be held Oct. 6 in Mt. Vernon, Illinois and Oct. 11-12 at Salt Lake City, Utah.

Contact Keith Gaskill of MSHA at (703) 235-1400 or FAX (703) 235-9412 for further information.

HSA is alive and well

A letter from your retiring president on the progressive state of the Holmes Safety Association

This is to convey to you, the Executive Board, and all chapters and councils of this great Association that it has been an absolute privilege to serve as your President, in essence, from June 1993 to June 1995.

As many of you well know, the progress that the Association has continued to make comes from the dedication of many members of the Executive Board, not the President. And short of the dubious discussion on prayer, I must take this opportunity to thank God for all the members, too numerous to list, who served and carried out, in gallant fashion, their duties and obligations on committee work these past two years.

Then there are those who I believe it is incumbent on me to acknowledge that made my tenure as your President such a privilege. First and foremost is my acknowledgment to the man whom I have considered to be my mentor within this great Association who is, as we all know him, the persistent and lovable Secretary-Treasurer William (Bill) Hoover. I say persistent because we all know that Bill, for lack of a better phrase, "carried this Association" through years of much more trying times than most of us have ever experienced during our brief time, compared to his 35-year tenure with the Joseph A. Holmes Association and its fostered Holmes Safety Association. To many of us, Bill is an inspiration and no less than a "living legend" to the good work that the Association continues to put forth today.

Upon Bill's retirement in 1990, the post of Secretary-Treasurer was then passed to Don Farley. In 1991, Robert (Bob) Glatter took over the position, and has continued to serve JAH and HSA in a manner that we can all be proud. As many of you are aware, Bob took his post as I was fulfilling my first term as the Association's Fourth Vice President. From that day forward, Bob has been a good friend and associate who allowed not only my, but all other good officers, duties to be conducted with ease. His receipt, during our June 1995 National Meeting, of the Ival Van Horne Award for individual dedication to this organization was well deserved.

I would also like to take this opportunity to recognize other individuals whose presidential leadership set, in my opinion, the course of the HSA toward revitalization. And those individuals are Ronald L. Keaton and Thomas J. Ward, whom I had the honor to follow as President. Hopefully I continued to carry out their wishes and desires for a prosperous Association.

Just to name one of those notable wishes was that of T.J. Ward, who established during his tenure, the HSA revitalization committee, which is still going strong today. This committee continues to be co-chaired by T.J. and ardent HSA member Bill Powell, who has the same visions, in short, for the National Committee to get back to the commitments and needs of its grass roots chapters and councils. Under their good guidance, there is no doubt that this shall be done.

Then, of pronounced assistance during my tenure has been that of your new President John Shutack of MSHA, followed by the now First Vice President Steve Walker of vendors, Second Vice President Fred Bowman of state government, Third Vice President Gary Moore from management, and a warm welcome to your Fourth Vice President Roger Carlson from labor. Without the commitment and good backing of these men, the post of President would not have been accomplished with such ease. Nor would such endeavors as the HSA Scholarship Award spawned by Gary Moore, nor other good accomplishments produced by others, have occurred without a great team. I am confident that as each of these officers comes to presidential leadership, JAH and HSA remain in good hands.

Also without question, I must acknowledge the "Man of the Year" and "Woman of the Year" recipients during our June 1995 national meeting. *Man of the Year* Al Simonson from Minnesota made not only our 1995 Minneapolis meeting a success by overseeing basically everything, but also assisted above and beyond the call of duty in our previous (1994 Lexington, Kentucky) National Conference.

There is no doubt that HSA will most certainly prosper with the dedication of individuals such as Al, as it will with *Woman of the Year* recipient Sandy Neal. Given Sandy's service in making sure that certificates were always prepared these past years for council competitions, speakers and numerous other recipients, it was only fitting and timely that she receive appropriate recognition for her good work. Moreover, I see the potential for greater strides in this Association by the involvement of more like Sandy Neal, Cindy Kinard, Cheryl Suzio and others too numerous to mention, to follow in the footsteps of previous Women of the Year, Irmadell Pugh, Judy Tate, Nancy Staley, Donna Schorr, and Penny Traver, just to name a few so deserving in recent years.

As to HSA's future agenda, I believe it will remain *alive and well* in the capable hands of both men and women leaders we are so fortunate to have on the horizon. For this we can be thankful, leaving little doubt regarding HSA's great potential to prosper.

In closing and to all of you involved in the belief that I acted in such good faith to be the first recipient of the JAH William (Bill) Hoover Lifetime Achievement Award, this remains overwhelming to me. In my opinion there were so many individuals more deserving. But I accept with heartfelt thanks to each and every one of you. And, I leave with you my intent to be available and continue to grow with this great organization.

Sincerely yours,

Harry Tuggle

Cyprus Amax develops a practical dry diesel scrubber

New emissions management system virtually eliminates particulate matter

By Steve Fiscor, Intertec Publishing Corp.; Fiscor is managing editor of Coal, E&MJ's sister publication, which serves the North American coal-mining industry.

Underground diesel engines have gained popularity in the United States, especially in coal operations with longwalls. These engines provide the power needed during longwall moves and when hauling supplies to the various mechanized mining units. However, they also have inherent problems, particularly with the exhaust scrubbing devices. Two concerns must be addressed when considering underground diesel scrubbers: the environment and safety. Environmental concerns focus on the diesel engines' exhaust emissions, which pose potential health risks to the miners sharing the common environment. Safety concerns involve aspects that pose a fire or ignition hazard from CH4, coal dust, or spilled fuels.

Cyprus Amax has the largest diesel population in U.S. underground coal and, including the company's mineral operations, perhaps the largest in U.S. underground mining. While some coal companies are bringing diesels on-line, Cyprus Amax Coal Co. has been developing a new dry scrubbing system for its diesel engines.

"We wanted to develop not only a more practical scrubber," according to W. Mark Hart, vice president, Cyprus Amax Coal Co., "we also wanted a system that would enhance the working environment for our personnel."

Norbert Paas, a diesel emissions specialist, owns Paas Technologies, Inc., and has been developing dry scrubbing systems since the mid-1980s. During 1990, Hart took an interest in Paas' system and invited mining equipment manufacturers, including Brookville, Getman, Goodman, and Cooling Systems International, to join in development and certification efforts.

From 1991-1993, the U.S. government's Mine Safety and Health Administration (MSHA) tested and certified the system and Paas was awarded a patent. Six machines have been placed in five Cyprus Amax Coal operations.

"This is a promising example of new technology being applied for underground diesel emissions control," said George Dvorznak, chief of the mechanical safety division, MSHA Certification and Approval Center. He was directly involved with testing and certification of the DST Management System.

In the United States, underground diesels in coal have a history of over 25 years. Initially, during the late-1960s and early-1970s, diesels were used underground primarily in western mines where the relatively thick seams allowed high profile equipment. Only a handful were operating in the East. During the late-1970s and early-1980s, about 90% of the mines west of the Mississippi River were employing diesels underground. Only a few existed in the East.

A number of states had had very restrictive regulations on use of diesel engines in underground coal mines, i.e. Virginia, Illinois, Alabama, Pennsylvania, and West Virginia. The national mineworkers' union had an influential role in that legislation. Its antipathy stemmed from the dieselization of railroads that began in the 1940s and consequent loss of a major coal market and jobs.

Today, all of those states have diesels in some form operating underground, except West Virginia. Changes in the East began with Alabama, followed by Virginia; during the early 1980s, Illinois opened its mines to diesels underground mainly because lower-profile (height) diesel engines attained certification.

During the mid-1980s, the percentage of diesel populations underground in the East essentially equaled that of the West. Underground diesels have seen an increase of about 200 units/yr. As of 1994, an estimated 2,500 diesels are operating in the United States' underground coal mines.

Cyprus Amax's new system

During late 1992, the first prototype, retrofitted to an Eimco 975 mantrip, was placed at the Shoshone mine. The Wyoming mine, with steep gradients, is one of Cyprus Amax's more difficult operations. This was the first water-jacketed, manifold-and-

catalyst scrubber installed on a Caterpillar (Cat) 3304 diesel engine underground. "This was a light-duty vehicle and the mine just wanted to get some hours on the system," said Paas.

After some minor engineering design changes and almost one year later, a second system was placed at Cyprus Amax's Twentymile mine, near Oak Creek, Colo. It was installed on an Eimco 913 scoop, selected for its duty cycles. "The scoop had a more erratic duty cycle, with more power spikes, compared to the first system—which was primarily steady state," explained Paas. The system has remained the same except for some refinements to engineering design.

A few months later, another system was installed on an Eimco 975 flat-bed truck, with a Cat 3304 engine, at the Empire Mine near Craig, Colo. At the same time, Cyprus installed another Cat 3304 system at the Plateau mine in Utah. The mine has been seeking approval for field modification for a two-entry system. "The Cat 3304-based systems have seen a lot of outby operating time, but unlike the Deutz MWM 916-6 based system, have not been MSHA certified yet," said Paas.

The newest system was installed on a Wagner ST5-25X longwall shield-hauler at the Twentymile operation. Although this system is not operational yet, the design concept was changed radically. The fundamentally re-engineered design moved from a direct engine mount to a modular scheme, where the components can be placed anywhere on the machine. This prototype will be the basis for MSHA certification and is targeted for 'inby' (potential explosive atmosphere environment) Cat 6-cylinder diesel engines.

In May 1994, Cyprus Amax began extensive emissions testing of a system on a Deutz 9166 diesel engine at West Virginia Univ. (WVU). Cyprus Amax hopes to place the system at either the Cumberland or Emerald mine in Pennsylvania. WVU is one of the few U.S. universities with underground diesel lab-testing facilities.

"Lab tests supplement in-mine testing by offering a wide range of duty cycles," explained Paas. "Field testing does not allow for certain variables to be isolated, and lab tests provide ideal conditions."

A seventh system was installed on a Jeffrey Ramcar in October 1994 at the Wabash mine in southern Illinois. It is inby-certified, replacing the water scrubbing system with a DST system on a Deutz MWM 916-6.

Water-jacket catalyst?

"The DST system combines several advanced, proven technologies that are extremely effective in reducing gaseous and particulate emissions from diesel exhaust," said Dvorznak.

The 4 components consist of:

- A specially formulated, manifold-mounted, water-jacketed oxidation catalyst;
- A dry tube-and-shell heat exchanger
- A disposable, low-cost filter
- An on-board cleaning system

Also included are the required flame- and spark-arrestors and safety shut-down devices. They are requirements for the system to be considered flame/explosion-proof by government regulatory agencies.

After an initial investment of $25K/machine, the filters cost $50, compared to a ceramic trap that costs about $5,000. The filters have a targeted price of $30.

"This is the only surface temperature-controlled catalyst that provides surface temperatures below the MSHA-required 302° F, simultaneously maintaining the 400° F internal-level needed for catalyst performance," said Paas. It removes most of the CO and unburned hydrocarbons which give diesel smoke the smell associated with diesel-powered equipment.

The dry heat exchanger is a simple, yet effective, two-pass, tube-and-shell heat exchanger. It is designed to be compact with minimal back pressure.

While developing the dry heat exchanger, the designers focused on finding a stabilization rate of the unpreventible sooting process inside the tubes. Since manual cleaning was out of the question, an on-board internal cleaning system was created.

Once the exhaust system reaches a certain back-pressure, the on-board cleaning system is activated by the operator (or automatically). This is done while the engine is operating, and restores the heat exchanger to "as new" condition. The filter safely captures dislodged soot.

"The design objectives for the filter," explained Paas, "were to provide a low-cost, truly disposable, large-capacity filter.'" The filter had to function under all operating conditions from prolonged idle to long periods of full power. The designers also wanted the filter to remove at least 95% of the total particulate matter, with the filter lasting a full week.

"We have achieved filter life of several weeks in actual mining operations," according to Paas. "Particulate reductions greater than 99% and CO reductions of up to 96% have been measured

in the field." All of the components are made from non-toxic materials that will not give off noxious fumes when heated and that have ignition temperatures which are at least twice as high as the operating temperatures. There is no risk of fire from the filter material.

Environmental concerns

Potential health risks from diesel particulate matter have been studied by many organizations. The prior focus has been the chemical composition of the particulates, and the carcinogenic potential of each of the many chemicals that adhere to the carbon particle. The general consensus was that the individual chemicals, which are part of the soluble organic fraction, would be responsible for the carcinogenic potential. More recent studies, however, have identified the size and shape of the particle to be the cause for the carcinogenic behavior of the diesel particulates, with the chemical composition being only a minor contributor.

Whichever school of thought one subscribes to, this system provides a viable solution. Total particulate matter, considered to be the culprit in the most recent studies, is reduced dramatically under all operating modes. The soluble organic fraction, and associated individual chemical constituents, are first reduced at the catalyst and then captured in the filter.

Extensive testing of the DST system on pre-combustion chamber engines has proven to reduce particulate matter by more than 95%, CO by 80-96%, and unburned hydrocarbons by 70-90%.

The catalyst removes unburned hydrocarbons and dries the soot for better filter performance. Rapid exhaust cooling, inside the heat exchanger, encourages soot particles to agglomerate, making them easier to capture in the filter.

The filter captures more than 95% of all particulate matter under all operating conditions. Sulphates from the fuel's sulphur content adhere to the carbon core of the diesel particulates and also are captured in the filter.

Diesel engines used with the DST system are MSHA certified. They are derated to less than the MSHA allowable limit for undiluted CO and are further derated for high altitudes.

The DST system is well-suited for applications where the engine operates under light loads or idles for long periods of time, or where the duty cycle switches between light and heavy loads.

In surface applications where heavy loads are common for extended periods of time, ceramic filters have been successful. However, when the loads are more frequently light, highly cyclical, or when long durations of heavy loads are not encountered frequently, the ceramic trap technology is severely limited. Even with catalytic coatings, fuel additives, external or internal heaters, these limits are present.

Water-filled scrubbers are problematic—difficult to maintain and sometimes impossible to clean thoroughly. The DST system does not use water which eliminates 20-30 rain/shift downtime. Flushing the system is simple, and can be performed while the machine is running. Due to the elimination of the possibility of the scrubber running dry, unscheduled scrubber-induced shutdowns are also avoided.

"Another attribute of the system is the fact that it can operate consistently at any gradient," according to Dvorznak. "Because the water-bath scrubber has been eliminated, the scrubber is not dependent on any orientation."

The DST system is inherently safe and does not rely on sensors and floats. It has several safety features that include three safety shutdown sensors for:

- Exhaust gas pressure
- Exhaust gas temperature
- Coolant temperature

The system also uses a set of redundant flame arrestors

Components are designed from non-toxic materials, will not give off harmful gases when heated, and will not burn under any operating conditions. "It should be stressed that even though this unit is certified for inby use," said Dvorznak, "it has more potential applications on outby machines because it largely eliminates the particulate matter."

"We are extremely proud of all the people who helped us reach our achievements to date," added Hart. Cyprus Amax plans to install approximately 100 systems during the next three years.

Reprinted from the June 1995 issue of Maclean Hunter Publishing Company's ***Engineering and Mining Journal*** *(E&MJ), Features section; Pg. WW54.*

Acknowledgements:
E&MJ appreciates the assistance of: George Dvorznak, Chief of Mechanical Safety Division, Mine Safety and Health Administration; Ron Eberhart, Goodman; Dana Getman, Getman; Bruce Spence, CSI; and Dalph McNeil, Brookville Mining Equipment (fabricators); W. Mark Hart, Vice President Empire, Shoshone, Twentymile Business Unit, Cyprus Amax Coal Co.; and Norbert Paas, Paas Technologies, Inc.

WINTER ALERT

October through March 1995-96

Zero in on the Winter Alert

You'll be on target if you take extra care with:

1. **Ventilation**
2. **Mine examinations**
3. **Control of ignition sources**
4. **Rock dusting**

Fire escape

If you're like most people, you probably don't think about fire at all. But think about it we must, say the experts, because a real fire could be deadly. It's excruciatingly hot; the rooms fill with smoke that makes it impossible to see; toxic fumes make thinking and reacting difficult; and every second counts.

Of the nearly two million fires each year, about 80 percent occur in the place people should feel safest—the home. While you can't prey vent every home fire from happening, you can be prepared if one does occur. According to the National Fire Protection Association (NFPA), working smoke detectors and a well rehearsed escape plan form the first line of defense against injury or death in a home fire. "Being in a fire is disorienting and terrifying—it's no time to decide how to get out," says NFPA's Meri K. Appy, who heads up the organization's public education mission. "Planning your escape before a fire occurs could save your life."

A way out

Appy recommends that you start by considering your home and what your escape needs are. Walk through all the rooms and make sure you have two ways out of each, a primary way—usually the door—and a secondary route in case the door is blocked by smoke or flames. Check to make sure all stairways are clear of debris and that the doors are not blocked by furniture or heavy toys. If doors have double-bolt key locks, keep the key in the lock or on a hook in a safe location so you won't get trapped inside. Try opening all windows to make sure they haven't been painted or nailed shut. Burglar bars should have a quick-release mechanism. Think about each window as a possible escape route; is it low enough to hang from and then drop to the ground? See if there is a porch roof overhang, or other structure you could drop to. If you have a two- or three-story home, you might want to consider buying laboratory-approved fire escape ladders, and keep them near the upstairs windows in a location that all family members are aware of.

Planning ahead

Once you're convinced that all exits are clear and everyone knows two ways out of each room, check to be sure that you have enough smoke detectors— one on every level of the house, as well as inside bedrooms for extra protection—and that each unit is in working order. Test smoke detectors at least once a month and replace the batteries once each year. If your smoke detectors are more than ten years old, replace them with new detectors.

"The whole family should be involved in fire escape planning and practice, including children," says Appy. Draw a plan of your home showing two ways out of every room and a meeting place outside, where the family will gather once safely out. Make sure everyone recognizes the sound of the smoke detector and knows what to do if the alarm sounds. The rule to remember is to get out first, then

Five simple steps to fire safety

- If your smoke detector goes off or you suspect a fire, immediately stop whatever you're doing and begin your escape.
- Feel the door; if it is hot to the touch, don't open it; use your secondary exit. If the door is cool, brace your shoulder against it and open it slowly; be ready to slam it shut if you see any smoke or flames.
- If the way is clear, proceed to your exit carefully.
- If you encounter smoke or flames along the way turn around and use your secondary exit. If you must escape through smoke, crawl low to the floor where the air is cleaner and cooler—about 12 to 24 inches off the floor.
- Once outside, call the fire department and then go to your meeting place. If you think someone is trapped inside, tell firefighters, who are trained and equipped to perform rescues.

Reprinted from the October 1994 issue of ***Home*** *magazine.*

Test your fire safety IQ

Did you know that of the approximately 800 deaths from fire each year in Canada, 85% happen not at work, but in the home? Test your knowledge of home fire safety by taking the following quiz (answers are below). If you miss a few questions, you might want to call your local fire department and request all available literature.

1. Which season has the largest number of home fires?

2. Which of the following time periods accounts for the largest number of fire deaths? A. midnight to 4 am B. 4 am to 10 am C. 10 am to 6 pm D. 6 pm to midnight

3. What is the major cause of home fires that result in fatalities?

4. What percentage of adult fire victims are impaired?

5. By what percent do smoke alarms increase your chance of surviving a fire? A. 25% B. 50% C. 75% D. 90%

6. Name one place in the home where you should NOT put a smoke alarm.

7. If a pan of grease or oil on the stove bursts into flame, what should you do?

8. The minimum time it can take a small fire in a waste basket to totally engulf a two-story house is: A. 5 minutes B. 15 minutes C. 30 minutes D. 45 minutes

9. If you are awakened by a smoke alarm in the middle of the night, the approximate amount of time you have to escape the house is: A. 1 minute B. 2 minutes C. 5 minutes D. 10 minutes

10. What type of fire extinguisher is most suitable for the average home?

11. True or false: most fire victims die of third degree burns.

12. True or false: test buttons on smoke alarms only tell you if the battery is charged.

Answers to fire safety quiz

*1. **Winter.** Space heaters, wood stoves, and other heating equipment are common sources of fire, as are dry Christmas trees and faulty electric tree lights.*

*2. **Midnight to 4 a.m.** One third of all fire fatalities occur during these hours. This underscores the importance of smoke alarms and well-rehearsed emergency escape plans. Rather than awaken you, smoke may put you into a deeper sleep due to the presence of carbon monoxide and other gases.*

*3. **Careless smoking.** Smoking when tired, especially if alcohol is involved, is an extremely dangerous practice.*

*4. **Thirty-three percent** (one third) of adult fire victims are impaired.*

*5. **B. 50%.** The other 50% is up to you. Again, well-rehearsed emergency escape plans are vital.*

*6. **Do not** place smoke alarms in small kitchens, bathrooms, near ceiling fans or other air moving equipment, or in corners where there may be dead air pockets.*

*7. **If it is small** and you can safely approach it, slide a lid on the pan and turn off the heat. Otherwise, leave the house and call the fire department from a neighbor's. You could also use the appropriate fire extinguisher. Never put water on a grease fire.*

*8. **A. 5 minutes.** This rapid spread is due to the flashover effect where superheated gases mix with oxygen in other parts of the house and ignite into fireballs.*

*9. **B. 2 minutes.** Smoke and fumes can quickly make it impossible to find your way around a house you have lived in for years. There is no time to collect valuables, or to get the family pet, or even to call the fire department (call from a neighbor's).*

*10. **ABC (multipurpose).** Class A fire extinguishers are for burning wood, cloth, paper; Class B. flammable liquids, oil, grease, fats; Class C, live electrical equipment; Class D, combustible metals such as magnesium. So unless your mag wheels burst into flame, an ABC extinguisher will do the job.*

*11. **False.** Most victims die of smoke inhalation. Fire consumes oxygen, forcing you to breath more quickly. Fire also produces carbon monoxide which enters the body 200 to 300 times faster than oxygen, causing disorientation and eventually death.*

*12. **True.** Test buttons only confirm that there is power, not that the alarm is working. Smoke alarms should be tested every six months by holding a piece of burning incense or smouldering string under them. Alarms should also be vacuumed periodically to prevent dust clogs.*

*Reprinted from the Ontario [Canada] Natural Resources Safety Association's **Safety Reminder** P.O. Box 2050, 690 McKeown Avenue, North Bay, ON P1B 9P1*

TVA meets clean air goal with Cumberland scrubbers

KNOXVILLE, TN—The Tennessee Valley Authority (TVA) has spent more money to install emission scrubbers at the huge coal-fired Cumberland Steam Plant than it cost to build the facility.

But the payoff from the $550 million investment is a dramatic decline in acid raincausing emissions and compliance with 1995 federal clean air standards. Officials at TVA, one of the nation's major emitters of acid-rain causing pollutants, acknowledge the Cumberland scrubbers won't do it all. But the impact should nevertheless be substantial.

Moreover, Cumberland plant manager Larry Moody said that meeting the Clean Air Act's 1995 requirements with changes at one plant "buys us some time to more economically phase in other units and hold down rates."

Cumberland's two 1,300-megawatt units are the largest in TVA's 59-unit, 11-station system, and the worst offenders.

Installing scrubbers will reduce emissions of sulfur dioxide from 470,000 tons a year to about 30,000 tons, TVA estimates. Even while continuing to use the politically sensitive, high-sulfur coal mined in western Kentucky.

Scrubbers came on line at Cumberland Unit 1 in October and ran for 80 days without an interruption. Moody is expecting similar success with the Unit 2 scrubbers that began operation earlier this year.

TVA is required under the 1990 Clean Air Act to reduce emissions at its 26 worst units to 538,000 tons by 1995. It has another 270,000 tons in pollution credits for adopting the scrubber technology at Cumberland. That's a total of 808,000 allowable tons of emissions for the worst half of its system. But TVA projects that emissions from the entire system will reach 880,000 tons this year, including the 29 other units that won't come under consideration until the year 2000.

TVA currently has scrubbers at two other units in Kentucky and two units at an Alabama station with a third unit scheduled to receive scrubbers soon.

Reprinted from the February 1995 issue of Acquire's ***COAL TODAY.***

What's in a house number?

What's in a house number?

Imagine an illness or accident happening to you, your child, or loved one. You are in a state of panic, need help, and go to the phone to dial 9-1-1. Every second counts to assure the best possible care is given in a time of crisis. Minutes seem like hours as you await professional assistance.

Emergency personnel know about time. The time it takes to be dispatched, obtain street directions from maps, fight traffic, sometimes in inclement weather conditions.

Emergency personnel also know the frustration of arriving on the correct street, only to find none of the house numbers are clearly visible—even with a spotlight!

The next time someone asks, "**What's in a house number?**" to you, please respond by saying, "**a life.**"

Can YOU pass the "What's in a house number test?"

1. Are your house numbers 5 inches in height?
2. Are the house numbers reflective and on a contrasting background?
3. Are your numbers placed in a conspicuous place that can be easily seen from the roadway, free from obstruction?
4. If there is more than one structure sharing a common entry or driveway, are the numbers addressed in sequence?
5. Are your house numbers illuminated or easily visible at night?
6. Are your house numbers of plain block numerals—NOT script or written numbers?
7. If you live in a rural area, are your house numbers placed on mailboxes as well as on or near your house?
8. If you live on a corner lot, do your house numbers face the street that is named in your address? Reminder: House numbers painted on curbs can be easily covered by snow, leaves, or blocked by cars.

Information provided by Debbie Hayre, Silver Spring, Md. Volunteer Fire Dept.

Reprinted from the March 1995, Vol. 7, No. 1 issue of ***SAFETYLINE SIGNALS,*** *Official publication of Maryland's Montgomery County Volunteer Fire-Rescue Association and Auxiliary Fire and Injury Prevention Committee.*

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Fire at South African gold mine sealed off

Johannesburg, July 2—An underground fire which killed six miners at St. Helena gold mine near Welkom in South Africa's Free State province has been sealed off, a spokesman for the mine owners (Gengold Corp.) said Sunday.

Sunday [July 2], Mineral and Energy Affairs Minister Pik Botha praised the "heroism" of three miners who died trying to warn their colleagues of an underground fire at St. Helena gold mine near Welkom in Free State province.

"The heroism and selflessness of the three miners who ran back through the smoke to warn their fellow workers serves as an inspiring example to us all," Botha said in a statement.

A total of six people died late Saturday in the fire and eight others suffered from smoke inhalation, mine owners said.

Gengold spokesman Andrew Davidson said 9 men had been returning from their shift when they noticed smoke some 1,600 meters (5,280 feet) below the surface.

He said six of the group realized that 3 of their colleagues were still coming up the shaft and rushed back through the smoke to warn them.

Three did not return and died with the 3 miners they had tried to warn. The other 3 were able to make it to the surface.

Davidson said fire fighters had sealed off the fire early Sunday but were battling to extinguish it. Management had cancelled the Sunday morning shift.

In his statement, Botha said the South African government was moving urgently to implement new mine safety procedures recommended earlier this year by a commission of inquiry into the mining industry.

The cabinet, Botha added, had last week approved the introduction of the new measures into all mines in the country and new legislation giving effect to the plan is to be put to parliament at its next session in August.

The minister said he had instructed the government mining engineer not to wait for the new law to be enacted before implementing the safety procedures. He urged mining houses to do the same.

More than 70,000 miners have been killed in South African mines since the turn of the century, including 104 people who died last May at Vaal Reefs mine near Orkney in North-West province when a runaway underground locomotive plunged down an elevator shaft onto a lift cage crammed with night shift workers.

A survivor of an underground fire at St. Helena gold mine near Welkom in Free State province Sunday told of desperate efforts to reach fellow workers trapped in a mine shaft behind a curtain of dense smoke.

Crosby Matimba, 31, told the national news agency, SAPA, that he and his team leader were conducting operations using a transvac system—sweeping up small particles of ore—when they detected a smell of smoke.

"At first we thought it was fumes from explosives," Matimba said.

Almost overcome by the fumes and blinded by dense smoke, he managed to crawl along a railway track to the safety of a mine relay station.

"I was blinded by the smoke and could not find my way," he said. "So I crawled along the railway track into the shaft."

From the station, he said, he and two other miners attempted to go back to try to rescue two team leaders trapped by the fire.

"The smoke was too thick," Matimba said. "We had to turn back."

Four other men who had reached the station, however, returned into the smoke in a bid to rescue the two men.

"They never came back," Matimba said.

Mineral and Energy Affairs Minister Pik Botha praised the miners who died trying to rescue trapped fellow workers.

"The heroism and selflessness of the miners who ran back through the smoke to warn their fellow workers serves as an inspiring example to us all," Botha said in a statement.

Gengold Mine owners said Sunday that 14 teams were busy sealing off the fire.

Reprinted via Reuters News Agency and Agence France Presse, from the July 3, 1995 issue of Caledonian Newspapers Ltd's ***The Herald*** *(Glasgow, Scotland).*

Let the sun shine

Mineral processing uses huge amounts of energy—most of it from nonrenewable sources. Experiments by the U.S. Bureau of Mines (USBM) and the Energy Department's National Renewable Energy Laboratory (NREL) suggest that someday the mineral industry may tap the sun instead to meet some of its energy needs.

Preliminary tests show that concentrated solar energy can be used to expand perlite—a natural volcanic glass used as insulation material, filter media, and lightweight filler for the manufacturing, horticulture, and construction industries.

Researchers chose perlite expansion as a demonstration project because it is a fairly simple, but energy-intensive process. When heated quickly to between 870 and 1,100 C°, perlite rock softens, its water content vaporizes, and the particles "pop," expanding up to 20 times their original volume. Fuel accounts for as much as 70 percent of the cost of producing expanded perlite.

"We see solar processing as a way to conserve energy, prevent pollution, and reduce costs," explained USBM mining engineer Doug Ward.

For the perlite tests, researchers used an existing NREL solar

furnace (an array of large mirrors that track the sun, reflect its light, and concentrate its energy) to expand sample particles.

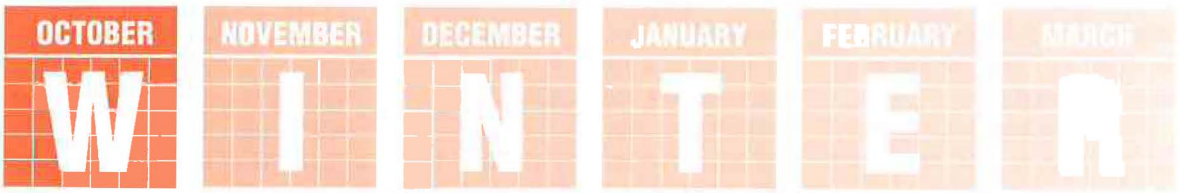
"It's a lot like frying ants with a magnifying glass, only on a much larger scale," Ward said.

Researchers acknowledge that solar energy has some inherent limitations. "Solar power probably wouldn't replace conventional furnaces, but it could provide a less expensive, environmentally sound alternative when weather and other conditions permit," Ward said.

The perlite demonstration has attracted the interest of several industry and academic groups. "We're now trying to put together a joint venture that would include the Bureau, NREL, and private sector partners," Ward said. That effort would involve bench-scale tests, economic evaluation, and the eventual construction and operation of a full-scale pilot facility.

"Our work makes an inroad into a whole heap of potential applications in the mineral processing arena," Ward said. "Solar energy could be used for just about any procedure that requires heat or burns fuel."

Reprinted from the U.S. Department of the Interior's Bureau of Mine's July 1995 issue of ***Tipsheet****, a monthly publication of the Office of Public Information, Mail Stop 1040, 810 Seventh Street, N.W., Washington, DC 20241*



ALERT reminder: *● Always maintain adequate mine ventilation and make frequent checks for methane and proper airflow. ● Know your mine's ventilation plan and escapeways. Properly maintain methane detection devices. Communicate changing mine conditions to one another during each shift and to the oncoming shift. ● Control coal dust with frequent applications of rock dust. ● Make frequent visual and sound checks of mine roof during each shift. NEVER travel under unsupported roof.* Adapted from Va. Dept. of Mines, Minerals, & Energy

JAH awards presented at east Texas/Louisiana council meeting

Pictured (left-to-right) are Donalee Boatright, McAlester, OK Subdistrict Manager; Fred Tony, equipment operator; Davis W. Hooten, Jr., shovel operator; and Bill Mersino, mine manager.

Joseph A. Holmes Safety Association Awards were recently presented at the East Texas/Louisiana Council meeting held in Longview, Texas. Mr. Donalee Boatright, Subdistrict Manager in McAlester, Oklahoma, presented the awards to Mr. Fred Tony, equipment operator, who began his employment with Norit Americas, Darco Strip, in 1961, and has worked more than 34 years without a lost-time injury. The other award was given to Mr. Davis W. Hooten, Jr., shovel operator, who started to work for Norit in 1942, and has worked more than 41 years. Mr. Bill Mersino, Mine Manager, also helped in the presentation of the awards.

Judy Tate, McAlester, OK Subdistrict Office, July 1995

Agency hopes to make mines vandal proof

Safety 1st: agency praised for covering mine shafts
41 abandoned openings in Tintic District get new vandal-proof grates

By: Mike Gorrell, reporter for the The Salt Lake Tribune

Eureka, UT—A sizable rock in hand, Louis Amodt walked slowly across the rebar poles covering an old mine shaft like the stringing of a tennis racket.

When he reached the center of the 30-foot-wide void, he stopped and dropped the rock through the steel grid. Then he listened.

A mental clock ticked off the seconds. One thousand, one. One thousand, two... One thousand, 11. One thousand, 12.

No sound returned from the shaft's depths until the countdown reached 15. Even then, from the way the noise echoed back it was apparent the rock had hit the shaft's side, not the bottom. No sound documenting the end of its fall reached the surface.

This shaft is at least 1,500 feet deep, figuring each second reflects about a 100-foot drop, said Amodt, a senior reclamation specialist and geologist in the Utah Division of Oil, Gas and Mining.

"If you fell in there, it would take two days to get you out," he added.

To keep people from making that deadly plunge, Amodt and his division colleagues developed what they hope are vandal-proof grates to cover this shaft and 40 other abandoned-mine openings in the historic Tintic Mining District, 70 miles southwest of Salt Lake City along the Utah-Juab county border.

Their work impressed the U.S. Office of Surface Mining. The Tintic project was one of nine to receive awards in Park City at the 16th annual conference of the Association of Abandoned Mine Land Programs.

"These national winners have properly set the highest standards of excellence for efforts to reclaim our abandoned mine lands and safeguard the environment," said a statement by Interior Secretary Bruce Babbitt, who oversees the Office of Surface Mining.

The safety threat in the Tintic Mining District was identified in 1984 when the Division of Oil, Gas and Mining conducted an inventory of abandoned hard-rock mines around the state. About 10,000 were found.

High priority:

Tintic was given a high-priority rating, Amodt said, partly because the risk of a deadly accident was worsening as mountain biking and hiking attracted more people to the East Tintic Mountains.

But resolving Tintic's problems posed a special challenge. The mining district is a National Historic Site, so any reclamation techniques that destroyed the visual appearance of the shafts were prohibited.

Moreover, many shafts are linked underground to tunnels from other area mines. The owners of those other mines objected to techniques that altered underground ventilation patterns or inhibited the use of technological advances that could make mining profitable again and restore the district to prominence.

Founded in 1869 and named after a Ute Indian chief who lived in the area, the Tintic district was Utah's leading mining center by 1899. Four major mining operations, financed largely with money from Eastern and Midwestern investors, had taken over from small-time prospectors and were removing millions of dollars worth of gold, silver, lead and copper from the Earth.

The community of Eureka evolved in a gulch that weaves through the west-desert range as miners and merchants, teamsters and other settlers were lured by prospects of striking it rich—or at least landing jobs with regular paychecks. One was Amodt's grandfather, who is buried in the Eureka cemetery.

Some people did get rich, but many did not as the district went through the typical mining cycle of boom and bust. The busts were longer and deeper after the turn of the century, eventually resulting in the cessation of mining by 1960.

"Hundreds of mine openings were abandoned one by one without any thought of reclamation or the safety hazards created by the open shafts and portals," Amodt noted.

Keeping vandals out:

Since it is Amodt's job to give thought to precisely those things, he had to develop a reclamation program that minimized the threat without violating the mines' historic integrity or the wishes of the property owners.

And his solution had to withstand attacks from vandals. It is unbelievable, he said, how many are out there.

As an example, Amodt noted that the shaft where he dropped the rock once was surrounded by a chain-link fence with posts embedded in concrete. But on one trip to the site, Amodt discovered the posts had been yanked out of the ground, probably by a chain hooked to a powerful pickup.

He shook his head at the memory of seeing "little footprints—it couldn't have been from a kid more than 3- or 4-years-old— standing right on the edge."

Tough to cut:

The vandal-proof closure designed by Amodt's group and installed by crews from Price Steel Fabrication crisscrossed the openings with inch-diameter rebar poles eight inches apart.

"You can wear out a hacksaw blade pretty quick trying to cut rebar that thick," Amodt said. To make the grate even more secure, crisscrossing poles were welded together where they intersected. Steel I-beams were added at some larger openings to provide extra weight and strength. The ends of the poles also were encased in concrete foundations poured on the bedrock around the hole.

The work was done in the fall of 1992 and spring of 1993. It cost $115,366—almost $4,500 per hole.

Based on conversations with old-timers and sheepherders and a systematic check of the terrain, Amodt said he has "fairly high confidence that we got all of the openings," even those hidden beneath the expansive branches of clusters of sage brush that flourish in the semi-arid environment.

Still, the remote possibility that others exist—or may open up if the ground above old mine workings collapses—makes it imperative for anyone exploring the area to be careful, he added.

No fatalities have occurred at abandoned mines in Utah since 1985, when three people died in separate accidents.

Reprinted from the Local section of the September 26, 1994 edition of the ***Salt Lake Tribune****, page B-1.*

Health

New imaging technology for detecting tumors is being developed by Thermal Wave Imaging (TWI) of Lathrup Village, Mich. Under a contract with the Of fice of Naval Research, TWI will investigate the use of light as an analytical tool for the detection of small masses obscured by their surroundings. 'Photo Density Wave Inversion' was originally used to enhance thermal wave images of subsurface defects in metal and composite materials. By extending the technique to work with light rather than thermal waves, it could provide a simpler, less expensive alternative to such tumordetecting devices currently under study that employ exotic lasers and detectors.

Ticked off by ticks? Perkasie, Pa.-based Scandinavian Naturals is marketing a new instrument, made of surgical steel, developed for tick removal. 'The TickPick' uses a cylindrical design to reverse the burrowing action of the tick, allowing the parasite to be quickly and effectively removed in a single piece. Its spring-loaded pinching action applies a predetermined amount of pressure, and fine, angled pincers permit precise placement on the tick's neck without touching its poison-filled body. The device lists for $14 and is available in drug stores, sporting goods stores, and supermarkets nationwide; or call 800/688-2276.

Reprinted from the July 5, 1995 issue of Automation News Network's ***IndustryNet Report.***

Help for hard-to-heal wounds may come with a new device recently approved by the FDA. Developed by doctors at Wake Forest's Bowman School of Medicine, the Vacuum Assisted Closure (VAC) device uses a pump to draw away excess fluid and bacteria through a tube and sponge trimmed to fit the wound. An adhesive drape keeps the sponge in place and creates an airtight seal. The tension placed on the skin increases cell reproduction and promotes cell growth from the center of the sore outward. The VAC is also more convenient and less costly than conventional treatment methods in that the wound is changed only three times a week, instead of once or twice a day. The device has been licensed by Wake Forest to San Antonio, Texas-based Kinetic Concepts, which is test marketing the device in 12 states.

Reprinted from the June 14, 1995 issue of Automation News Network's ***IndustryNet Report.***

Assisted CPR in situations not conducive to manual CPR—such as confined spaces, water rescue and medical transport—may soon be possible with a portable device developed at Johnson Space Center. Unlike some other devices designed for the same purpose, this one requires no structural attachments or supplemental restraints. The device includes a pair of levers hinged to a compression pad, which is positioned on the patientls sternum. By use of the lever and tension straps, an effective combination of compression of the entire chest by constriction via the chest strap and localized compression of the sternum via the compression pad can be applied. It can be stored compactly and deployed quickly to perform prolonged and effective CPR. For more information, call JSC at (713) 483-0474, refer to MSC-22148.

Reprinted from the May 3, 1995 issue of Automation News Network's ***IndustryNet Report.***

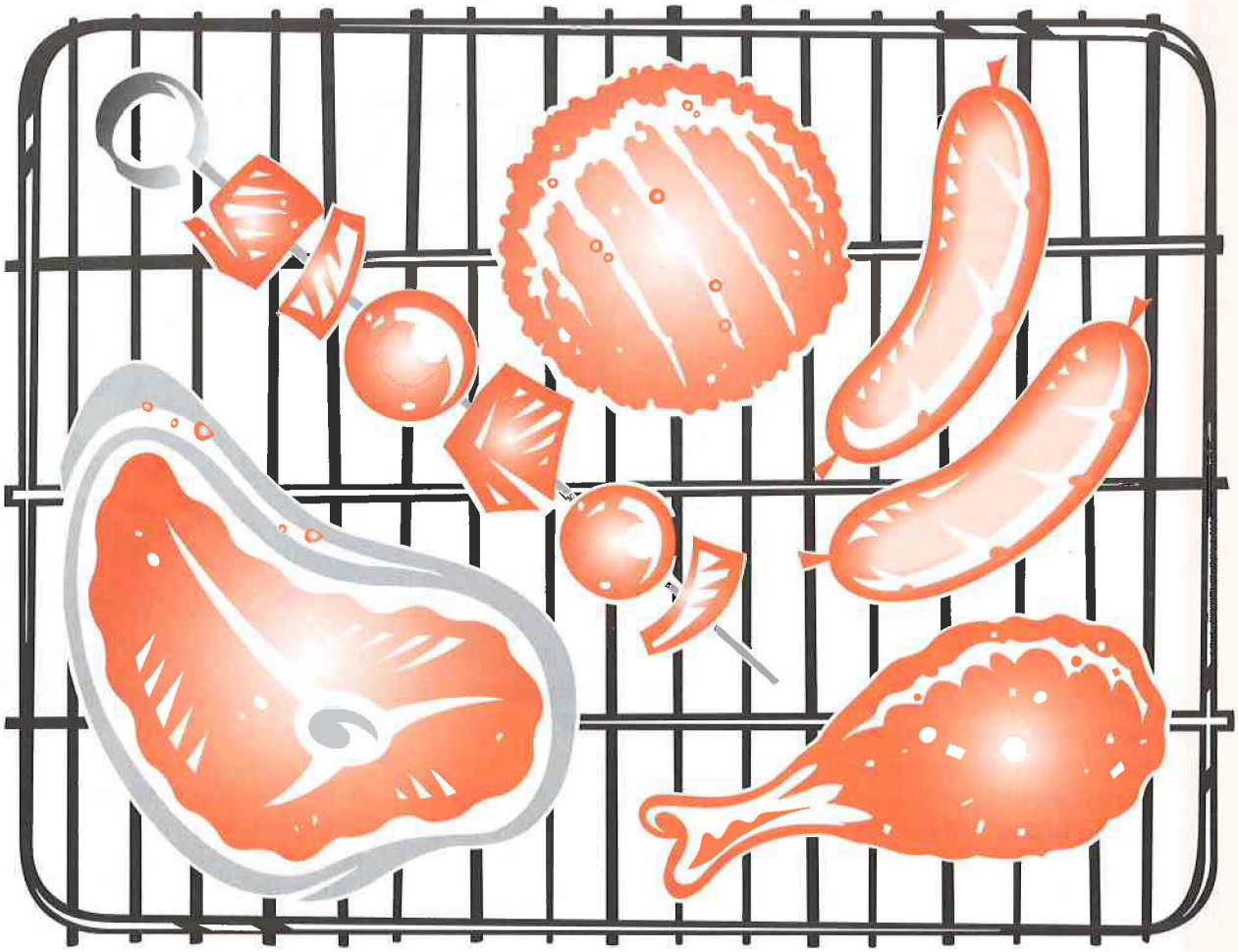
Home

The radon monitor may soon join smoke and carbon monoxide detectors as home essentials. Los Alamos Lab is working on a prototype of a home radon monitor that would be as reliable, easy to use and affordable as the common home smoke detector. Using an advanced electrometer, the device is able to detect and count individual radon particles. The monitor can continuously measure radon levels, triggering an alarm if the levels exceed some threshold value. The monitor will also have the ability to store a year's worth of measurements, which could be read out and analyzed to determine a radon concentration history for a dwelling. The lab has received a patent on the device and is seeking an industrial partner for commercial development.

Reprinted from the May 3, 1995 issue of Automation News Network's ***IndustryNet Report.***

Reduce accident risks

Check safety of LP gas grills



By Bob Crawford

Easy start-up and cleanup have made cooking on liquefied petroleum (LP) gas grills an increasingly popular choice for summer barbecues.

Because LP gas is highly flammable, it should be handled carefully. Before firing up the grill, take these steps to ensure a safe cookout:

- Transport LP gas tanks in a secure upright position.
- After barbecuing, make sure the grill has been turned to the "off" position. Always keep the LP gas tank service valve closed when not in use.
- Use a safety plug when LP gas tank is not connected
- Never use or store LP gas tanks indoors or in an enclosed area.
- Never leave a tank—empty or full—inside a vehicle.
- Carefully follow the grill manufacturer's instructions.
- If you smell a strong odor of gas, call your gas company immediately. Check the cylinder service valve to make sure it is turned off.
- Before using, make sure gas grill cylinders are not dented or damaged. If a cylinder needs attention, take it to your local gas company.
- Periodically check all grill fittings and connections by brushing them with a soap and water solution. Bubbles will appear if gas is leaking.
- If you can't light your grill, don't fight it! Contact your gas company.

Bob Crawford is the Commissioner of Agriculture for the Florida Department of Agriculture and Consumer Services.

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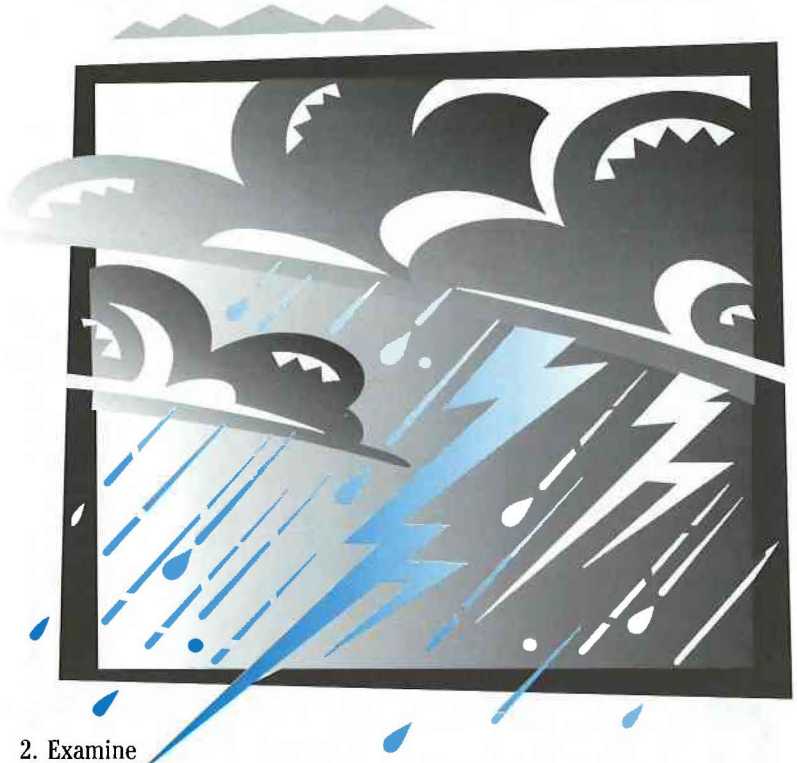
Don't rely on local emergency personnel

Develop a hurricane emergency plan

By Ron Pittser, PCAM

[Weather scientists predict that this hurricane season shows signs of exceeding the previous all-time high of 21 storms in 1933. Ed.]

From June 1 to November 30, many people on the Gulf and East Coasts of the United States are threatened with the devastating effects of a hurricane. Protect yourself and family by preparing for hurricane season in advance.



Begin by checking with your local disaster coordinator. Obtain evacuation plans for the area and find out which communication system local authorities will be using prior to and during the storm. Obtain the location and types of shelters that will be established and find out which one is closest to your home.

Then do your homework. Decide what to do when the National Weather Service issues a *hurricane watch*—a notice that is issued 48-72 hours prior to the emergency; decide what to do when the service issues a *hurricane warning*— a notice that is issued 12-24 hours prior to the emergency; and decide what to do when the storm is over.

Finally, write a plan taking into account your family's size, location, and amenities:

1. Prepare an emergency information form. Distribute it to the members. Identify individuals who may need assistance during an evacuation. Identify those individuals on a map [if you live in an enclave of nearby families] so they can be reached more easily.
2. Examine the common elements to identify potential problems (e.g., signs, landscaping, roofs, fences, trash areas, lighting fixtures, and trash receptacles). Also examine all trees on the property, especially the roots and dead branches. Develop a list of repairs.
3. Store supplies that will be needed prior to the storm, such as materials to board up windows, sandbags, first aid equipment, flashlights, batteries, emergency generators, and water.
4. Store family records in a safe place. Establish a procedure for moving them, if needed.
5. Prepare a list of contractors who could assist after the storm has passed. Make arrangements with the contractors before the storm strikes.
6. Establish an evacuation plan.
7. Set up an emergency information center.
8. Establish a procedure to review and update the plan annually prior to the hurricane season.

Once the plan is developed, distribute it to family members. Make sure that they understand the difference between a hurricane watch and a hurricane warning. Conduct several practice sessions. Teach family members First Aid and CPR.

Don't wait until a hurricane warning is issued to develop a disaster plan. Prepare family members to handle emergency services so they can help mobilize your community when a hurricane hits.

Ron Pittser, PCAM, is a community manager with PMI Management in Virginia Beach, Virginia.

Reprinted from the July-August 1995 issue of the Community Associations Institute's ***Board Briefs.***

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Cover photo of the Joy 14CM10 continuous miner courtesy of ***Joy Technologies Inc.*** *We welcome* ***any*** *materials that you submit to the Holmes Safety Association Bulletin. We especially need color photographs (8" x 10" or larger—color negatives are acceptable) for our covers. We cannot guarantee that they will be published, but if they are, we will list the contributor(s).*

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Mark your calendar NOW!

Coming events:

- *Workshops on Miner's Exposure to Diesel Particulate, Oct. 6 at Holiday Inn, Mt. Vernon, IL, and Oct. 11-12 at the Salt Lake Hilton, Salt Lake City, UT*
- *Fifth Annual Mine Health & Safety Conference, Oct. 31-Nov. 2 at Oklahoma City, OK*
- *1995 Pennsylvania Ground Control Seminar, Nov. 1 at Somerset, PA*
- *Holmes Safety Association, Executive Committee Meeting, Nov. 16-17 at the Hyatt Regency Hotel Lexington, KY*