

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground Coal Mine

Electrocution
September 17, 2019

Panther Creek Mining, LLC
American Eagle Mine
Dawes, Kanawha County, West Virginia
I.D. No. 46-05437

Accident Investigators

Larry B. Hedrick
Electrical Specialist

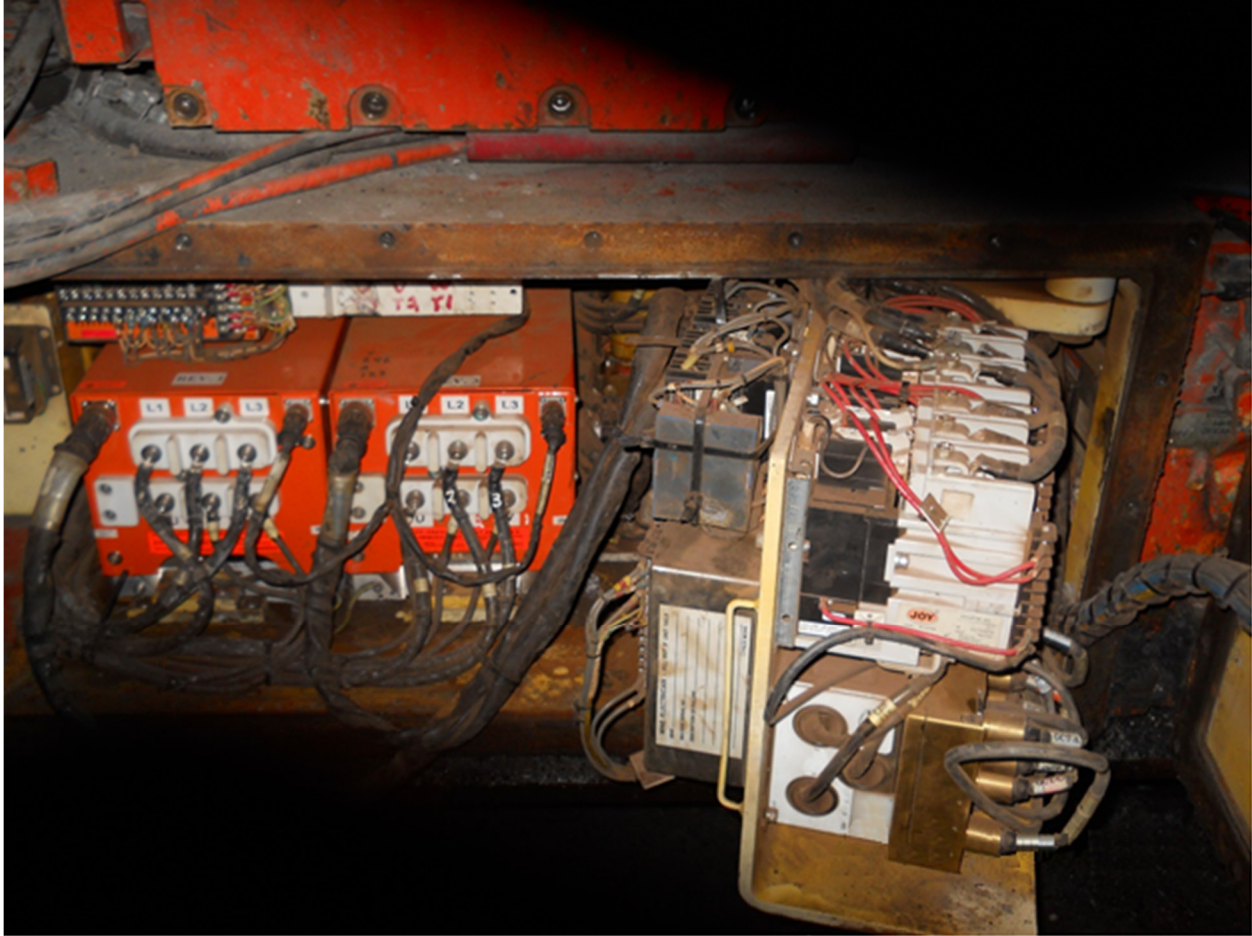
Robert L. Grose
Electrical Specialist

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Electrical Supervisor

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OVERVIEW

On Tuesday, September 17, 2019, at approximately 12:30 a.m., Steven Keeney, a 40-year-old electrician with nine years of total mining experience, died when he contacted an energized 995 VAC component. The victim was performing electrical work on the scrubber motor circuit of a continuous mining machine (CMM). The accident occurred because electrical work was performed on an energized electrical circuit while the circuit was not locked and tagged out.

GENERAL INFORMATION

The American Eagle Mine is an underground coal mine operated by Panther Creek Mining, LLC, in the Eagle Coal Seam and is located near the town of Dawes, in Kanawha County, West Virginia. The mine operates five to six days per week, and employs 389 miners underground and 20 miners on the surface. The mine is ventilated by seven air shafts, one slope, and one drift opening. Miners primarily access the mine at the Coal Fork and Dawes Portals. Miners produce coal from three CMM sections. The fourth section is a longwall section using a full face shearer. All coal is removed from the mine by belt conveyors to the surface.

The CMM sections “hot seat” and operate two nine-hour production shifts and one nine-hour maintenance shift which operates at night. The longwall section operates 24 hours a day, seven days per week. The mine produces an average of 17,170 raw tons of coal per day and the average mining height is 72 inches. The mine liberates a total of 3,467,565 cubic feet of methane per 24 hour period and 103(i) spot inspections are performed every five days.

The principal officers for the mine at the time of the accident were:

General Manager.....Jamie Wiant
Mine Superintendent.....Joey Athey
General Mine Foreman.....Scott Thompson
Safety Manager.....Ricky Estep

At the time of the accident, a regular (E01) safety and health inspection was in progress which began on July 2, 2019. The previous E01 inspection was completed on June 25, 2019. The non-fatal days lost (NFDL) injury incident rate for the mine was 4.60 in 2018 compared to the national NFDL rate of 3.15 for mines of this type.

DESCRIPTION OF ACCIDENT

On Tuesday, September 16, 2019, Keeney started work at 10:30 p.m. at the Coal Fork Portal on the maintenance shift. He met with his co-workers at the hoist and traveled down into the mine. At the shaft bottom, the crew boarded a diesel personnel carrier and traveled to the No. 1 Section. The crew arrived at the mouth of the section at approximately 11:31 p.m. The No. 1 Section, or longwall headgate 25, is a three-entry development section. Upon arrival at the end of the track, they met the evening shift crew that was leaving the No. 1 Section. They exchanged information about work that needed to be done and were informed that three repairs were needed on the CMM. The offside crawler chain was loose and needed to be tightened, the conveyor chain was loose, and the flooded-bed scrubber motor would not operate.

The maintenance night shift crew met at the section power center and discussed how they would complete their work. Scott Hendrick, No. 1 Section Maintenance Foreman, informed Stephen Ramsey, Apprentice Electrician; Robert Baldwin, Electrician; Justin Niday, Electrician; and Keeney, Electrician, what needed to be done. Kevin Young, Section Foreman and Emergency Medical Technician (EMT), finished making an examination of the faces at 12:17 a.m. and passed by the area where Hendrick, Ramsey, Baldwin, Niday, and Keeney were getting ready to work on the CMM.

The CMM was positioned to allow Hendrick to adjust the excessive slack from the crawler chain. Ramsey and Niday adjusted the conveyor chain to remove the excess slack. Baldwin started checking the top covers to make sure they were secured to the CMM.

When Hendrick finished adjusting the offside crawler chain, he handed an 18-millimeter ratchet-socket to Keeney so he could open the main controller panel on the CMM to access the flooded-bed scrubber motor electrical circuit.

Hendrick, who was working on the opposite side of the CMM from Keeney, was looking for a rag to clean the grease from his hands when he heard Keeney trying to start the scrubber motor after he had opened the main controller. Hendrick started to go to the other side of the CMM to help Keeney read the diagnostic panel when Keeney contacted an energized electrical component inside the main controller.

Hendrick heard a buzzing noise. Ramsey, Niday, and Baldwin also heard the noise and turned to see what was causing it. Baldwin, who was the closest miner to Keeney, told investigators that Keeney said "knock the breaker." Baldwin deenergized the CMM 995 VAC main circuit breaker inside the main controller where Keeney had been working. Keeney fell backward. Baldwin, Hendrick, and Niday went to help Keeney.

Ramsey went to the roof bolting machine, where Zack Bowles, Roof Bolter and EMT, and George Hignite, Roof Bolter, were working. Hignite went to the mine phone to notify the dispatcher of the accident and Bowles went to the CMM. Bowles found Keeney on the ground and he checked for a pulse. Bowles told Hendrick, Ramsey, Baldwin, and Niday to start cardiopulmonary resuscitation (CPR) while he went to the power center to retrieve the automated external defibrillator (AED). At the section power center, Bowles met Kevin Young who had been called to the scene to help by one of his crew members, and Adam Vest, Move Crew Laborer, who heard on the mine radio or mine phone there was an accident on the section. Together Bowles and Kevin Young went back to the CMM. They arrived at the CMM at 12:41 p.m. and found Keeney had been moved to a safer area where CPR was being administered by Baldwin. Bowles connected the AED to Keeney and the AED indicated a shock should be administered. Bowles administered the shock and checked for a pulse. Kevin Young was able to find a strong pulse, but it only lasted for a short period of time.

Bowles and Kevin Young continued to administer CPR to Keeney as he was being placed on a stretcher and taken to the emergency vehicle. Cody Young, Outby Crew Member, transported Keeney to the mouth of the section. Once they reached the mouth of the section, Keeney was placed on the personnel carrier and was accompanied on the trip outside by Bowles, Hignite, Cody Young, and crew members Christopher Franklin and James Eplin.

Once outside, Keeney was placed in the care of Kanawha County Emergency Ambulance Authority and transported to Charleston Area Medical Center. Dr. Elizabeth Rouse, Deputy Chief Medical Examiner, pronounced Keeney dead at 2:58 a.m. on September 17, 2019.

INVESTIGATION OF ACCIDENT

On Tuesday, September 17, 2019, at 1:29 a.m., Tony Sparks, Safety Department, called the Department of Labor National Contact Center (DOLNCC) to report the accident. Sparks reported the event occurred at 12:45 a.m. The DOLNCC called Robert H. Hatfield, Electrical Supervisor. Robert L. Grose, Electrical Specialist, was dispatched to the American Eagle Mine. Grose issued a 103(k) order to the operator at 3:55 a.m. to ensure the safety of other miners and preserve the accident scene.

The accident investigation was conducted in conjunction with the West Virginia Office of Miners' Health, Safety and Training (WVOMHST), and mine management. Investigators obtained statements from persons having knowledge of the facts and circumstances surrounding the accident. On September 17, 2019, investigators went underground to investigate the scene of the accident. Investigators photographed and sketched the accident scene.

On September 19, 2019, MSHA and WVOMHST jointly conducted interviews at the office of the WVOMHST in Oak Hill, West Virginia. See Appendix A for a list of persons interviewed and those participating in the accident investigation.

DISCUSSION

Accident Location

The accident occurred in the No. 1 Entry of the No. 1 Section at survey spad No. 23842. The mine floor was relatively flat and was damp to wet with mud present where the accident occurred. The mine roof was eight feet in height and the No. 1 Entry was 19 feet, six inches wide. The victim's tools were lying on the mine floor in front of the main controller where he was performing electrical work on the scrubber motor circuit. There were no electrical troubleshooting gloves or electrical meter where the accident occurred. Investigators found two screwdrivers and an adjustable wrench lying on the mine floor. There was an 18 millimeter ratchet-socket lying inside the main controller on an electrical component. There was a notebook lying on the machine near the enclosure.

One screwdriver was lying in the mud. A second screwdriver was lying just below the main controller on the mine floor near the adjustable wrench. On the screwdriver below the main controller, investigators found physical evidence on the steel shaft near the handle that indicated it was being used by Keeney when he was electrocuted.

Equipment

The CMM that was being worked on by Keeney and the other electricians is a Joy 12 CM mining machine (serial number JM6911). The MSHA approval number is 2G-4117A-00. The operating voltage is 995 VAC and electrical power is provided to the

CMM through a 2/0 American Wire Gauge (AWG) shielded trailing cable. The impedance of the equipment grounding conductor in the trailing cable was tested by MSHA and WVOMHST. The impedance of the grounding conductor tested to be near zero ohms indicating a good CMM frame ground. The grounded phase protection for this cable is provided at the section power center. The neutral grounding resistor measured 39.1 ohms. A phase to ground fault was simulated on each 995 VAC phase. The circuit breaker protecting this CMM and trailing cable at the time of the accident interrupted the simulated faults at an average of 13.8 amperes per phase. This indicates the grounded phase protection was working correctly.

Inspection of the components and circuitry inside the main controller revealed that the scrubber motor circuit vacuum contactor was mounted beside the pump motor vacuum contactor. The scrubber motor contactor receives its power from the pump motor contactor via jumper wires. There was a loose connection of the center phase on the pump contactor (see Appendix B). The screw holding this connection to the pump contactor was a Phillips hex head screw. The screwdriver that was lying on the mine floor was a Phillips Bit Socket style driver. As previously stated, investigators found physical evidence that the victim was using this screwdriver when he was electrocuted.

Investigators used an electrical meter to test the electrical circuit. Tests revealed that the reason the flooded-bed scrubber motor would not operate was because of an open circuit in either in the wiring or the motor of all three phase conductors.

Lock Out and Tag Out Procedure

At the time of the accident, the company had a written policy for locking and tagging out electrical circuits. The policy had been in place since the mine operator took ownership on October 26, 2015, and had the following steps:

1. Notify those in the area of your intentions;
2. Make certain control buttons or control switches for the equipment are in the "off" position;
3. All electricians are required to have a voltage tic tracer;
4. Trace the trailing cable from the equipment back to the power source;
5. Determine the circuit breaker protecting the circuit to be de-energized and switch it to the "off" position;
6. Disconnect coupler at the power source and put dust cover, if one is provided, on the gear mounted portion of the coupler. Lock and tag the coupler with the proper lock.

Green Lock

- Personal lock with only one key.
- Used when work is being performed.
- Work under this lock can only be performed by the individual that installed it.
- Only acceptable lock to use while performing any maintenance.

Red Lock

- Community lock with multiple persons having a key, (keyed alike).
- Used for transferring responsibility to oncoming shifts.
- Always replace red lock with green lock and re-trace cable to be sure correct.

Blue Lock (Optional)

- Only electricians are permitted to have keys to these locks.
- Prohibits general workforce from accessing electrical installations such as transformers, breaker boxes, belt starters, etc.
- Return to equipment and operate the starting controls to be sure the source of power is completely isolated, prior to beginning work on such equipment.

Troubleshooting and Testing

MSHA policy states that troubleshooting or testing does not include the repair of the electrical, hydraulic, or mechanical problems. When troubleshooting and/or testing an energized machine, extreme caution must be taken to prevent inadvertent contact with energized parts in close proximity and ensure that equipment will not be accidentally started. Gloves are required whenever miners troubleshoot or test energized electric power circuits or electric equipment. Examples of tests which may be performed with equipment energized are:

1. Voltage and current measurements;
2. Pressure and volume measurements on hydraulic systems; and
3. Mechanical clutch setting.

Experience and Training

Keeney was hired at this mine on February 22, 2011, and received underground experienced miner training on the same date. Prior to his employment at this mine, Keeney worked approximately nine years on surface coal mining operations and seven months at another underground coal mining operation. He obtained his underground apprentice training in 2010 and received his underground miner's certificate January 26, 2011. He received his electrical certification from the WVOMHST on August 19, 2005. Keeney's annual and electrical retraining were up to date and he was certified by the WVOMHST and qualified by MSHA as an electrician. He completed his last underground electrical retraining on April 23, 2018, and he was scheduled for his 2019 annual electrical retraining on October 5, 2019.

The victim had eight 5000-23 certificates of task training verifying training for "Lock and Tag Out" during the timeframe of April 4, 2011, through April 23, 2018.

ROOT CAUSE ANALYSIS

MSHA conducted an analysis to identify the most basic causes of the accident that were correctable through reasonable management controls. A root cause was identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below is the root cause identified during the investigation and the operator's implemented corrective action to prevent a recurrence of this type of accident:

Root Cause: Electrical work was performed on an energized electrical circuit while the circuit was not locked and tagged out.

Corrective Action: The mine operator revised the written lock out/tag out procedures.

1. The revised written procedures contain more detailed instructions and list specific roles and responsibilities. The instructions address communication, job safety analysis, identifying and turning off energy sources, locking out and tagging out visual disconnects, testing and verification, and the three lock system. For example, the procedures require miners to be notified when, and given the reason why, equipment will be deenergized, locked, and tagged. The procedures also explain when and where each of the three locks is to be installed and removed.
2. All electricians are required to keep a blue electrician's lock on their person. All miners must carry a green personal lock and a red community lock.
3. All certified electricians attended an electrical safety course highlighting the hazards involved when working near energized sources.
4. The mine operator retrained all electricians and trainee electricians on these new procedures.

CONCLUSION

On Tuesday, September 17, 2019, at approximately 12:30 a.m., Steven Keeney, a 40-year-old electrician with nine years of total mining experience, died when he contacted an energized 995 VAC component. The victim was in the process of performing electrical work on the continuous mining machine (CMM) flooded-bed scrubber motor circuit. The accident occurred because electrical work was performed on an energized electrical circuit while the circuit was not locked and tagged out.

David S. Mandeville
District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued verbally at 3:55 a.m. September 17, 2019, to Panther Creek Mining, LLC's, American Eagle Mine, to protect miners and to prevent the destruction of any evidence which would assist in the investigation of the cause or causes of the accident. An accident has occurred at this operation resulting in a fatality at this mine. This Section 103(k) order is intended to protect the safety of all persons on-site, including those involved in rescue and recovery operations or investigation of the accident. The mine operator shall obtain prior approval from an Authorized Representative of the Secretary for all actions to recover and/or restore the affected area. Additionally, the mine operator is reminded of its existing obligations to prevent the destruction of evidence that would aid in investigating the cause or causes of the accident. This order was issued verbally at 3:55 a.m., September 17, 2019, and is now being reduced to writing.
2. 104(a) citation, 30 CFR §75.509, issued to Panther Creek Mining, LLC
On September 17, 2019, an electrician was electrocuted while performing electrical work on an energized 995 VAC electrical circuit. The energized electrical circuit was inside the main controller on a continuous mining machine (serial number JM6911) on the 006-0 MMU (No. 1 Section). The electrician contacted an energized component while holding a screwdriver. Troubleshooting and testing were not being performed when the electrician was electrocuted.
3. 104(a) citation, 30 CFR §75.511, issued to Panther Creek Mining, LLC
On September 17, 2019, an electrician was electrocuted while performing electrical work on an energized 995 VAC electrical circuit. A disconnecting device for the electrical circuit was not locked out and suitably tagged while the electrical work was being performed. The energized electrical circuit was inside the main controller on a continuous mining machine (serial number JM6911) on the 006-0 MMU (No. 1 Section).

APPENDIX A
Persons Participating in the Investigation
(Persons interviewed are indicated by an * next to their name)

Blackhawk Mining Company

Jamie Wiant.....General Manager
JJ Meadows V.P. of Safety and Compliance
Matt Osborne Maintenance Chief
*Zack Bowles..... Roof Bolter and EMT
*Scott Hendrick.....No. 1 Section Maintenance Forman
*Stephen Ramsey..... Apprentice Electrician
*Robert Baldwin..... Electrician
*Justin Niday..... Electrician
*Kevin Young.....Section Foreman and EMT

West Virginia Office of Miners Health Safety & Training

John KinderDeputy Director
McKennis Browning.....Inspector at Large
Bobbie Harper..... Assistant Inspector at Large
Kendell Smith..... Chief Electrical Inspector
Jeffery Davis..... District Inspector
Gene Stewart..... District Inspector
Christopher Dawson..... District Inspector

Mine Safety and Health Administration

Joseph Presley..... Staff Assistant
Marty CarverField Office Supervisor
Larry B. Hedrick..... Electrical Specialist
Robert L. Grose..... Electrical Specialist
Robert H. Hatfield..... Electrical Supervisor
Fred MartinTraining Specialist

Keeney Family

J R CarterFamily Representative

Appendix B Photographs

