

There when you need them: Mine safety rescue teams prepare for emergencies

by Nancy Profera, Associate Editor

There's a saying that for every minute spent on planning, 10 are saved on execution. This adage applies well to mine safety emergency scenarios, where nothing could be more critical than being prepared, saving time and potentially lives. Planning and practice are essential toward continuous improvement and increased safety.

Practice situations that are as realistic as possible, all while getting to know one's teammates and developing an understanding of the environment—also known as situational awareness or threat assessment—are essential to saving lives in any risky or dangerous situation, and are especially so for miners. This is exactly why miners throughout the United States and world embark on mine rescue training events and take part in competitions each year where they test their training and skills in as-close-to-realistic situations as possible.

There are currently more than 250 mine rescue teams certified and equipped to perform mine rescue operations in the United States. These teams train and compete in mine rescue competitions nationwide.

Mining Engineering (ME) recently reached out to some of today's mine safety trainers and practitioners in the field, and they shared some of their best practices and current training scenarios with us.

Prairie State

At the Prairie State Generating Co. in Marisa, IL, Daniel Meier is an engineering supervisor responsible for developing realistic on-site mine rescue training scenarios conducted live on the Prairie State Energy Campus, where state-of-the-art technology is used to operate “one of the cleanest power plants of its kind” at this coal-fired energy generating power plant. There are about 350 miners on site including section supervisors, operations, belt crew and maintenance teams.

The plant was built on the same site as its underground coal mine. The close proximity between the two allows the company to transport unearthed coal via conveyor belts from the mine directly to the power plant—no emissions are burned in the transport of the coal for processing because no vehicles, trucks, trains or boats are used in transportation to processing. Once the coal arrives at the plant, it's burned using a highly efficient super critical boiler. Because the boiler burns at higher temperatures and

pressures, it is able to extract more electricity from each pound of fuel, effectively producing a lot less carbon dioxide and other air pollutants. Prairie State is a nonprofit; it is owned by nine not-for-profit rural electric cooperatives and municipal utility agencies, owned and governed by the member-owners they serve, comprising 2.5 million homes and businesses across eight Midwest and Mid-Atlantic states.

Mine rescue competitions

Mine rescue competitions allow team members to practice the skills they may need to use in the event of an actual emergency. “If there is a large disaster, many mine rescue teams would be called to help with rescue and recovery. Competitions allow for members to meet each other and have a connection with the people they may be working with in a disaster,” said Meier.

Simulated emergencies allow team members to study and train for any situation thrown at them. “The problem designers will put in certain explosive gasses or have people that are injured in the problem to practice the skills. Team members are willing to put themselves in harm's way to rescue their fellow miners,” said Meier.

This year, Prairie State held a Mine Emergency Response Drill that included a simulated fire and rescue situation underground. “This allowed us to practice our skills underground along with our fire brigade team and mine management in the command center. It opened a lot of people's eyes to what could happen if we were dispatched to an actual emergency,” said Meier.

There are coal mine rescue contests and metal/nonmetal mine rescue contests per requirements of the U.S. Mine Safety and Health Administration (MSHA), which requires that teams practice a minimum of 96 hours per year. To fulfill this requirement, the teams meet at least once a month for an eight-hour training session. MSHA requirements also call for mine rescue teams to compete in two competitions each year.

During the first week of August 2021, the Prairie State mine rescue team competed at the Virginia Mining Institute's Mine Rescue Competition in Blacksburg, VA. After three days of competition, the team finished in third place on day two, being one of only four teams to complete the problem scenario. Then, in late September, they competed again at the Prairie

State's training center. The first competition placed the Prairie State Black Team in third place and its Green Team in fourth place, while the Green Team placed second in the following competition. "Our typical practice consists of running multiple practice problems, studying the gas charts and rules, and going through certain situations that we might run into in a contest," said Meier.

Meier explained that the summer of 2022 is also a recent year that made him quite proud of the teams' efforts. Prairie State has two mine rescue teams that train and compete and that year, one team came in first place in the Illinois state competition and the other team came in fifth place in the national competition. "Mine rescue members are very proud and competitive. We all want to work our hardest to be the best at every competition. If you win the competition, especially a national competition, it's like having bragging rights," said Meier. "We also look back to our old competitions and look at where we fell short, then work to get everyone to understand where we messed up."

Competition set up

Each team is made up of seven members, all of whom are employed at Prairie State. They have varying jobs at the mine including mine manager, section supervisor, compliance officer and multiple equipment operators. "One of our teams is one of the few in the country that have women on the team," said Meier. Loretta Fondaw, team captain, is a section supervisor who has been on the team for eight years. Bonnie Jamerson, "map man," works in operations running a roof bolter and has been on the team for three years.

Each team has a captain, two gas people who take air readings and call out to the fresh-air base, a map man and tail captain. In the fresh air base, there is a briefing officer and a command center attendant who are in charge of mapping and ventilation.

According to Meier, most of the mine rescue principles are the same between metal/nonmetal and coal. "On the coal side we focus a lot on specific gases that we may encounter in the mine including methane, carbon monoxide and oxygen. Some of the metal/nonmetal competitions are actually held underground while the coal competitions are held on a simulated field. We do participate in a competition that is held at an underground training facility in Indiana," said Meier. One can never have enough training either, as some participants report learning something new every time they train, even on the same concepts.



The 2022 Prairie State mine rescue team came in first place in the Illinois state competition.

Most of the competitions focus on rescue scenarios after an explosion, fire, irrespirable atmospheres or roof falls. "While simulating this, we're also looking for lost or injured miners that are unaccounted for," said Meier. The practice scenarios allow the team to be prepared and learn lessons before being needed in a real emergency. It allows them to respond to a variety of disasters including mine fires, water inundations, entrapments, dangerous atmospheric conditions and roof falls. Prairie State's mine rescue teams train to respond to all these scenarios. They also have seven emergency medical technicians between the two teams who are readily available in the event of an emergency at Prairie State's mine or any other mine in the area.

"In a competition we have a command center that we report out to. However, in a real emergency, the command center is located on the surface of the mine and would have numerous people in it working on plans to handle the emergency. The people in the command center would be mine management and engineering, MSHA and state officials, the legal department, and others helping in responding to the emergency," said Meier.

Florida Mine Safety Program

Karen Miller is a certified mine safety professional (CMSP), has earned MSHA Instructor Trainer Certification (IN) and Instructor Surface (IS) trainer qualifications, and is the mining program manager at the Florida Mine Safety Program (FMSP) in Havana, FL. The program is held in conjunction with the Florida Public Safety Institute at Tallahassee Community College.

Miller explained that Florida mining includes

Mine Rescue

(Top) Members of the 2023 Florida Annual Surface Mining Emergency Response Training and Competition at the Florida Public Safety Institute in Havana, FL. (Middle and Bottom) The Florida response teams practicing for emergency scenarios.



surface metal and nonmetal mines consisting of phosphate rock, shell, sand, gravel, surface stone, limestone, heavy minerals such as titanium, fuller's earth, attapulgite and clay, among others. FMSP aims to educate miners who partake in mining operations by assisting mining companies and mining contractors with their health and safety training. The program has operated as a partially funded federal grant program under

MSHA for more than 35 years. "This is done through a variety of training courses, program development, mine rescue competitions, conferences and information sessions," said Miller.

Florida Mine Rescue Competitions

Miller explained the annual competition events allow emergency response teams in mining and related industries to test their skills across a range of realistic emergency response scenarios. The four-day annual event features certified training sessions and demonstrations on topics including basic fire science, assessment and protection training, advanced rope rescue and knots, mine rescue simulation, water safety and rescue and first aid and medical response to trauma. "Our ultimate goal for these events are for participants to take home knowledge and skills that will better prepare them for real-life emergency scenarios that they may face on the job, and which will help prepare them to perform potentially life-saving actions so that they can go home safely to their families at the end of each day," said Miller.

In late February/early March, 2023 FMSP held its fourth annual surface mining emergency response training competition at the Florida Public Safety Institute in Havana, FL. At this time, 17 teams competed in two training tracks, one for national and one for regional competitions. Teams came from KGHM Robinson, NV; Nevada Gold Mines (including members from Carlin, Cortez, Phoenix and Turquoise Ridge) and Nutrien and Nyrstar in the national preparation teams. The regional teams included competitors from Carmeuse Longview Warriors, AL; the Lhoist Montevallo plant, AL; Mosaic (Bartow, Wingate, New Wales and Four Corners, FL) and Vulcan Materials (with two different teams from Tennessee).

Miller reported that the training was "a blast" with some of the results as follows: Overall regional grand champion, Carmeuse; regional field competitions went to Carmeuse teams for first and second place with Vulcan Materials earning third place. The overall national preparedness grand champion went to Nevada Gold Mines, Carlin with overall national preparedness field competitions also going to Nevada Gold Mines (Carlin, Turquoise Ridge and Cortez respectively earning first through third place). The overall Florida team champion went to Mosaic Wingate.

The FMSP has a video that includes some of the 2023 competitions, training tracks and closing ceremonies. Readers can watch it at flminesafety.com. ■

Prairie State competitors with their awards and practicing for emergency scenarios.

History of mining acts

In the early 1900s, coal mining expanded quickly and broadly in the increasingly industrialized United States. As demand for coal grew, operators sped up production. The result was a largely untrained labor force and the use of hazardous, unregulated explosives.

A catastrophic explosion in the Monongah Mine in West Virginia resulted in the deaths of 362 miners. President Teddy Roosevelt was said to be so distraught by the case that he ensured the first federal mine safety legislation was passed during his presidency.

Since that time, there has been the establishment of rules and protocols to protect workers at mine sites.

Historical U.S. acts passed for mine safety

1910 – U.S. Department of Interior established the Bureau of Mines. The Bureau is charged with enhancing mine safety through improved research and education. At this time, the Bureau also assisted in the aftermath of mine disasters, aiding in rescue and recovery. The Bureau investigated possible causes of accidents and recommended operational changes to prevent their repetition.

1911 – First national mine rescue demonstration held in the United States at Forbes Field in Pittsburg, PA with President William Howard Taft and Dr. Joseph Holmes in attendance. Holmes had been appointed by Taft in 1910 as the first director of the U.S. Bureau of Mines.

1969 – U.S. federal Coal Mine Health and Safety Act established. Typically referred to as the “Mine Act.” The Mine Act has proven to be one of the most significant pieces of safety legislation in the history of the United States.

1971 – National Mine Health and Safety Academy established in Beckley, West Virginia. It would become the world’s largest educational institution dedicated to mining health and safety.

1973 – Mine Enforcement and Safety Administration established within Dept. of Interior.

1977 – U.S. federal Mine Safety and Health Act established leading to dramatic improvements in mine safety. Law passed establishing the creation of Mine Safety and Health Administration (MSHA) within the U.S. Department of Labor. At this point, MSHA is a regulatory agency charged with ensuring the health and safety of the nation’s miners.

1995 – Bureau of Mines closed.

2013 – Oct. 30 designated as National Mine Rescue Day in United States. ■

