## Contents

**Feature**
- 2011 TRAM Competition Winners ................................................................. 3
- Mine Emergency Response Development/ Mine Rescue Contest .................. 4
- The Cross Mountain Mine Disaster ............................................................... 16
- Lifesaver Award ............................................................................................. 20
- What 2011 Had In Store for Kevin Dycus .................................................... 22
- Spring Thaw Conference .................................................................................. 23
- Council Updates .............................................................................................. 24
- National Mine Rescue Association Application Information .................... 26
- JAHSA National Executive Officers .............................................................. 27

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2011 TRAM Training Materials Competition
FIRST PLACE AND GRAND PRIZE WINNERS
October 4, 2011

Video Category Winner
Bevill State Mine Technology
Montpelier, VT
“Virtual Emergency Mine Training (VEMT)”

Printed Material Category Winner
PotashCorp
Aurora, NC
“PotashCorp Hazard Training 30 CFR §48.31”

Mixed Media Category and Grand Prize Winner
Center for Business & Industry at South Central College
North Mankato, MN
“MSHA46.com Digital Training System - HAZCOM”
Mine Emergency Response Development/ Mine Rescue Contest: A Combined Exercise

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Abstract
Mine emergency response development (MERD) training exercises were authorized in the Mine Rescue Teams regulation 30 CFR 49.60(b) as a way to satisfy the 2006 Mine Improvement and New Emergency Response Act of 2006 requirement for all coal mine rescue teams to participate in two local mine rescue contests (MRCs) per year. In April 2008, eight mine rescue teams participated in a combined MERD and MRC at the National Institute for Occupational Safety and Health, Office of Mine Safety and Health Research, Safety Research Coal Mine (SRCM) located in Pittsburgh, PA. In 2009, two combined MERDs/MRCs were conducted—one with six teams at the Mining Technology and Training Center (MTTC) in Ruff Creek, PA, and the other with five teams at the National Mine Health & Safety Academy Mine Simulation Lab (MSL) in Beckley, WV. These three MERDs were designed to fulfill the requirements necessary for consideration as MRCs. However, the exercises varied in the use of command structure and personnel.

MERDs and MRCs were developed for very different reasons, but both are important to learning and emergency response preparedness of mine rescue teams. The purpose of an MRC is to build teamwork, train, and demonstrate the level of skills required to respond to a mine emergency, with a winning team chosen based on performance. The purpose of a MERD is to improve crisis management skills for the individuals making critical decisions in the command center (CC). These two purposes can be in conflict unless accommodations are made to satisfy the training needs of both the teams and the CC personnel. This paper describes the three MERDs and explores whether these exercises can be successfully used to enhance mine rescue team capabilities while meeting the requirements for MRCs.

Introduction
Prior to passage of the Mine Improvement and New Emergency Response Act of 2006 (MINER Act), mine rescue teams were classified in two ways: as “competition teams” that spent a large percentage of their training time on contest rules and procedures, or as “go teams” that seldom, if ever, participated in mine rescue contests (MRCs) but responded to mine emergencies. Training time for the “go teams” was used to develop emergency response skills. Passage of the MINER Act required all teams to compete in at least two local MRCs each year [MINER Act 2006]. Some teams expressed concern that they would find themselves at a disadvantage when participating against teams that had a great deal of MRC experience. One way to fulfill the requirement, yet not requiring teams to participate in regular open competition, was to use a Mine Emergency Response Development (MERD) exercise as an MRC, as provided for in the February 8, 2008,
Mine Rescue Teams: Final Rule (30 CFR 49.60(b)), with the approval of the Mine Safety and Health Administration (MSHA) District Manager. MERDs are a natural extension of emergency responder training because these types of training exercises provide mine rescue team members experience with overall crisis management.

A goal of the NIOSH Office of Mine Safety and Health Research (OMSHR) is to minimize the risk to and enhance the effectiveness of emergency responders. One of the first MERD/MRC combined exercises was organized by NIOSH OMSHR and the Pennsylvania Department of Environmental Protection (PaDEP) Bureau of Deep Mine Safety in April 2008 for eight composite mine rescue teams. Composite teams are those whose members come from different companies and mines. The combined MERD/MRC was conducted over three days at the OMSHR Safety Research Coal Mine (SRCM). Each team participated on one of the three days. None of the participating teams had prior experience in an MSHA-sanctioned MRC. Personnel representing MSHA, PaDEP, labor, and the mine operators managed the command center (CC), just as they would in a real emergency. The exercise followed 2008 national coal MRC rules, which qualified the exercise as one of the two required MRCs. Each team worked a different area of the mine containing different problems to solve and, therefore, each team had different experiences requiring different amounts of time to solve.

The following year, after a NIOSH researcher witnessed a successful MERD/MRC scenario developed and tested in May 2008 at the Edgar Mine [Lovely 2010], Colorado Mine Safety & Training Program, two additional 2-day exercises were conducted using the Colorado format. One exercise was conducted by the Mining Technology and Training Center (MTTC) in Ruff Creek, PA, and the second by the WV Alliance at the National Mine Health & Safety Academy Mine Simulation Lab (MSL), near Beckley, WV. In these exercises, both the CC and the mine rescue field were staffed by team members. This allowed mine rescue team members to gain the experience of being the decision-makers and to have a better understanding as to why decision-making delays occur. In these exercises, each team solved the same problem, which removed the built-in time variation experienced at the SRCM exercise.

Background on MERDs and MRCs
MERDs and MRCs came into being for very different reasons. The purpose of a MERD is to improve crisis management skills for the individuals making the emergency decisions in the CC [Kravitz and Peluso 1986]. The purpose of an MRC is to build teamwork, train, and demonstrate a minimum level of the skills required to respond to a mine emergency, with a winner chosen from the participating teams. The two missions can be in conflict; however, there are ways to adapt a MERD as an MRC for mine rescue teams, as shown by the strategies used at the SRCM and those at MTTC and MSL. The following two subsections describe the differences between MERDs and MRCs.

Mine Emergency Response Drills
A MERD is a role-playing exercise intended to improve crisis management skills in the event of a mine emergency. Originally, it was the acronym for Managerial Emergency Response Development [Kravitz and Peluso 1986, Lauriski 2002]. MERDs usually reflect a simulated emergency situation or may be adapted from an actual mine emergency. The scope can range from a tabletop or paper exercise to a Level 1 or full-scale, mine-wide exercise where production is stopped, all mine personnel are involved, and all state, federal, and emergency management agencies participate. The objectives of a MERD usually include evaluating one or more of the following: mine site pre-planning and emergency preparedness; responsible person
(RP) training; CC management and operations; and communication. Good communications are especially critical between the CC, the fresh air base (FAB), and the mine rescue teams. The CC must also maintain good communication with involved agencies, such as emergency management services (police, fire, ambulance, search and rescue, Red Cross, etc.), hospitals, media, families, mine rescue services, and teams. Individuals in the CC (mine rescue personnel, representatives from regulatory agencies, mine or corporate management, and labor) are required to interact with one another, explore possible solutions, create a response plan, direct the mine rescue teams, and ensure that rescuers are not exposed to dangerous conditions.

Typically, CC participants and RPs are expected to use the emergency response plan (ERP) developed specifically for that mine as a guide for their initial organization and response. A well-developed MERD includes all the mine resources that would be available in a real emergency so that a true test of the response plan can be evaluated and improved, if necessary. Progressive organizations may use MERDs as a framework for continuous improvement of their emergency response capabilities. Often, organizations conduct their own simulation drills to prepare in-house responders, but rarely do all of the organizations involved in an actual response train together [Alexander et al. 2011, in press].

Mine Rescue Contests
MRCs are simulations in which teams follow official contest rules to address an underground mine emergency. The emergency can include water inundations of various depths, bad or fallen roof, fires, explosions, missing or injured miners, ventilation disruptions, or a combination of any of these components. An excerpt from the Holmes Safety Association Bulletin for November 1992 states:

“Mine rescue contests are designed to sharpen skills and test the knowledge of team members who would be called on to respond to a mine emergency. The contest requires team members to solve a hypothetical problem while being timed and observed by judges according to contest rules.”

In an MRC, which is usually held on a practice field, gymnasium, or a similar non-mine setting, the team members are presented with a problem and, in conjunction with their FAB attendant/team briefing officer, the team alone decides how to explore the mine and what actions to undertake as they advance. The team is required to follow the MRC rules in making their decisions—e.g., how far they can advance, what protections must be employed for team safety, what ventilation changes might be needed, etc. There is no external input as the team works the problem. MRCs are scored in the following categories:

- The complete and correct solution of the underground problem.
- Time needed to complete the problem.
- A written test of 10 multiple choice questions taken verbatim from the MRC rules’ 100 statements of fact.
- The accuracy of the maps drawn by the team mapman and briefing officer.

SRCM MERD/MRC Exercise-SRCM Format
The exercise was set up in the OMSHR SRCM located in Bruceton, PA. The SRCM is a drift mine, developed in the 5.5-ft-thick Pittsburgh coal seam, using the conventional (undercut, drill, and blast) room and pillar mining method. The average entry dimensions are 6.5 ft high by 14 ft wide. The mine is accessed through two portals; one is the main intake entry that includes the track and the second is a return entry. As can be seen in Figure 1, the inby portion of the mine consists of a series of entries and crosscuts, with
the farthest distance from the portals being approximately 1,500 ft. In order to run two or three mine rescue teams in succession on the same problem, the mine was divided into three zones—one for each team to explore.

**Goals of the SRCM MERD/MRC**
The objectives were:
1. Follow the 2008 national coal MR rules.
2. Maintain team safety at all times, explore and rescue any victims, and extinguish any fires.
3. Enhance realism by having teams work under the direction of a functional CC and emergency response representatives.

The emergency scenario was as follows: the Stefko No. 3 Mine operates one working section with two production shifts and one maintenance shift per day. A fire was discovered approximately 1 hour before the day shift began, as workers arrived at the mine. There were three miners underground when the fire was reported to the responsible person on the surface (a trainer, for this exercise). The RP then contacted the responders, management, and the federal and state agencies. As the contacted personnel began to arrive, the CC was formed, MSHA and state inspectors were briefed on the situation, and the RP handed off responsibility and information to the now-in-control CC.

**Command Center**
The SRCM exercise was developed to utilize an operator/trainer as the RP to take charge and organize the initial response according to the mine’s ERP. The CC (Figure 2) was staffed by mine operator liaisons from companies representing the mine rescue teams, PaDEP mine inspectors, a labor representative, and MSHA experts in mine emergencies. Half of the CC personnel admitted to having limited knowledge of MRC rules and had never closely watched a mine rescue team work a problem. The MSHA experts provided guidance, when necessary, to the CC personnel. Many of the lead participants had prior training in the Mine Emergency Command System (MECS) [Varley 2010] or with the procedures outlined in the MSHA publication IG 110 [2008]. However, the CC participants had never trained together.

*Figure 1 – SRCM map showing the three exploration zones and the two FABs.*
Other participants in the exercise represented the following groups: MSHA mine rescue teams (judges), MSHA managers, gas detector vendors, the PA Special Medical Response Team (SMRT), Department of Energy, Allegheny County Emergency Management System, the City of Pittsburgh, and local fire departments. Between 55 and 67 participants were on-site on each of the three days. Coordination of these volunteers was one of the responsibilities of the CC. Approximately halfway through the exercise, the CC staff relinquished responsibility to a second shift to provide those individuals an opportunity to become more involved in the CC process. In an actual emergency, a CC representative could relinquish responsibility due to fatigue, deteriorating judgment, or for other reasons. This switchover of personnel demonstrates the need for an adequate number of available CC personnel. A sufficient number of adequately trained personnel are needed to provide at least three shifts of coverage per day [Alexander et al. 2011, in press].

Normally, the mine operator is responsible for drafting a specific response plan for the emergency situation based on the ERP of the mine and the experience of the participant. The plan must be submitted to MSHA for approval to proceed. In the interest of time for this exercise, MSHA provided a verbal approval.

The pace of making decisions appeared to be dependent on the amount of control that the lead participants exercised. Some operators made specific appointments of people for tasks, such as serving as liaisons with media, police, etc., while others allowed CC personnel to assume those various tasks. Initially, the participants were unsure of their roles until a working organization was established within the CC. If the CC participants had trained together on the mine ERP and the MECS system prior to the MERD, they most likely would have performed the CC tasks more efficiently.

One state team trainer acted as the exercise facilitator in the CC. This exercise facilitator kept the decision-making focused, provided a sense of urgency to the CC personnel, and corrected for various underground factors such as noises and lights that were not part of the exercise and real-life air ventilation movements which conflicted with movements indicated on the map.

When the CC personnel were reminded that national coal MRC rules must be followed, the participants expressed disappointment because some rules are in conflict with practical behaviors. For example, in a real-life situation, a team is almost certain to advance to a fallen miner immediately upon discovery, assuming there are no apparent hazards present. However, several MRC rules could prevent the teams from advancing to the fallen miner, such as the “2+3 rule” concerning systematic search, or the 20-minute rule which requires team members to do a team check at intervals of no greater than 20 minutes, or the 25-ft link line limit specifying that the distance between the mine rescue team captain and tail captain be no greater than 25 ft. (2010 National Mine Rescue, First Aid and Bench Contest Rules).
**The Fresh Air Base**

The briefing officer at the FAB maintained communication with the CC and the team. The officer kept track of team progress on a mine map and relayed information and questions between the CC and the team. In the case of a MERD, the personnel in the CC direct all activities of the team. The team has limited discretion to act unless a quick decision is made by the team to retreat because of an unsafe situation. The FAB was initially located outside the portal (figure 3) and was then moved into the mine.

To prevent or correct any potential communication errors when information is relayed from the teams through the FAB to the CC, teams were immediately debriefed by the CC when they exited the mine and their maps were compared to ensure that the official CC map was accurate. In real emergencies that may involve long travel times out of the mine, this debriefing may be delayed by as much as 4 hours [Waggett 2008].

**The Mine Rescue Teams**

The first mine rescue teams arrived at the mine as the CC was being established. The teams unloaded their equipment, checked in with the CC, and prepared to go underground as if responding to a real emergency. The CC briefed the first team once the CC was confident that the team could safely enter the mine. The team then reported to the mine portal, where they were briefed by the mine manager (figure 4). FAB1 was set up near the portal at this time.

The CC then ordered the team into the mine to begin the exploration. The other two teams, acting as standby and back-up teams, were given instruction on gas detection and gas sampling techniques and reported (simulated) gas readings from the fan and mine borehole to the CC.

Teams were instructed to use national MRC rules to explore the mine, accurately map significant features, locate missing miners, and extinguish the fire. The maps and procedures were judged so that a winning team could be selected for the combined MERD/MRC exercise. Each team was accompanied by two MSHA mine rescue team members or state mine rescue team trainers who served as judges. The exercise was designed so
that the first team followed the contaminants, smoke (as shown in Figure 5), and carbon monoxide, as indicated by placards in the return air. Team 1 conducted systematic exploration of zone 1 and relocated the FAB from outside the mine to an area inside the mine (FAB2), where the team had confirmed that the atmosphere was clear. Team 1 briefed team 2 about the assumed fire location. Team 2 then proceeded to locate the fire and extinguish it. When the second team left the mine, the third team entered and continued the exploration until it found the missing miners and brought them to safety. Each team member used between 1 and 2 hours of oxygen during the exercise. At the end of each day, the judges met with all the team members to provide feedback on actions that were performed well and actions where improvements could be made.

Following MRC rules and simultaneously working under the direction of others was a new experience for the rescue teams. Some teams expressed frustration that the CC slowed their advance, even though, in a real emergency, teams would be required to work under the strict direction of a CC. In a non-MERD contest, the teams and their FAB attendant(s) make all their own decisions while attempting to complete the exercise as quickly as possible.

**Discussion: Can the SRCM Format MERD be considered an MRC?**

After the SRCM exercise was conducted and the teams debriefed, the comments received from the participants concluded that the MERD requirements, meant to simulate a real emergency response, were, in many ways, in conflict with MRC requirements. Because of these differences between MERDs and MRCs, this combined MERD/MRC exercise exhibited the following shortcomings:

- Time could not be used as a factor in determining a contest winner because three different contest zones were explored in the mine.
- The involvement of the CC in decision-making and approving all team movements prevented the team from controlling response times.
- The contest zones contained different degrees of difficulty, so direct comparison of team performance was not practical; e.g., only one team moved the FAB, fought a fire, or found missing miners.
- Some directives from the CC were in conflict with MRC rules.

There were also three important positive outcomes from this exercise:

1. For the first time, these eight teams were required to work under the direction of a CC, which enhanced the realism of the exercise.
2. Approximately 20 CC participants had the experience of directing teams in an actual coal mine rather than providing directions to a simulated team in the next room.
3. Eight FAB attendants gained experience in communicating with a team and CC simultaneously. This interaction more realistically simulated a real emergency.
During the initial stages of the exercise when only a few individuals were in the CC, there was some confusion, since none of them had practiced together using a standard protocol and they did not know their individual duty assignments. Once the CC was fully staffed, a leader was selected from the operator representatives. This person assigned duties and prepared a response plan in consultation with the labor, state, and federal representatives for approval by MSHA.

At times, the CC expressed frustration because of the apparent slow progress of the teams. Part of this perceived delay was due to some CC personnel having no experience with mine rescue teams. Experienced personnel who had served in various CC roles during actual emergencies were able to advise the new CC participants on the reasons for the “delays.” Inexperienced CC personnel could gain experience by accompanying team members during mine exploration exercises. In this way, these CC personnel could observe how the teams address and solve problems [Conti 2000]. Another improvement for inexperienced CC participants would involve training in the proper preparation of approvable response plans.

The teams and CC both reported frustration during the combined MERD/MRC. From the perspective of the teams, the CC squandered too much time directing the teams and then often did not follow the typical contest rules for systematically exploring a mine. This resulted in back-tracking, essentially wasting the efforts and time of the team. The primary frustrations of the CC involved the time needed for the teams to get organized and their own uncertainty in tracking the activities and locations of the teams.

Post-exercise comments from CC personnel on the effectiveness of the MERD as a training tool were positive. However, six of the eight teams did not like the combination of a MERD and MRC because of what they considered differing interests between the team and the CC. The problem lies with making real-life decisions as opposed to being judged on how well the teams followed MRC rules.

Some conflict can be expected when conducting combined MERD/MRC exercises where one activity focuses on the teams and the other focuses on the decision makers (CC). When a MERD exercise includes a mine rescue team, both the teams and the CC personnel can benefit from the experience. However, judging teams under national MRC rules while participating in a MERD that uses different sections of a mine resulted in diminished performance in terms of team competitiveness and non-uniform judging conditions.

Since the teams could not act independently, they could not be fully evaluated on their decision-making capability or by how quickly and systematically they explored the mine. The teams reported that many times the CC took too long in providing them with directions. However, judges reported that all teams responded well to the CC needs and carried out their assignments quickly and safely.

Participant comments addressed the attitude of the teams regarding this simulated emergency. When arriving at the scene of an actual mine emergency, teams experience an almost instinctive sense of urgency unique to that incident. At a traditional MRC, urgency is created for the teams by knowing they must use and rely on their own judgment to address the issues required of the contest and because of the time component. Upon arrival at the SRCM site, the teams regarded the MERD/MRC exercise as an ordinary practice and did not establish that sense of urgency. In the future, it is important to build a sense of urgency into the exercise so that the practice is as realistic as possible. As noted by Mitchell [1990], in an emergency “Time is never your friend.”
Comments from the numerous participants indicated that this was a good exercise and learning experience, but a number of changes needed to be made. Specific issues that need to be addressed include how to use time as a judging factor, equalizing the tasks that teams were required to do in exploring different zones of the mine, building a sense of urgency into the exercise, and resolving the conflicting purposes of a traditional MERD and an MRC.

**MTTC and MSL MERD/MRC Exercises Colorado Format**
The MERD/MRCs conducted in 2009 utilized a different approach from that used at the SRCM in 2008. In addition to using a MERD as an MRC, the exercises were designed to give the mine rescue teams experience in managing the CC and, thus, gain a better understanding of the issues which might limit the advance of a team. The exercises were held by the WV Alliance at the National Mine Health and Safety Academy MSL in Beckley, WV, and at MTTC at Ruff Creek, PA. The exercises were modeled after the MSHA-approved MERDs/MRCs developed and executed at the Edgar Mine in Idaho Springs, CO, in 2008 [Lovely 2010].

Coal and metal/nonmetal mine rescue teams regularly train at the Colorado Mine Safety and Training Program Edgar Mine facility [Bealko et al. 2010]. National MRC rules [MSHA 2009] were modified and approved by MSHA District 9 so that teams could be judged during a MERD while, at the same time, enhancing their rescue-related skills. The initial MERD exercise was held in May 2008 with three teams. In this 2008 MERD/MRC, one team managed the CC, the second team worked the underground problem, and the third team demonstrated additional mine rescue skills that were included in the MERD/MRC criteria being judged. Each team was judged on their activities and decision-making opportunities as they rotated through each position. The underground portion of the exercise was different for each team because they continued the exercise begun by the previous team. In this way, no team had an advantage when they rotated. These specific training facilities are discussed by Bealko et al. [2009] and Alexander et al. [2011].

The 2009 MERD exercise was set up as a traditional MRC with the added complication that the briefing officer was required to obtain permission from the CC before authorizing actions by the mine rescue team. These exercises differed from the Colorado format in that each team was faced with the same or similar simulated emergency.

**Goals of the 2009 MTTC and WV Alliance MERD/MRCs**
Three specific goals were set by organizers at MTTC and MSL:

1. Comply with the MINER Act of 2006 and the June 2009 MERD Guidelines, promulgated by MSHA, so that the MERD would qualify as an MRC.
2. Make the MERD as realistic as possible to show how the national MRC rules can be adapted to a real-life situation.
3. Allow the members to work as a team to address a simulated mine emergency, to serve in the capacity of CC officials, and to participate in a skills training opportunity [2009 MTTC].

**The MERD/MRC and Skills Training**
As with a traditional MRC, the teams had to respond to a simulated underground emergency. The differences were that, while one team was working the in-mine exercise, another team served in the CC, and the remaining teams participated in skills exercises. These skills exercises involved navigation and mapping in smoke, first aid, a written test (10 multiple choice questions taken verbatim from the contest rules “100 statements of fact”), fire-fighting/hose handling, and gas testing.
A significant benefit of having the teams serve in the CC was to provide them the opportunity for actual decision-making (Figure 6). This also enabled the team members to better understand the reasons for the CC delays in providing instructions for the next team action.

The exercises that were held in 2009 put less emphasis on training MERD participants, since the personnel staffing the CC (i.e. the team members) were not likely to be in that role during actual mine emergencies. The team members commented that the CC experience was invaluable in that it showed team members a broader perspective of the CC operations. The team members encountered some of the factors that must be considered prior to any decision for action on the team’s part, the legal responsibilities that must be addressed, and the overall “big picture” that develops when information comes in from a variety of sources.

Discussion: Can the Colorado Format MERD be considered an MRC?
The format for MERD/MRC exercises used at MTTC and MSL appeared to have few shortcomings. With a diminished emphasis on training CC participants, the conflict between the needs of the CC and the teams is negligible. One judging factor that differs from a stand-alone MRC is that time should not be a determining factor in declaring a contest winner. Although the CC function is minimized, the teams are still affected by requirements from the CC and the time needed to receive and execute its directives. In these simulated underground exercises, the CC personnel felt that the teams were taking excessive time in solving the problem while the teams felt that the CC was taking excessive time in providing instruction to them.

These exercises were opportunities for mine rescue teams to train and be judged, as well as to gain an understanding of how teams and the CC interact. The exercises allowed the FAB attendants as well as the other five team members to experience control by the CC. Comments from participants indicated that, other than using time as a judging factor, the Colorado format provides a good method for combining a MERD and an MRC.
Conclusions
OMSHR researchers evaluated two methods of conducting MERDs as MRCs. The SRCM format, while providing a learning experience for all participants, introduced significant issues that needed to be addressed. Using three separate exploration zones within the exercise prevented equal judging methods from being applied to each team. The conflicting objectives of a MERD (to train and prepare CC personnel for a real mine emergency) and an MRC (to train and evaluate mine rescue team skills and abilities) resulted in delays which, in turn, invoked frustration in many of the participants. However, participants did acknowledge that these delays were more realistic than the fast pace with which MRCs are conducted. Finally, the time necessary for completion was shown to be an invalid factor in determining a winner.

The Colorado format for the MERD/MRC exercises appears to be more successful in the fair selection of a winning team as required by MSHA. The reduced emphasis on training CC personnel and using team members to staff the CC made the exercises at MTTC and MSL less frustrating for participants while still contributing to mine rescue team training. As with the SRCM format, the time necessary for completion should not be used to determine a contest winner.

CC personnel with no experience at directing teams should accompany a team during mine exploration exercises to observe how the teams address and solve problems. In addition, CC personnel should be trained to work together on the mine ERP and approvable response plan, as well as be familiar with the MECS system prior to the MERD.

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BRICEVILLE, Tenn. — The coal mine that spawned this once-thriving community was the scene of a ground-shaking calamity 100 years ago this past December of 2011.

Flame from a miner’s lamp deep inside the state-of-the-art Cross Mountain Mine ignited a methane gas blast, which detonated coal dust.

That larger explosion ripped through the mine’s labyrinth early Dec. 9, 1911, sending a cloud of smoke and dust billowing 100 feet above the entrance.

Eighty-nine men and boys had just entered the mine. Eighty-four died, including 14 sets of brothers. The victims ranged in age from 16 to 61.

Many died from the blast’s concussion, others suffocated as poisonous gases called afterdamp supplanted air.

Reminders of the disaster remain in this remote village in the foothills of the Cumberland Mountains in Anderson County.

There are the tombstones, some arranged in concentric circles around a central monument in one hillside cemetery, others scattered in the Briceville Church Cemetery.

Inscriptions carved into markers include the poignant farewell message that 22-year-old miner Eugene Ault scrawled on barricade boards as he slowly suffocated: “I guess I have come to die. Air is not good now. Well, all be good and I aim to pray to God to save me and all of you.”

The tragedy left other legacies — from a now-popular saying to dramatic improvements in coal-mining techniques and rescue procedures.

“Lessons learned at Cross Mountain led to safer working conditions for miners today,” said Barry Thacker, a Knoxville engineer who is president of the Coal Creek Watershed Foundation.

That nonprofit organization, dedicated to improving the quality of life and the environment in the watershed, planned an observance to be held in December 2011 on the day of the mine disaster centennial.
Caged canaries, dramatic rescue

The phrase “canary in a coal mine” originated in Briceville.

For the first time, rescuers carried the caged birds into the Cross Mountain Mine as an early-warning system to alert them to changes in air quality.

The explosion had rendered much of the air inside the mine deadly with afterdamp, the asphyxiating mix of toxic gases.

“As long as the birds remained cheerful and hopped about in their cages, it was known that all was well with the surrounding atmosphere,” a 1912 edition of Popular Mechanics reported.

“But suddenly when the birds began to droop and gasp for breath it was realized that the traces of the deadly ‘afterdamp’ were present and the unmasked volunteers with no oxygen equipment had reached the place for them to stop ...”

“The canary birds drew the line of safety.”

That oxygen equipment also was a new feature in mine rescue efforts in the U.S.

The Cross Mountain Mine explosion was the first time that the U.S. Bureau of Mines, which was created 1910, mounted a full-scale rescue effort.

Staff members from the Knoxville office arrived hours after receiving word of the disaster.

Those rescuers used self-contained breathing apparatus as they combed the dark catacombs for survivors.

Almost miraculously, five miners were found alive behind a barricade they erected far inside the mine 58 hours after the explosion. “Everybody had given up hope,” said Thacker, who has studied the history of coal-mining in the watershed.

“After the miners were rescued, reports just exploded on the front page of the newspapers.”

“It was a big deal at the time because it showed hope, it showed improvements,” Thacker said.

“In 1911, there were 2,656 fatalities in coal mines in this country. Last year, there were 48, while coal production has doubled.”
The Cross Mountain mine disaster occurred less than a decade after another nearby coal mine catastrophe.

All 216 miners inside the Fraterville Mine, located a mile north of the Cross Mountain Mine, died in an explosion on May 19, 1902.

Ironically, both mine explosions occurred at the same time — 7:20 a.m., or shortly after miners arrived for work.

Some at Cross Mountain were spared by luck. The normal workforce was 125 miners, but only 89 went inside that morning.

Hugh Larue was saved by a dream.

His wife, who had a nightmare the night before of "scores of miners with their heads blown off," refused to make him lunch, according to a New York Times report. Larue laid out of work that morning.

Col. Isaac Williams, a teen at the time, had been barred from working on the day of the disaster, according to his grandson, writer Don Williams.

"As it was, Grandpa lived long enough to tell his many grandchildren six decades later about walking down the railroad tracks on his way to help retrieve the bodies of 84 men.

"I once heard him say that every house along the way echoed with the cries of widows and children."

James Jacob Harmon was one of those children. He was the son — one of 10 children of Powell Harmon — who was 53 when he suffocated inside the Fraterville mine.

"My time has come to die," Powell Harmon wrote in his heart-rending last message. "My
boys, never work in the coal mines.” But his oldest son, Condy Harmon, didn’t follow his father’s advice. He died nine years later in the Cross Mountain Mine.

The surviving family went on to eke out an existence in abject poverty, recalls James Harmon’s daughter, Carolyn Harmon McCafferty of Florence, Ala.

“Daddy walked along the railroad tracks when he was 6 years old, picking up coal that fell off train cars so the family could heat the home,” McCafferty said.

“He never forgot the hardships that all of the families went through after those mine explosions,” she said. “So much of their lives were destroyed. Their normal everyday activity was so difficult.”

McCafferty said she and 10 other descendants planned to attend the centennial ceremonies.

Also to attend was Anderson County resident Joe Leinart. He is the great-grandson of Americus Alonzo Haynes, who died in the Cross Mountain Mine explosion. A son, John Frank Haynes, also was killed.

“I remember my mom telling me that when her mom, Alice Bear Smith, was little, she crawled on top of the coffins after the miners’ bodies were inside,” Leinart said.

Although Leinart grew up in Briceville, he said that as a child, he didn’t know much about the mine disaster: “Now, I want to find out everything about it.”
On October 6, 2011, Brandon Sheffler, a battery coal hauler operator, was not feeling well before the start of the shift and was complaining he may be getting the flu. He was unusually quiet during the shift and the other miners and fellow coal hauler operators noticed he was not acting quite right. The crew was mining coal on a single split super section but the return miner was down due to a faulty methane monitor. They finished up mining in number 8 entry and the hauler operators helped to move the continuous miner to number 7 entry. As they walked back to their cars one miner noticed Brandon leaning up against his battery and a few seconds later he passed out. He came to a few seconds later and crawled a few feet and leaned up against a set of cribs complaining that his chest was hurting. The shift manager notified dispatch that an ambulance was needed at the North portal as he would be bringing out a sick employee. At this time miners working around the bottom of the hoist were notified to hold the hoist on bottom. During these few minutes Brandon passed out a second time and was loaded on a stretcher and placed on our underground ambulance for transport. Oxygen was administered and at this time no one thought it was anything more than maybe a bad flu or even sugar problems. Two of my first responders, the shift manager, general mine manager and two operators escorted Brandon to the hoist and began the two minute trip to the surface. (I arrived at the top of the hoist at this time) Half way up the shaft Brandon began gasping for air and temporarily quit breathing. They hit the top of the shaft, pulled him out and laid the stretcher on the ground and we began working on him. He would come to maybe every two minutes but pass out again quickly. This is when everything went from bad to worse.

I opened up his airway and checked his pulse which was very shallow and erratic. After feeling his pulse we put an AED on him and we began to monitor his breathing and pulse. We thought that he had stopped breathing again and I placed my ear over his mouth and felt no breaths at all. Steve was checking his pulse at this time and we had lost that as well so he immediately began chest compressions. After one cycle of 30 compressions he began breathing and we got his pulse back at this time then the local ambulance service showed up and took over.

Everyone did a fantastic job and remembered their training. No one panicked, no screaming, just working the problem. I was very proud of them. Brandon awoke after about fifteen minutes in the ER and was finally talking to the medical staff and I. He couldn't remember anything that happened and was wondering where he was. He has had several tests and is now in the care of a specialist.

You hear about this happening to older miners or miners with a history of heart problems but this wasn't the case. Brandon is 21 years old and very healthy. This is why paying attention during first aid training is crucial not only for your fellow workers but family members as well. No one expected this to happen but it did. Thank God my men paid attention to my first aid classes.
After Brandon consulted his doctor we found out a little more of what happened. The doctor was assuming Brandon’s pulse was pushing over 300 BPM which threw his body into shock, stopping his heart. He has been wearing a heart monitor since and has seen a specialist to go over the results. He is thinking that a heart surgeon can fix the problem.

Listed below are the names of everyone involved at the top of the slope with Brandon.

Names are in Alphabetical Order: Joey Axe, Bill Emery, Toby Heiden, Chris Hollis, Shad Montgomery, Rick Pigg, Troy Rogers, Steve Zygai

Article submitted by Mr. Ron Bucci, Vincennes Southern Indiana Council for Lifesaver Awards for the miners assisting with Mr. Sheffler.

Events leading up to the need for assistance was submitted by Shad Montgomery, Mine Safety Manager, Sunrise Coal, LLC.

The mine is an underground coal mine in Southern Indiana.
The first step in the plan was to find a reason to lose weight. Some of my reasons were; to be healthier, watch my boys grow up to have families of their own, and have eye surgery. These are just a few reasons I wanted to put into perspective on reaching this goal.

The second step in the plan was to make a decision to lose weight. I had made this decision many times in the past and failed. I struggled with deciding what would be my motivation that was different than ever before. This time I am making the decision to lose weight and make choices that will create a better lifestyle. My mind set this time was that the journey that I was entering was a lifetime of changing habits.

The third step in the plan was to create an outline of events that would help in my success. In my outline of events, I had to change my eating habits and start an exercise program. All plans, you want to achieve, need to have a goal. Therefore, I set short and long term weight goals that I would work toward. To track my progress and hold myself accountable, I created a spreadsheet.

The fourth step in the plan is the most important of all. I had to truly believe that I would be successful in achieving my goal of losing weight. I knew there would be obstacles that could hinder my success along this road. As long as I believed I could do it, I could push myself through the tough times. Now, the 4-step plan was ready to put in place. So on January 11th, I put into action the road to achieving my goals to lose weight. I changed my eating habits and started getting up at 4:30 a.m. every morning to hit the gym before work. Everything began to change and for many people, it was hard to believe. The weight started to melt off, and by April 26th, I had lost 50 pounds. I was completely encouraged to keep going, and by July 15th, I had lost 90 pounds. I thought I had the losing weight battle all figured out. What I didn’t realize was that the days ahead were going to be some of the roughest days yet.

I went for about three weeks and did not lose any weight. I was walking 40 miles a week and still had not dropped a pound. I was getting very frustrated and knew the easier road was to just quit, but I never gave up on where I was headed. On August 4th, I met with a trainer at the gym I had joined. She listened to my story and told me that I needed to “shock my body”. She put together a workout plan that would indeed, “shock my body”. After being on her workout plan for 14 days, I had lost 10 more pounds. August 18th, I hit 100 pounds of weight loss in 7 months and 7 days. It was a great time to celebrate my achievements, so I had eye surgery to correct my vision.

I started out in 2011 weighing 328 pounds, and today I weigh 197 pounds. Words cannot describe how 2011 has changed my life. I changed my lifestyle, and I am happy with what I’ve accomplished. I’m no longer plagued by joint pain. The “new” Kevin is extremely energetic. My life doesn’t feel out of control anymore!

Sometimes a picture tells a story better than words. The pictures above show the “new” Kevin and the “old” Kevin. I still have 25 pounds to lose to get to my goal weight, but I am determined to get there. I would like to reach my goal weight by March or April. My goal weight will be between 165 to 175 pounds.
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Contact: Heidi Orleman  
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518-623-2352

MSHA Annual Refresher Certification Available!
On Tuesday, November 15, 2011, at 6:00 p.m., the 4th quarter meeting of the Western Kentucky Chapter of the Joseph A. Holmes Safety Association was conducted at Willow Pond Restaurant at 3442 U.S. Highway 62 near Calvert City, Kentucky (just off exit #27 on I-24). Vulcan Materials was our sponsor and Mr. Truman Chidsey (Corporate Safety Director) was the featured speaker presenting a program on Ergonomics in the Workplace for VMC. The meeting was very well attended (packed) with 67 folks signing-in and a headcount of around 80 persons.

Vulcan Materials recognized several long-time employees with Holmes awards for no lost-time injuries during their lengthy tenures. Recipients include:

- Floyd Scott – 40 years
- Arnold Chittenden – 30 years
- Teddy Gillum – 30 years
- Dwight Coleman – 30 years
- James Stephenson – 30 years
- Randy Jeter – 30 years
- Kevin Dycus – 30 years
- Joseph G. Winiger Jr. – 30 years
- David Burkhart – 30 years
- Dale Driskill – 30 years
- Kenneth Downs – 30 years
- Lynn Rushing – 30 years
- Allen Palmer – 30 years

Martin Marietta’s Three Rivers Quarry was awarded recognition with a National Sentinels of Safety Certificate (Large Quarry Group M/NM, 2010) presented by MSHA’s Joe Fritz and a Proclamation from the Holmes Safety Association (Western Kentucky Chapter) presented by Robert Stone for amassing 143,158 no lost-time injury hours during 2010.

Kinder-Morgan (Grand Rivers Terminal) also received well-deserved recognition as National Sentinels of Safety (Coal) in an award presentation from MSHA’s Joe Fritz to Kinder Morgan’s (GRT) Area Manager Ralph Fielder for amassing 114,792 no lost-time injury hours during 2010. Also recognized were three employees in attendance who received Holmes awards presented by Nathan Tobey, GRT Terminal Manager for no lost-time injuries during their lengthy tenures.

Officers:
Kevin Dycus, President
(207) 362-1234
(Vulcan Materials)

Robert Stone, VP
(207) 871-1461
(Hunter Sand & Gravel)

Tim Binkley, Secretary
(207) 928-2141
(Martin-Marietta)
Pictured Recipients include (In Alphabetical Order):
Ted Byars 5 years, Robin Doom 10 years,
Keith McGrath 10 years

Our congratulations to all the companies and their employees on their great accomplishments in safe work practices!

The coming year’s agenda was outlined and confirmed with the next meetings scheduled for March 13, 2012 (Pine Bluff Sand & Gravel), May 8, 2012 (Rogers Group), The Summer Sizzler on July 6, 2012 (Occunet, Pine Bluff Sand & Gravel, and Vulcan Materials), September 11, 2012 (Kinder Morgan), and November 13, 2012 (Hunter Sand & Gravel).

We wish to express our appreciation to Jim Croft (MSHA Franklin District Field Office Supervisor) along with Darren Conn, Heather Smith, and Joe Fritz for their attendance and participation. We’re all very pleased to see Joe’s progress with his recovery and will continue to pray for his improvement.

Eight companies were represented in attendance. Spouses and children of many were there and always appreciated. Finally, of note, I was presented with the Holmes award for 40 years of industry service without a lost-time injury. It was a surprise and the result of a conspiracy involving those in our chapter and the HS&G folks with which I work. I am grateful to all.

“Stoney”

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**Reschedule Notice** - Joseph A. Holmes Safety Association
Western Kentucky Chapter
1st Quarter 2012
Date rescheduled from March 13, 2012 to March 6, 2012

As the result of a conflict of schedules, the regular date for the 1st quarter meeting has been rescheduled from March 13th to March 6th. The original date conflicted with the NSSGA Convention and AGG1 held in Charlotte, North Carolina. Pine Bluff Materials is to be the meeting sponsor, and Mr. Brian McGeorge, President, is to be the scheduled speaker. To accommodate both Mr. McGeorge’s schedule and that of any of our other members and guests who would wish to attend these important events, please make a note on your itineraries that the Western Kentucky Chapter of the Holmes Association is now scheduled for March 6, 2012.

On March 6, 2012, the meeting will commence at 6:00 p.m. at Willow Pond Restaurant at 3442 U.S. Highway 62 near Calvert City, Kentucky (just off exit #27 on I-24). We’re looking forward to a good turn-out as again, there are several awards and certificates to be presented, and we’re anticipating an excellent presentation from Mr. McGeorge and from Pine Bluff Materials.

Please again note the date change (3/6/12) and extend an invitation to your associates and their families to join us for an excellent meal, insightful presentations, and good company!
We are pleased to announce that this year’s NMRA Post 5 Mine Rescue Contest will be held August 15-16, 2012, at Mylan Park in Morgantown, West Virginia.

Teams may enter as many participants as they wish. Each participant may compete in any or all of the following competitions:

• Mine Rescue
• First Aid Team
• Bench Participant
• Preshift Participant

Teams may also purchase tickets for:

• Awards Banquet
• Golf Outing

For Contest Applications and Additional Information:

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