#### UNITED STATES DEPARTMENT OF LABOR MINE SAFETY AND HEALTH ADMINISTRATION

#### **REPORT OF INVESTIGATION**

Underground Mine (Limestone)

Fatal Hand Tools Accident May 21, 2020

Bluff City Minerals Bluff City Minerals LLC Alton, Madison County, Illinois ID No. 11-00122

Accident Investigators

Bub Whitfield Mine Safety and Health Electrical Specialist/Accident Investigator

> Eric Crum Mine Safety and Health Inspector

Originating Office Mine Safety and Health Administration Vincennes District 2300 Willow Street Vincennes, Indiana 47591 Ronald W. Burns, District Manager

OVERVIEW
GENERAL INFORMATION
DESCRIPTION OF THE ACCIDENT
INVESTIGATION OF THE ACCIDENT
DISCUSSION
Location of the Accident
Procedure for Removal and Installation of Heavy Components
Unsecured Overhead Steel Pipe
Examination
Training and Experience
ROOT CAUSE ANALYSIS
CONCLUSION
ENFORCEMENT ACTIONS
APPENDIX A - Photograph of locations of the pipe and motor prior to the accident
APPENDIX B - Persons Participating in the Investigation
APPENDIX C – Photograph of the east side of the platform
APPENDIX D - Photograph looking south on platform

# TABLE OF CONTENTS



## OVERVIEW

On May 21, 2020, at approximately 12:30 p.m., John C. Corbin, a 60-year-old mine employee with 27 years of mining experience, was injured when an unsecured overhead steel pipe slid out of place and struck him. Corbin died due to complications from his injuries on May 23, 2020.

The accident occurred because the mine operator did not ensure equipment was blocked against hazardous motion. The mine operator also did not provide adequate task training.

## GENERAL INFORMATION

Bluff City Minerals LLC operates the Bluff City Minerals mine, an underground limestone mine located in Alton, Madison County, Illinois. The mine employs 51 miners and operates three, eight-hour shifts, five to six days per week. The miners drill and blast limestone in the underground mine. The miners use front-end loaders to load the blasted limestone into trucks, and haul it to the processing plant.

The principal officers at the time of the accident were:

Dale C HoettePresident
Deborah A. Puyear
Julie L. Shields

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on March 19, 2020. The non-fatal days lost (NFDL) incident rate for Bluff City Mine in 2019 was 5.29, compared to the national average of 1.31 for mines of this type.

#### DESCRIPTION OF THE ACCIDENT

On May 21, 2020, at 6:00 a.m., Corbin started his shift operating the water truck. At approximately 9:00 a.m., Josh Caswell, Plant Superintendent, reassigned Corbin to assist Chris Hackworth, Day Plant Maintenance, in replacing the 100 horsepower electric motor on the underground platform at the head drive of the number 11 belt conveyor. This platform was approximately 52 feet above the mine floor. Due to the configuration of the platform, Corbin and Hackworth could not use a mobile crane to lift the defective motor directly off the motor base. They planned to manually remove the motor, which weighed 1,120 pounds, from the east side of the platform and place it on the south side of the platform where the crane could reach it. To accomplish this, they decided to simultaneously move the motor vertically off its base, and horizontally towards the crane. For the vertical movement, they attached the motor to a 3/4-ton lever hoist, which was attached overhead to an unsecured, 4 ½-inch diameter by 11-foot long, steel pipe positioned between the I-beams of the framework for the platform. (See Appendix A). For the horizontal movement, they attached the motor to a one-ton chain hoist, which was attached overhead to a lifting eye on the structure of the platform.

At approximately 12:30 p.m., Hackworth was operating the lever hoist to lift the motor, and Corbin was operating the chain hoist to pull the motor, when the load shifted. The unsecured overhead steel pipe slid out of the I-beam channel and struck Corbin in the head and back, knocking him to the platform floor. Hackworth pushed the steel pipe off Corbin and helped him to his feet. Hackworth yelled for help to Rob Harbaugh, Afternoon Plant Maintenance, who was operating a skid-steer loader on the mine floor on the east side of the platform. Harbaugh used a company radio to call for help. Hackworth helped Corbin walk down the walkway to the mine floor.

Caswell was in the surface shop when he heard Harbaugh call for help over the company radio. Caswell drove to the pit and backed into the portal where he met Hackworth, Corbin, and Harbaugh. They helped Corbin into the truck and Caswell drove him to Alton Memorial Hospital in Alton, Illinois. Corbin was transferred to Barnes Jewish Hospital in St. Louis, Missouri. He was treated and released from the hospital on May 22, 2020. On May 23, 2020, Corbin became ill at home and was taken to St. Joseph's Hospital in Breese, Illinois. Corbin passed away while being treated at St. Joseph's Hospital.

#### INVESTIGATION OF THE ACCIDENT

The accident occurred on May 21, 2020, at approximately 12:30 p.m. The mine operator did not immediately report the accident to MSHA because the initial on-site assessment of Corbin's injuries were not considered life threatening.

Dale Lickenbrock, Vice President of Safety and Health, was informed of Corbin's death and called the Department of Labor National Contact Center (DOLNCC) at 9:45 a.m. on Saturday, May 23, 2020. On the same day, at 10:09 a.m., the DOLNCC notified Chad Lampley, MSHA Field Office Supervisor. Lampley called Lickenbrock to gather information regarding Corbin's death. Lickenbrock said that the mine was shut down until Tuesday, May 26, 2020, in observance of Memorial Day.

On May 26, 2020, Eric Crum, Mine Safety and Health Inspector, arrived at the mine and issued a 103(k) order at 7:36 a.m. Bub Whitfield, Electrical Specialist/Accident Investigator, and Kevin Hirsch, Assistant District Manager, arrived at the mine to conduct the initial on-site investigation.

Crum, Whitfield, Hirsch, and Dustin Galloway, Mine Safety and Health Inspector/Accident Investigator, conducted a physical examination of the accident site, interviewed miners, and reviewed conditions and procedures relevant to the accident. Dave Brown, Training Specialist, reviewed training records. MSHA conducted the investigation with the participation of mine management, a miners' representative, and miners. See Appendix B for a list of persons participating in the investigation.

#### DISCUSSION

#### Location of the Accident

The platform for the head drive of the number 11 belt conveyor is 11 feet, 3 inches wide by 13 feet, 6 inches long and contains the 100 horsepower electric motor, gearbox, and pulleys used to drive the 36-inch wide belt conveyor. The upper framework of the platform is secured against the mine roof. The platform is elevated approximately 52 feet above the mine floor and may be accessed by an approximately 145-foot long walkway beginning at the mine floor and ending at the elevated platform.

The overhead framework of the platform is made of 8-inch by 5-inch steel I-beams, each with a 2 <sup>1</sup>/<sub>2</sub>-inch wide horizontal flange extending from the vertical web.

An approximately 36-inch wide walkway is on the east, south, and west sides of the platform. The belt conveyor enters the platform from the north side.

#### Procedure for Removal and Installation of Heavy Components

The upper structure of the platform for the head drive of the number 11 belt conveyor is mounted to the mine roof which prevents overhead use of a crane. Typically, to remove and install heavy components, miners use lever hoists and chain hoists to manually move the components to the south side of the platform. From there, miners use a mobile crane to lower the components to the mine floor.

#### Unsecured Overhead Steel Pipe

The steel pipe that struck Corbin was approximately 11 feet long by  $4\frac{1}{2}$  -half inches in diameter, and weighed approximately 225 pounds. The pipe had been used as a lifting anchor since at least 2003, and was located overhead between the I-beams of the framework of the platform for the

number 11 belt conveyor. The pipe had square steel plates welded on each end, which were positioned on the 2  $\frac{1}{2}$ -wide horizontal flanges on each of the I-beams.

Typically, miners would slide the steel pipe to different positions inside the I-beams to use as an anchor when lifting heavy components on the platform. In this case, miners could not position the steel pipe squarely over the lifting eye on the defective electric motor due to the placement of two overhead area lights. As a result, the miners oriented the steel pipe at an angle in relation to the I-beams, rather than perpendicular to the I-beams. See Appendices A, C, and D.

Miners normally would install "C" clamps adjacent to the steel pipe if they thought lateral pulling motion could move it out of position. Miners discussed movement of the steel pipe on the morning of the accident, but they had not been trained to recognize the hazard of the unsecured overhead steel pipe sliding out of the I-beams. Therefore, they did not secure the steel pipe against hazardous lateral movement.

#### Examination

Hackworth conducted an examination of the working place on the morning of the accident. He did not record any hazards found at that time.

#### Training and Experience

Corbin had 27 years of mining experience. Investigators determined Corbin's annual refresher training was current; however, there was a contributory task training deficiency. Although the miners had done this work in the past, they had not been task trained to recognize and correct hazards related to lateral motion of the unsecured pipe when used as an anchor. The mine operator should have trained the miners in the safety and health aspects and safe work procedures specific to lifting and pulling heavy components from the platform.

#### **Chargeability Determination Process**

When a miner's death is not conclusively determined to be chargeable to the mine operator, MSHA submits the case, including facts and supporting information, to the MSHA Chargeability Review Committee (Committee) for a decision. The Committee examined Corbin's medical records from before the accident, during his recovery period, and at the time of his death. The Committee also reviewed the medical examiner and coroner's conclusions. The medical evidence indicates the accident and blunt force injuries created significant pain and stress that precipitated a coronary event which claimed Mr. Corbin's life. The committee determined Mr. Corbin's death to be chargeable to the mine operator.

### ROOT CAUSE ANALYSIS

MSHA conducted a root cause analysis to identify the underlying causes of the accident. The following root causes, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below are the root causes identified during the investigation and the corrective actions the operator implemented to prevent a recurrence of this type of accident.

1. <u>Root Cause:</u> The mine operator did not ensure that repairs were performed after the equipment was blocked against hazardous motion. The mine operator also did not provide appropriate equipment or establish safe procedures for the task of moving heavy components on the platform.

<u>Corrective Action</u>: The mine operator installed a new lifting and anchor system for handling heavy components at the head drive of the number 11 belt conveyor.

2. <u>Root Cause:</u> The mine operator did not adequately task train miners in safe work procedures for the task.

<u>Corrective Action</u>: The mine operator revised the training plan and instructed the miners in the safety and health aspects and safe work procedures for the task. The mine operator will provide appropriate additional task training when the new system is installed.

#### CONCLUSION

On May 21, 2020, at approximately 12:30 p.m., John C. Corbin (victim), a 60-year-old mine employee with 27 years of mining experience, was injured when an unsecured overhead steel pipe slid out of place and struck him. Corbin died due to complications from his injuries on May 23, 2020.

The accident occurred because the mine operator did not ensure equipment was blocked against hazardous motion. The mine operator also did not provide adequate task training.

Approved by:

Ronald W. Burns District Manager

Date

#### ENFORCEMENT ACTIONS

1. A 103(k) Order No. 9196331, was issued to Bluff City Minerals LLC on May 26, 2020:

The mine has experienced an accident at the head of the number 11 belt conveyor. This order is issued to ensure the safety of any person in the mine until an examination or investigation is made to determine that the belt is safe. Only those persons selected from company officials, state officials, the miner's representative and other persons who MSHA deems to have information relevant to the investigation may enter or remain in the affected area.

 A 104(a) Citation was issued to Bluff City Minerals LLC for a violation of 30 CFR 57.14105:

On May 21, 2020, at approximately 12:30 p.m., a miner suffered injuries due to being struck by an unsecured overhead steel pipe while removing the 100 horsepower electric motor located on the platform at the head drive of the number 11 conveyor belt. The electric motor had to be replaced to return the number 11 conveyor belt to service. The unsecured overhead steel pipe was used as an anchor for a lever hoist attached to the electric motor for the purpose of lifting it. While lifting and pulling the electric motor, the load shifted causing the unsecured overhead steel pipe to fall. The steel pipe was located in a beam channel above the work platform and was not blocked against hazardous motion. The miner died due to complications from his injuries on May 23, 2020.

3. A 104(a) Citation was issued to Bluff City Minerals LLC for a violation of 30 CFR 48.7(c):

On May 21, 2020, at approximately 12:30 p.m., a miner suffered injuries due to being struck by an unsecured overhead steel pipe while removing the 100 horsepower electric motor located on the platform at the head drive of the number 11 conveyor belt. The mine operator did not ensure miners were adequately task trained in the safe work procedures of the task of removing and replacing the electric motor. The miner died due to complications from his injuries on May 23, 2020.

## APPENDIX A Photograph of locations of the pipe and motor prior to the accident

When the two miners were moving the electric motor, the overhead steel pipe, as shown, slid to the right, fell out of the I-beam channel, and struck Corbin. At the time, Corbin was standing in the corner, with his back turned to the pipe, operating the chain hoist.



# APPENDIX B Persons Participating in the Investigation

# Bluff City Minerals LLC.

Dale Lickenbrock	
Dennis Sullens	Safety Supervisor
Josh Caswell	Plant Superintendent
Chris Hackworth	Day Plant Maintenance
Trevor Kroeschel	Plant Leadman/Miners' Representative
Rob Harbaugh	Afternoon Plant Maintenance
Terry Croxford	General Manager
Brian Hendrix	Attorney
Dale Lobbig	
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# Mine Safety and Health Administration

Bub Whitfield	Electrical Specialist/Accident Investigator
Eric Crum	
Dustin Galloway	Mine Safety and Health Inspector/Accident Investigator
Kevin Hirsch	Assistant District Manager
Dave Brown	

APPENDIX C Photograph of the east side of the platform



APPENDIX D Photograph looking south on platform

