FAI-2019-19

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Powered Haulage Accident
September 5, 2019

Cardinal Mine
Warrior Coal, LLC
Madisonville, Hopkins County, Kentucky
ID No. 15-17216

Accident Investigators

Matthew Stone
Roof Control Specialist

Richard Braem
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
District 10
100 YMCA Drive
Madisonville, KY 42431
Robert A. Simms, District Manager

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OVERVIEW

On Thursday, September 5, 2019, at approximately 2:50 p.m., Jeremy Elder, a 39-year-old continuous mining machine (CMM) helper, died when a battery-powered scoop struck him. The victim was in the No. 3 entry behind a ventilation curtain that directed air to the CMM mining in the No. 3 right crosscut. A scoop, carrying roof bolting supplies, was tramming through the No. 3 left crosscut and struck the victim as the scoop turned into the No. 3 entry and passed through the ventilation curtain.

The accident occurred because miners were not aware of the change the scoop operator made to his travel route. Also, the scoop operator did not slow down or sound an audible alarm prior to traveling through the ventilation curtain.

GENERAL INFORMATION

The Cardinal Mine is located near Manitou, Hopkins County, Kentucky and originally developed in the Kentucky No. 9 and No. 11 seams. The mine has been operating since 1993 and is currently mining in the No. 9 seam. Two exhaust fans provide ventilation for the mine. Cardinal Mine employs 415 underground miners and 18 miners on the surface. The

mine operates 10 mechanized mining units (MMU) producing approximately 22,838 tons of coal daily. The mine produced 3,528,289 tons of coal in 2018. The mine liberates approximately 830,000 cubic feet of methane in 24 hours requiring them to be on a 103(i) spot inspection every 10 days.

At the time of the accident, the Mine Safety and Health Administration (MSHA) was in the process of completing a regular E01 safety and health inspection of the mine. MSHA completed the previous regular E01 safety and health inspection of the mine on June 26, 2019. The Non-Fatal Days Lost (NFDL) rate for this mine in 2018 was 2.99. The NFDL rate for the nation for mines of this type in 2018 was 3.15.

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

Bill Adleman ..... General Manager
Joel Bradley ..... Assistant General Manager
Bruce Morris..... Director of Safety and Training

DESCRIPTION OF THE ACCIDENT

On Thursday, September 5, 2019, Jeremy Elder started his regular shift at approximately 6 a.m. Elder and other miners traveled to the No. 6 unit (MMU 005-0/008-0). Upon arrival on the No. 6 unit, Merle Carter, Section Foreman, sent the miners to their respective jobs. Murray Vandiver, CMM Operator, completed a 35-foot cut in the No. 4 entry and moved the continuous mining machine (CMM) to the No. 3 right crosscut.

At approximately 2:50 p.m., Elder stated that he had leg cramps. Vandiver last saw Elder sitting on the mine floor in the No. 3 entry, outby the No. 3 right crosscut and behind the ventilation curtain (see Appendix A). Vandiver saw Elder facing outby stretching his cramped muscles by extending his legs and pulling his toes toward him.

Elder positioned himself away from the established shuttle car travel route which was from the No. 2 entry, through the No. 3 left crosscut, to the CMM that was mining the No. 3 right crosscut (see Appendix B). Corey Burge, Scoop Operator, used the No. 6040 scoop to take roof bolting supplies to the roof bolting machine near the face in the No. 2 entry (see Appendix C). After Burge unloaded the supplies at the roof bolting machine, he trammed the scoop outby in the No. 2 entry.

Since the shuttle cars had been traveling in the No. 2 entry, Burge was going to follow the loaded No. 2067 shuttle car to travel toward the feeder. While traveling the No. 2 entry, Burge met the No. 2074 shuttle car travelling to the CMM to be loaded. Burge told investigators that he then decided to tram around the coal pillar. From the No. 2 entry, Burge made a right turn into the No. 3 left crosscut and travelled toward the CMM. When the scoop came toward the No. 3 right crosscut, Vandiver said he thought it was the next shuttle

car arriving to be loaded with coal. He then started up the cutter motors on the CMM and began to tram the mining machine into the No. 3 right crosscut to continue mining coal.

When the scoop reached the No. 3 entry, Burge made a right turn into the No. 3 entry. When Vandiver saw the headlights turn into the No. 3 entry, he realized it was the scoop. Vandiver yelled for Burge to stop but the scoop had traveled through the ventilation curtain and struck Elder.

Vandiver and Burge went to Elder and realized that he had already succumbed to his injuries. Someone on the unit called Section Foreman Carter, telling him he was needed in the No. 3 entry because of an accident. Carter met Juan Mendoza, Shuttle Car Operator, who was walking away from the accident scene and learned that the scoop struck Elder in the No. 3 entry. Carter contacted David Tyson, Production Superintendent and responsible person, at 2:52 p.m. Carter gathered all of his crew at the feeder.

At the time of the call, Tyson and Jay Hopper, Dayshift Mine Foreman, were both outside at the Hanson Portal. Tyson and Hopper traveled underground to the unit where they began the process to recover the victim. Darrell Walker, Maintenance Foreman, drove John Short, Mine Foreman, to the mine's underground ambulance and both traveled separately to the accident scene. Once there, Tyson and Short placed the victim on a stretcher. Tyson, Carter and Short placed the stretcher on the mine ambulance and drove the victim to Hanson Portal, arriving on the surface at 4:23 p.m. Medical Center Emergency Medical Services transferred the victim to their ambulance where they awaited the coroner. Dennis Mayfield, Hopkins County Coroner, pronounced the victim dead at 4:45 p.m.

INVESTIGATION OF THE ACCIDENT

On Thursday, September 5, 2019, at 3:00 p.m., Dustin Blanchard, Safety Manager, notified William Barnwell, Assistant District Manager, of the accident. Barnwell told Blanchard to call the Department of Labor National Contact Center (DOLNCC). Barnwell directed Matthew Stone, Roof Control Specialist, to serve as lead accident investigator. Barnwell also directed Richard Braem, Mine Safety and Health Inspector, and Louis Adams, Electrical Supervisor, to assist in the investigation. At 3:18 p.m., Dustin Blanchard called the DOLNCC and reported the accident.

Stone arrived at the mine and interviewed miners. Stone performed the investigation with Tim Fugate, Deputy Chief Accident Investigator for Kentucky Division of Mine Safety (KDMS); Kenny Mitchell, District Supervisor; and KDMS mine safety specialists Lee Vincent, Jet Tabor, and Mark Turner.

Following the interviews, investigators traveled underground and took photographs of the scoop and surrounding ventilation controls. Investigators took measurements and mapped the area. John Benson, MSHA Electrical Specialist, inspected the scoop as investigators took measurements and gathered evidence.

Investigators conducted additional interviews at the KDMS Office in Madisonville, KY, on September 6, 2019, at 9:00 a.m. See Appendix D for a list of persons who participated in the investigation and those that were interviewed.

DISCUSSION

Accident Scene

The accident occurred in the No. 3 entry just outby the No. 3 right crosscut intersection. The mining height in this area was 73 inches and the entry was 19 feet wide. The CMM was mining the No. 3 right crosscut and two shuttle cars trammed to the CMM using the No. 2 entry and the No. 3 left crosscut.

Miners ventilated the No. 3 right crosscut with a clear "wing" curtain angled outby across the No. 3 entry. No ventilation curtain impacted the ability of the shuttle car operators to see the travel route as they trammed to the CMM.

Burge trammed the No. 6040 battery-powered scoop bucket end first from the No. 2 entry, through the No. 3 left crosscut, and into the No. 3 entry. Investigators used information from the interviews to determine the original location of the victim and his location at the time of recovery.

Investigators determined that the scoop traveled through the clear ventilation wing curtain and struck the victim who was last seen sitting on the mine floor approximately 10 feet outby the No. 3 right crosscut corner behind the ventilation curtain. The scoop operator did not sound an audible device or slow down prior to traveling through the ventilation curtain.

Equipment

The No. 6040 battery-powered scoop was a modified Caterpillar scoop, model B524-M-2, serial number 190429. The Matrix Design Group had modified the scoop and it was the only battery-powered scoop operating at this mine with alternating current (AC) motors. During interviews, miners stated "this scoop sounds just like a shuttle car" which also have AC motors. Similar scoops at this mine operate using 120V direct current (DC) batteries that power DC motors. Investigators did not find any mechanical or permissibility hazards or other factors that may have contributed to this fatal accident.

Training and Experience

Jeremy Elder had 15 years of total underground mining experience with 10 years of experience as a CMM helper. He was employed at the Cardinal Mine for just 2 weeks and 4 days. Before working at the Cardinal Mine, Elder and his crew members had previously worked at the Dotiki mine. Elder was a certified mine foreman and mine emergency technician. Elder received task training and experienced miner training for the Cardinal mine on August 19, 2019. Burge had operated a scoop in an underground coal mine before working at the Cardinal mine. On August 19, 2019, Burge was trained to operate the type of scoop he was operating at the time of the accident.

ROOT CAUSE ANALYSIS

MSHA conducted an analysis to identify the fundamental causes of the accident that were correctable through reasonable management controls. Investigators identified a root cause that, if eliminated, would have either prevented the accident or mitigated the consequences.

Listed below is the root cause identified during the analysis and the corresponding corrective actions implemented to prevent a recurrence.

Root Cause: Miners were not aware of the change the scoop operator made to his travel route. Also, the scoop operator did not slow down or sound an audible alarm prior to traveling through the ventilation curtain.

Corrective Actions: The mine operator voluntarily agreed to trial install a proximity detection system (PDS) on the No. 6040 scoop in order to attempt the workaround of technology issues with this type of deployment. Additionally, the mine operator developed a written policy to require the following:

1. All miners on foot whose normal job duties do not require them to work in close proximity to a ventilation curtain should remain a safe distance from the curtain.
2. Training for all underground powered haulage operators regarding sounding an audible warning device at a safe distance before the equipment travels through curtain.
3. All scoops traveling on the working section will stop and give an audible alarm before proceeding through a curtain.
4. Training regarding the hazards of sitting or kneeling on active haulageways inby the loading point shall be provided for all underground miners.
5. All underground miners who are on foot and who are on an active working section shall be equipped with an operating, flashing personal safety light that is approved by MSHA as intrinsically safe. The light shall be readily visible and securely attached to the miner, at or above the shoulders while on the working section.
6. Any time a miner on foot is required to work in close proximity to a ventilation curtain in areas where mobile equipment may travel, a flashing light will be hung on the opposite side of the curtain to notify other miners of his location.

The mine operator trained all miners on working sections in the new PDS system and written policy. As the obstacles to this technology application are potentially overcome in the future, the mine operator and MSHA will explore further implementation.

CONCLUSION

On Thursday, September 5, 2019, at approximately 2:50 p.m., Jeremy Elder (victim), a 39-year-old continuous mining machine (CMM) helper, died when a battery-powered scoop struck him. The victim was in the No. 3 entry behind a ventilation curtain that directed air to the CMM mining in the No. 3 right crosscut. A scoop, carrying roof bolting supplies, was trammed through the No. 3 left crosscut and struck the victim as the scoop was turned into the No. 3 entry and passed through the ventilation curtain.

The accident occurred because miners were not aware of the change the scoop operator made to his travel route. Also, the scoop operator did not slow down or sound an audible alarm prior to traveling through the ventilation curtain.

Approved By:

_____ _____

Robert A. Simms Date
District Manager

ENFORCEMENT ACTIONS

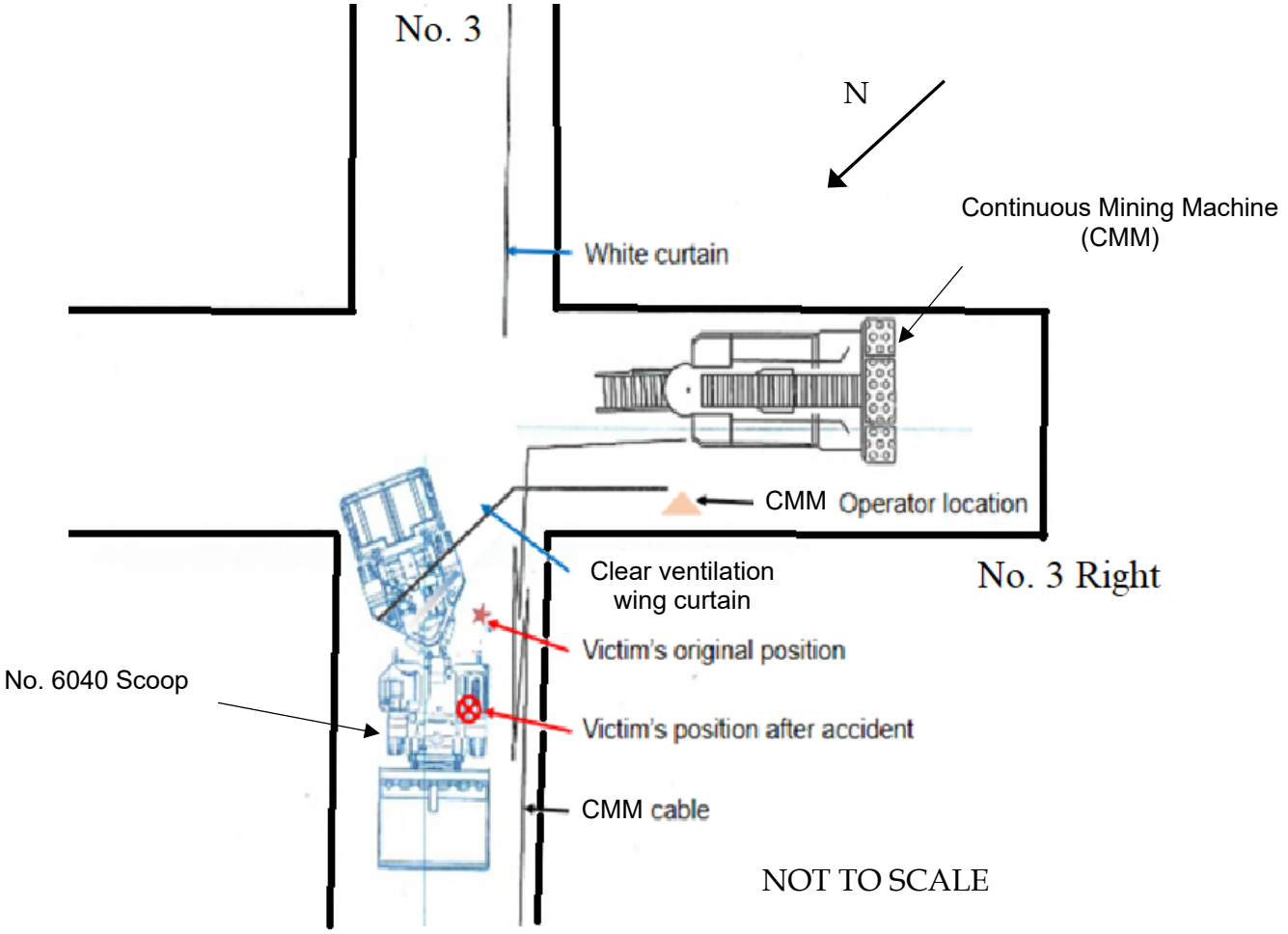
1. 103(k) Order, No. 9142938, was issued to protect the miners and preserve the accident scene. The order prohibits all activities inby the tailpiece on the No. 6 unit (MMU 005-0/008-0), No. 9-1st East Panel B, until MSHA determines the area is safe to resume normal operations.

2. 104(a) Citation, issued to Warrior Coal LLC for a violation of 30 CFR 75.1403-10(f)
The face equipment operator shall give an audible warning prior to traveling through ventilation controls. The operator of the No. 6040 battery-powered scoop did not give an audible warning prior to tramming the scoop through a ventilation curtain and into the No. 3 entry (No. 6 unit MMU 005-0/008-0). This curtain was providing ventilation to the continuous mining machine in the No. 3 right crosscut. The No. 6040 scoop struck a miner that was located on the outby side of the ventilation curtain, resulting in fatal injuries.

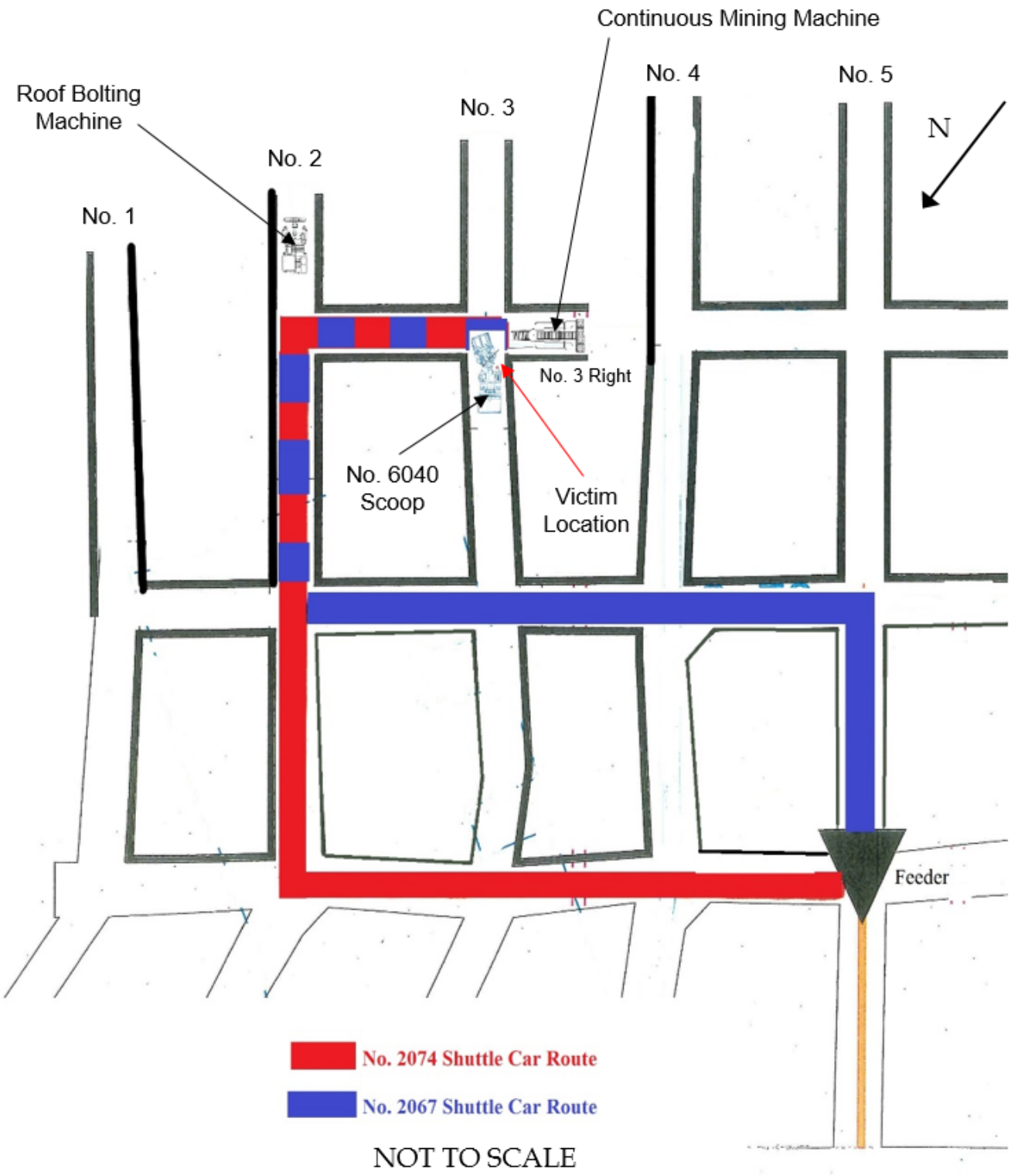
3. 314(b) Safeguard, 30 CFR 75.1403-10(f), was issued to Warrior Coal LLC
The operator of a battery-powered scoop trammed the scoop through a ventilation curtain while on the No. 6 unit (MMU 005-0/008-0). A miner died after the scoop struck him while he was located on the outby side of the ventilation curtain. This is a notice to provide safeguard that when scoops are operating on a working section the following safety precautions will apply:

    1. All miners on foot whose normal job duties do not require them to work in close proximity to a ventilation curtain should remain a safe distance from the curtain.
    2. All scoops traveling on the working section will stop and give an audible alarm before proceeding through a curtain.
    3. All underground miners who are on foot and who are on an active working section shall be equipped with an operating, flashing personal safety light that is approved by MSHA as intrinsically safe. The light shall be readily visible and securely attached to the miner, at or above the shoulders while on the working section.
    4. Any time a miner on foot is required to work in close proximity to a ventilation curtain in areas where mobile equipment may travel, a flashing light will be hung on the opposite side of the curtain to notify other miners of his location.

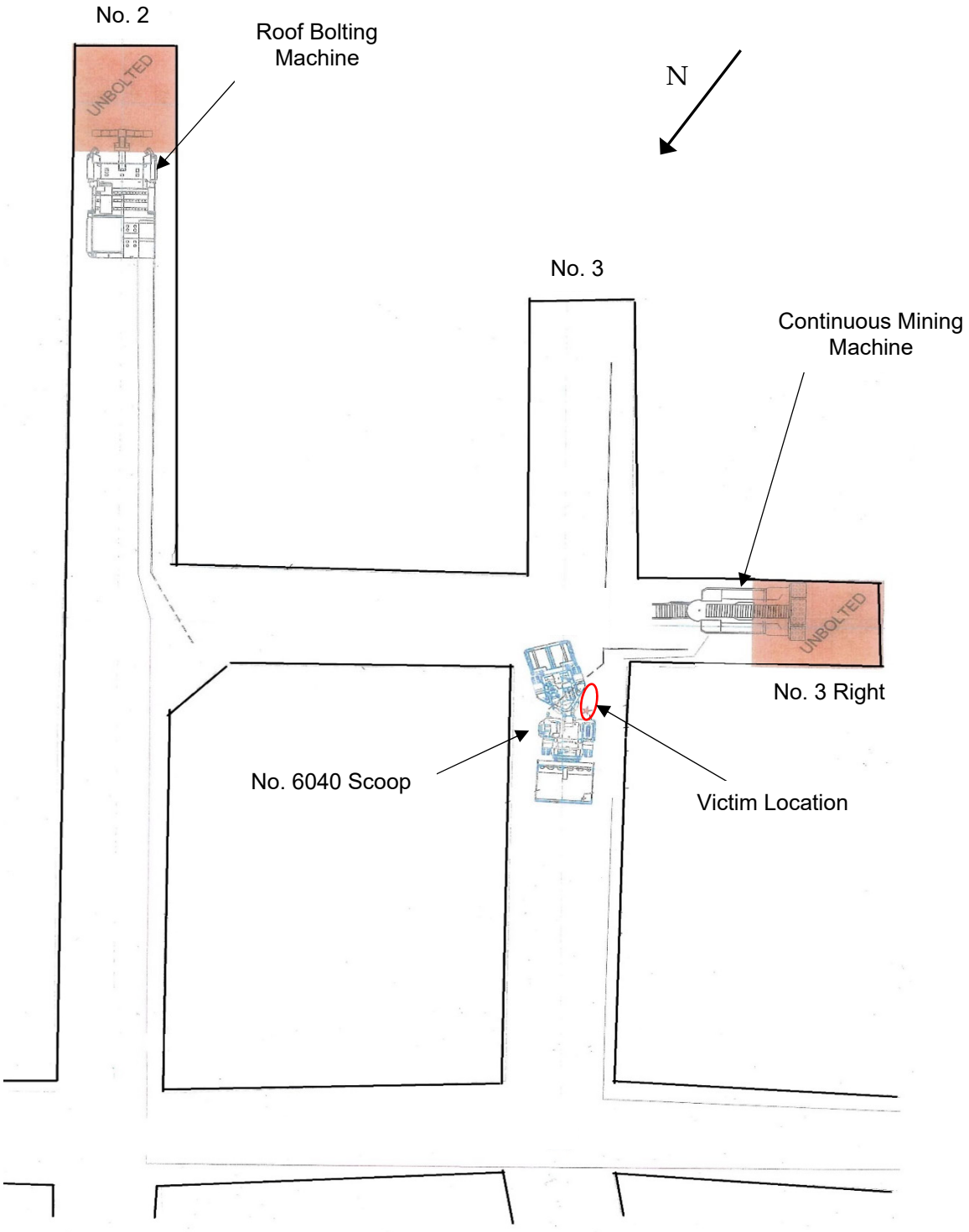
APPENDIX A
Accident Scene Drawing



APPENDIX B
Shuttle Car Travel Route



APPENDIX C
Accident Location



NOT TO SCALE

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

Mine Company

Bill Adleman ..... General Manager
Joel Bradley ..... Assistant General Manager
Kenny Murray ..... Corporate Safety
Bruce Morris ..... Director of Safety and Training
Brodie Rich ..... Assistant Director of Safety and Training
*David Tyson ..... Production Superintendent
*Jay Hopper ..... Dayshift Mine Foreman
*John Short ..... Mine Foreman
*Darrell Walker ..... Maintenance Foreman
*Merle Carter ..... Section Foreman
*Keith Shipp ..... Shuttle Car Operator
*Steve Vance ..... Shuttle Car Operator
*Travis Littlepage ..... Shuttle Car Operator
*Juan Mendoza ..... Shuttle Car Operator
*Travis Fox ..... Continuous Mining Machine Helper
*Murray Vandiver ..... Continuous Mining Machine Operator
*Corey Burge ..... Scoop Operator
*Jordan Washer ..... Unit Mechanic

Kentucky Division of Mine Safety

Tim Fugate ..... Deputy Chief Accident Investigator
Kenny Mitchell ..... District Supervisor
Lee Vincent ..... Mine Safety Specialist
Jat Tabor ..... Mine Safety Specialist
Mark Turner ..... Mine Safety Specialist

Mine Safety and Health Administration

Louis Adams ..... Electrical Supervisor
John Benson ..... Electrical Specialist
Matthew Stone ..... Roof Control Specialist
Richard Braem ..... Mine Safety and Health Inspector
Mike Pruitt ..... Education Field Services
William Barnwell ..... Assistant District Manager