

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Bituminous Coal)

Fatal Fall of Roof Accident
March 18, 2023

Mine No. 1
Hamilton County Coal, LLC
Dahlgren, Hamilton County, Illinois
ID No. 11-03203

Accident Investigators

Bub Whitfield
Mine Safety and Health Specialist

Todd Seilhymer
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
Vincennes District
2300 Willow Street Suite 200
Vincennes, IN 47591
Ronald Burns, District Manager

TABLE OF CONTENTS

OVERVIEW	1
GENERAL INFORMATION	1
DESCRIPTION OF THE ACCIDENT	2
INVESTIGATION OF THE ACCIDENT	3
DISCUSSION	3
Location of the Accident	3
Longwall Recovery	4
Geology	4
Roof Control Plan and Support	5
Training and Experience	6
Examinations	6
ROOT CAUSE ANALYSIS	7
CONCLUSION	8
ENFORCEMENT ACTIONS	9
APPENDIX A – Persons Participating in the Investigation	11
APPENDIX B – Drawing of Accident Scene	12
APPENDIX C – Photo of Accident Scene	13



OVERVIEW

On March 18, 2023, at approximately 2:05 a.m., Cameron Fourez, a 41 year-old roof bolter operator with over eight years of mining experience, died when a section of roof fell while he and others were building cribs (roof support) during the recovery of longwall shields.

The accident occurred because the mine operator: 1) did not ensure that miners followed the approved Roof Control Plan, 2) did not ensure the roof was adequately supported to protect miners from falling rock hazards, and 3) did not correct hazardous roof conditions before miners worked or traveled in the area.

GENERAL INFORMATION

Hamilton County Coal LLC, a subsidiary of Alliance Coal LLC, owns and operates Mine No. 1, an underground bituminous coal mine located approximately seven miles east of Dahlgren, Hamilton County, Illinois. Mine No. 1 employs 338 miners and operates three shifts per day, six days per week. The mine uses longwall mining methods to extract coal from the Herrin No. 6 coal seam.

The principal management officials at Mine No. 1 at the time of the accident were:

Jay Emery
Michael Hathaway

General Manager
Safety Director

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on December 29, 2022. The 2022 non-fatal days lost incident rate for Mine No. 1 was 4.47, compared to the national average of 3.21 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On March 17, 2023, Fourez arrived at Mine No. 1 along with other members of the longwall recovery crew (Crew) to begin work on the third shift, starting at 11:00 p.m. Jason Elders, Mine Manager, assigned the Crew to work on the longwall recovery. The Crew traveled underground with Justin Mayberry, Longwall Foreman, and arrived at the 6 Right longwall face at 11:34 p.m. The Crew took over work duties from the second shift crew, recovering the longwall on the Headgate side. The Crew pulled shield 64 out and installed cribs to support the mine roof. The Crew repeated the process with shields 63 and 62.

Zachary Ziegler, Mule Operator, pulled shield 61 out of place and positioned it in front of shields 55 through 58 to prepare it for transport from the face area. After shield 61 was pulled out of place, Fourez, Mark Massey, Ventilation Tube Man, and Dylan Mapps, Shieldman, observed a six-inch to ten-inch hole in the roof mesh near the end of a four-inch I-beam. Based on interviews, investigators determined Fourez told Massey not to stand under the hole in the mesh. Fourez, Massey, Mapps, Zachary Fear, Ventilation Tube Man, and Brandon Tanner, Longwall Outby, entered the “pit” (the area between the walking shield, shield 60, and the gob) to start installing cribs. A walking shield is a single longwall shield specially positioned parallel to the longwall face and dedicated to aiding in supporting the recovery room roof during the longwall recovery process. A walking shield advances toward the head gate as each subsequent longwall shield (shield) is removed from the face.

Miners stated they typically install three cribs simultaneously after they remove the shield. Miners were intending to build one crib near the gob next to shield 60 and two cribs towards the walking shield, underneath a four-inch I-beam. Mapps and Fear were working in the pit area, installing a crib away from shield 60, near the gob. Massey was handing crib blocks to Fourez. Fourez was working in the pit area, handing crib blocks to Mapps and Fear. Fourez was positioned near the hole in the roof mesh close to the end of an I-beam, near the crib Mapps and Fear were building. Tanner was handing crib blocks to miners working in the pit area.

At approximately 2:05 a.m. on March 18, 2023, loose rock in the mine roof directly above the six-inch to ten-inch hole in the roof mesh fell and covered Fourez. The falling rock tore the roof mesh and made the hole in the roof mesh larger. The rock fall covered the feet of Mapps, trapping him. The rock fall struck Fear, but he was not injured. Tanner did not receive any injuries.

Other miners working outby the area responded after hearing the rock fall from the mine roof. Ziegler and Mayberry removed rock off Mapps and pulled him out of his boots to free him. Mapps crawled out through shield 60 and did not sustain any injuries. Mayberry, Ziegler, and Elders started looking for Fourez. Elders observed his boot sticking out of the pile of fallen rock. Mayberry reported the rock pile was three to four feet tall. Elders directed miners to build additional cribs to provide protection for miners working to recover Fourez. Jonathan Ryker, Pumper, Ziegler, Mayberry, and Elders worked to remove the fallen rock from Fourez.

Joey Duty, Longwall Maintenance Foreman, and Austin Sandefur, Roof Bolter, who are Emergency Medical Technicians, were working outby the shield removal area when they learned an accident had occurred. Duty and Sandefur traveled to the accident scene, assisted in recovery efforts, and began treating Fourez. Sandefur helped place Fourez on a backboard and then onto an underground diesel-powered vehicle to be transported to the surface. Duty and Sandefur performed cardiopulmonary resuscitation (CPR) on Fourez as they traveled out of the mine.

Fourez arrived on the surface at 2:46 a.m. where Hamilton County Ambulance and AirEvac personnel took over treatment. Hamilton County Ambulance personnel transported Fourez to Hamilton Memorial Hospital where Jeffrey Frederick, M.D., pronounced Fourez dead at 3:13 a.m.

INVESTIGATION OF THE ACCIDENT

On March 18, 2023, at 2:19 a.m., Michael Hathaway, Safety Director, called the Department of Labor National Contact Center (DOLNCC) to report the accident. The DOLNCC contacted Donnie Lewis, Supervisory Mine Safety and Health Inspector, and informed him of the accident. Ronald Burns, District Manager, contacted Daniel Bradley, Supervisory Mine Safety and Health Inspector. At 5:45 a.m., Bradley and Steven Horseman, Mine Safety and Health Inspector, arrived at the mine. Horseman issued an order under the provisions of Section 103(k) of the Mine Act to assure the safety of the miners and preservation of evidence. David Stepp, Assistant District Manager, Dustin Galloway, Staff Assistant, and Bub Whitfield, Mine Safety and Health Specialist, arrived at the mine at 7:15 a.m.

MSHA's accident investigation team, along with the State of Illinois Department of Natural Resources, Office of Mines and Minerals, interviewed miners and management, conducted an examination of the accident scene, and reviewed conditions and work procedures relevant to the accident. See Appendix A for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at crosscut ten of the headgate entries, on the 6 Right District 3 Panel 10 teardown face of the longwall (see Appendix B). Miners were working adjacent to shield 60, between the walking shield, and the gob. The hole in the roof mesh was located where shield 61 had been located (see Appendix C). The rock fall was located approximately 21 feet from the face, three and a half feet from shield 60, and nine feet from the walking shield.

Longwall Recovery

The longwall face support system consisted of 210 two-legged shields manufactured by Komatsu. The shields are 78.1 inches wide and rated at 1,310-ton support capacity. Longwall crews had completed mining in the current panel and started the process of recovering shields on March 13, 2023.

The mine operator was using a shield recovery method that involved recovering shields from each direction beginning near mid-face. The mine operator started at shield 99 and worked in both directions. One group of miners worked from the headgate side while another group of miners worked from the tailgate side.

The mine operator uses one walking shield in the headgate side of the recovery area during shield removal. The Crew advances the walking shield parallel with the longwall face as another longwall shield is removed. Prior to removing the next shield, miners were installing cribs, floor to roof, and a steel four-inch I-beam against the roof to support the roof mesh and facilitate the installation of cribs in the area. This was done to support the mine roof so the next shield could be removed.

Geology

The immediate roof (layer of roof immediately above the mined area) in the fall area is comprised of Energy ‘gray’ shale that varies in thickness from zero to four feet, five inches and Anna ‘black’ shale that varies in thickness from zero to three feet, three inches. The Energy and Anna shales are inherently weak and difficult ground to support. A layer of Brereton Limestone that varies in thickness from one foot, four inches to six feet, five inches is located above the shale. The average mining height is eight feet, ten inches and the average cover over the coal seam is 950 feet.

Longwall mining creates abutment loads from the extracted area which increase the stress on the face during the mining process and in the area where longwall equipment recovery occurs. As each shield is recovered, the roof it had been supporting can cave into the active work area. Wide sections of synthetic roof mesh are installed above the shields to provide roof support and help control the loose roof rock. The mesh is bolted to the roof on the solid coal side of the longwall face and held against the roof by the remaining pressurized shields on the gob side. Each recovered shield is also replaced with two to three cribs. The cribs also serve to keep the mesh held tightly against the roof. The miners constructing the cribs rely on the walking shield, the closest remaining pressurized shield, the previously installed cribs, and the roof mesh all to control the roof while they are working in this area.

The rock that fell through the mesh created a void in the mine roof that was measured to be approximately four feet in diameter and four feet high. Investigators calculated the fallen rock to weigh approximately five tons.

The mine operator installed polyurethane grout into the mine roof in the longwall area on the day shift and second shift of March 12, 2023, to consolidate loose rock strata. The grout is injected into the mine roof where it expands and sets to consolidate and seal broken rock. Twenty-one

holes were drilled, and three tons of grout was injected into the mine roof to stabilize the area over shields 53 through 83.

Roof Control Plan and Support

The mine operator installed two rows of primary roof bolts as permanent roof support in the mine roof next to the longwall face. The mine operator also installed rib bolts in the solid coal face. The mine operator installed roof mesh, manufactured by Huesker Minegrid, in the accident location prior to the recovery, as the longwall completed mining to provide skin control roof support. The 46-foot-long roof mesh extended from the mine floor, up the coal face rib, along the mine roof, behind the shields that the mine operator was recovering, and into the gob. The high strength polyester fabric roof mesh is installed to protect miners when the powered roof support is pulled away for transport. The mesh over the shields is intended to hold the gob rubble and loose rock out of the work area.

Huesker Minegrid 400/300 – 3/4S roof mesh was installed to cover the mine roof prior to the accident occurring to prevent rock intrusion. The mesh has a minimum ultimate tensile strength of 23,365 pound/foot, which exceeded the requirements of the Roof Control Plan. The hole in the roof mesh was near the end of an I-beam that had been pressed against the mine roof by shield 61 prior to the removal of that shield. Miners stated the roof mesh can be damaged when installing the I-beam.

Miners were installing four-inch steel I-beams as the mine operator thought they were needed, based on mine roof conditions. Miners installed one I-beam per shield where the accident occurred. Miners placed the steel I-beam on top of the shield and against the mine roof prior to shield removal. As the walking shield advanced under the I-beam, miners constructed wooden cribs underneath each end of the I-beam to support it. The I-beams located in the accident area were pre-installed during the previous shift.

Miners were installing wooden cribs by hand when the accident occurred. The wooden cribs were built using wood blocks that were six inches wide by six inches tall by 30 inches long. Miners were passing wood blocks to each other and constructing square cribs. The crib installation began by miners placing two wood blocks in parallel with a space between them on the mine floor. Miners would stack two more parallel wood blocks perpendicular to and on top of the previous blocks. They repeated this stacking process until the stacked assembly of wood blocks (a wooden crib) provided support between the mine floor and mine roof. Investigators determined that miners were constructing the three cribs closest to shield 60 simultaneously, but none had been completed when the accident occurred. Miners interviewed stated that they installed additional cribs to support the mine roof as miners worked to recover Fourez.

The mine operator's approved Roof Control Plan states, "The installation of the cribs/posts shall be done from the shields, permanently supported roof or from the previously installed temporary support. If necessary, simplex-type jacks may be set to provide personnel temporary roof support during crib/post installation." Based on interviews, investigators determined that simplex-type jacks were not being set to provide personnel temporary roof support during crib installation. Miners also stated that they did not provide additional support or take additional measures to address the hole in the roof mesh. The mine operator did not ensure the mine roof

was adequately supported around the damaged roof mesh to protect miners from the hazards of falling rock.

Additionally, miners were installing cribs away from under the support of the shields, permanently supported roof, or from previously installed temporary supports (cribs/posts). The mine operator stated they interpreted their approved Roof Control Plan to mean miners could work up to five feet away from a shield, permanently supported roof, I-beams, or from previously installed cribs and posts as they installed new crib sets. According to interviews with miners and mine management, the normal longwall recovery practice on this shift was for multiple miners to enter the pit area, under unsupported roof, to build multiple cribs simultaneously. Mine management instructed miners to build cribs simultaneously, rather than sequentially, from the shields or other roof support.

The investigators determined that the hazardous conditions of the damaged roof mesh and loose rock in the mine roof, the roof not adequately supported to protect miners from hazards of falling rock, and the mine operator not following the approved Roof Control Plan contributed to the accident.

Training and Experience

Fourez had over eight years of mining experience with approximately one and a half years at Mine No. 1. Dave Brown, Mine Safety and Health Training Specialist, reviewed Fourez's training records. This was Fourez's third longwall recovery at Mine No. 1, and he performed the same work activities during the other two recoveries. Fourez received task training on the longwall recovery process, and inspectors previously observed miners installing one crib at a time while protected by roof support. Investigators determined that training was adequate; however, the mine operator instructed multiple miners to enter the pit area, while not protected by roof support, to build multiple cribs simultaneously.

Examinations

A preshift examination was conducted by John Waychoff, Examiner, on the second shift on March 17, 2023, and no hazards were recorded. Shield 61 was in place at the time of the preshift examination. Mayberry conducted an on-shift examination on the third shift at 12:00 a.m. and 2:00 a.m. on March 18, 2023, and he did not record any hazards. Shield 61 had not yet been removed at that time.

When miners removed shield 61 minutes before the accident, they observed a hole in the roof mesh. The mine operator did not correct the hazardous roof condition before miners worked in the affected area. Investigators determined this contributed to the accident.

ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes of the accident. The team identified the following root causes, and the mine operator implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The mine operator did not ensure that miners followed the approved Roof Control Plan.

Corrective Action: The mine operator developed and implemented revised safety procedures in the Roof Control Plan for longwall recovery. Revisions included a certified mine foreman dedicated to the shield recovery area during shield removal and standing support installation, a certified mine foreman to inspect and identify any roof mesh damage immediately after shield removal and prior to the installation of any floor to roof support, and cribs/posts will be built in sequence beginning from the walking shield. Miners were trained on the revised Roof Control Plan.

2. Root Cause: The mine operator did not ensure the roof was adequately supported to protect miners from hazards of falling rock.

Corrective Action: The mine operator developed and implemented revised safety procedures in the Roof Control Plan for longwall recovery. Revisions included support for the longwall recovery area by incorporating higher tensile strength roof mesh, a certified mine foreman dedicated to the shield recovery area during shield removal and standing support installation, a certified mine foreman to inspect and identify any roof mesh damage immediately after shield removal and prior to the installation of any floor to roof support, and cribs/posts will be built in sequence beginning from the walking shield. Miners were trained on the revised Roof Control Plan.

3. Root Cause: The mine operator did not correct the hazardous roof condition before miners worked or traveled in the area.

Corrective Action: The mine operator revised the Roof Control Plan to require a certified mine foreman, who is trained and familiar with longwall equipment recovery procedures, will be dedicated to the shield recovery area during shield removal and standing support installation. This person will be responsible to inspect and identify any roof mesh damage immediately after shield removal and prior to the installation of any floor to roof support. The certified mine foreman will ensure that the installation of the cribs/posts shall be done from the shields, permanently supported roof, or from previously installed temporary supports, prior to traveling under the identified damaged mesh.

CONCLUSION

On March 18, 2023, at approximately 2:05 a.m., Cameron Fourez, a 41 year-old roof bolter operator with over eight years of mining experience, died when a section of roof fell while he and others were building cribs during the recovery of longwall shields.

The accident occurred because the mine operator: 1) did not ensure that miners followed the approved Roof Control Plan, 2) did not ensure the roof was adequately supported to protect miners from falling rock hazards, and 3) did not correct hazardous roof conditions before miners worked or traveled in the area.

Approved By:

Ronald Burns
District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Hamilton County Coal, LLC.

A fatal accident occurred March 18, 2023, at approximately 2:05 a.m. This order is being issued under the authority of the Federal Mine Safety and Health Act of 1977, under Section 103(k) to insure the safety of all persons at the mine, and requires the operator to obtain the approval of an authorized representative of MSHA of any plan to recover any person in the mine or to recover the mine or affected area. This order prohibits any activity in the affected area. The operator is reminded of the obligation to preserve all evidence that would aid in investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(d)(1) citation was issued to Hamilton County Coal, LLC for a violation of 30 CFR 75.220(a)(1).

On March 18, 2023, a fatal accident occurred at crosscut ten of the headgate entries, on the 6 Right District 3 Panel 10 teardown face of the longwall, when a section of roof fell while miners were building cribs during the recovery of longwall shields. The mine operator did not comply with the Roof Control Plan, approved May 18, 2015, during the longwall shield recovery, in that: (1) miners were installing multiple wooden cribs simultaneously, away from the shields, in an area with no permanently supported roof, and without temporary support (cribs/posts); and (2) the mine operator did not set simplex-type jacks while miners were installing cribs under damaged roof mesh.

Page 57, item 3, under Shield Recovery, states “The installation of the cribs/posts shall be done from the shields, permanently supported roof or from the previously installed temporary supports (cribs/posts). If necessary, simplex-type jacks may be set to provide personnel temporary roof support during crib/post installation.”

The mine operator engaged in aggravated conduct constituting more than ordinary negligence by instructing miners to build cribs simultaneously, rather than sequentially, from the shields or other roof support. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 104(a) citation was issued to Hamilton County Coal, LLC for a violation 30 CFR 75.202(a).

On March 18, 2023, a fatal accident occurred at crosscut ten of the headgate entries, on the 6 Right District 3 Panel 10 teardown face of the longwall, when a section of roof fell while miners were building cribs during the recovery of longwall shields. The mine operator did not adequately support or otherwise control the roof where miners work or travel. The section of roof that fell measured four feet in diameter and four feet thick, and weighed approximately five tons. Miners observed a hole in the roof mesh before the roof fall occurred.

4. A 104(a) citation was issued to Hamilton County Coal, LLC for a violation 30 CFR 75.211(c).

On March 18, 2023, a fatal accident occurred at crosscut ten of the headgate entries, on the 6 Right District 3 Panel 10 teardown face of the longwall, when a section of roof fell while miners were building cribs during the recovery of longwall shields. After shield 61 was removed, miners became aware of a tear in the roof mesh when they entered the area to work. The mine operator did not correct the hazardous roof condition before miners started installing cribs in the area for the shield removal process. The section of roof that fell from the roof measured four feet in diameter and four feet thick and weighed approximately five tons.

APPENDIX A – Persons Participating in the Investigation

Hamilton County Coal LLC.

Kenneth Murray	Corporate Safety
Jay Emery	General Manager
Michael Hathaway	Safety Director
Dennis Kittenger	Safety
Levi Sisco	Safety
Joseph Monteggia	Longwall Coordinator
Jason Elders	Mine Manager
Justin Mayberry	Longwall Foreman
Joey Duty	Longwall Maintenance Foreman
Zachary Ziegler	Mule Operator
Zachary Fear	Ventilation Tube Man
Mark Massey	Ventilation Tube Man
Austin Sandefur	Roof Bolter
George Rush	650 Operator
Tyler Laughard	Longwall Mechanic
Brandon Tanner	Longwall Outby
Dylan Mapps	Shieldman
Jonathan Ryker	Pumper

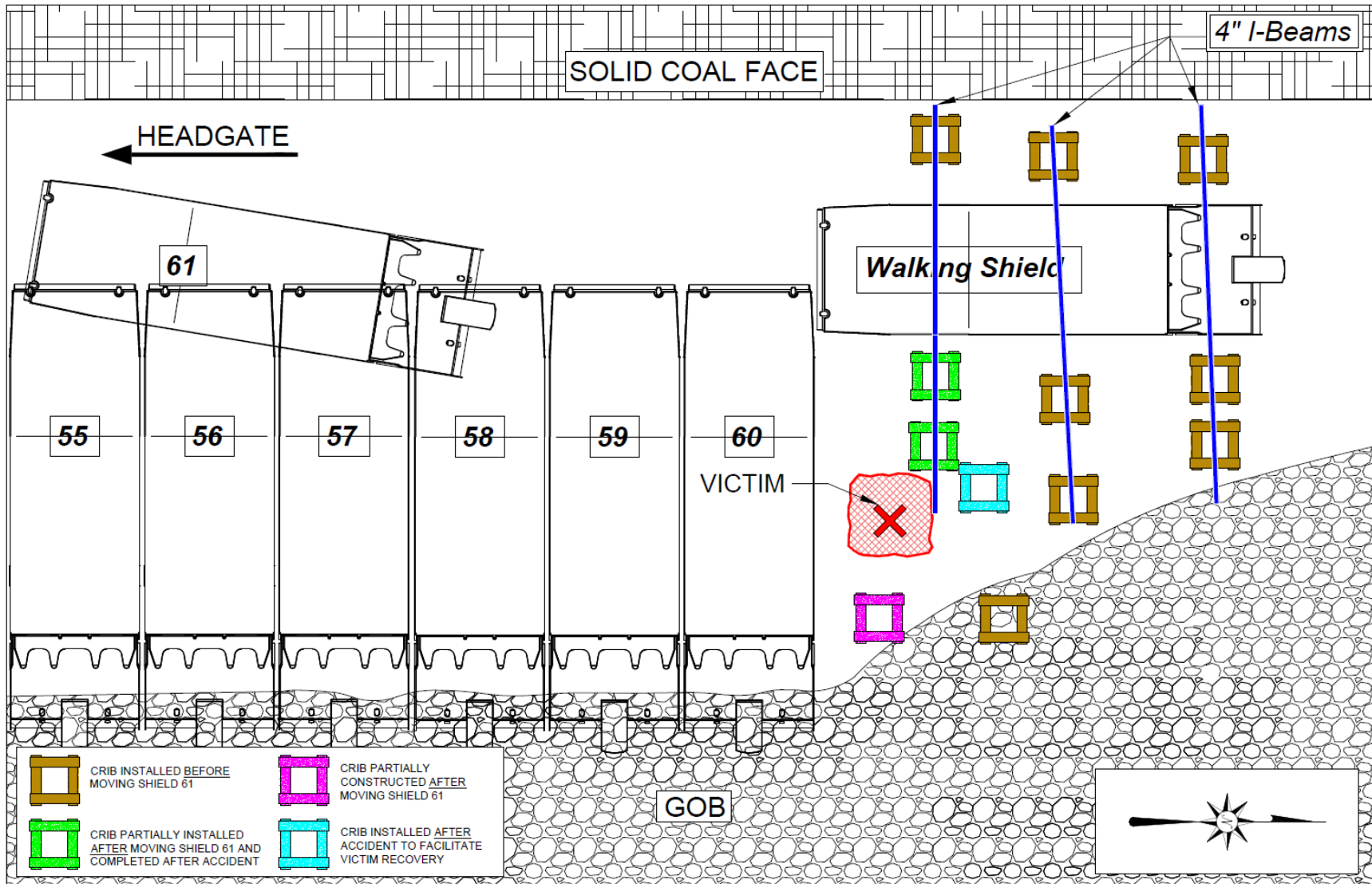
State of Illinois Department of Natural Resources, Office of Mines and Minerals

William Patterson	Inspector at Large
Keith Dixon	Inspector

Mine Safety and Health Administration

David Stepp	Assistant District Manager
Dustin Galloway	Staff Assistant
Daniel Bradley	Supervisory Mine Safety and Health Inspector
Bub Whitfield	Mine Safety and Health Specialist
Dave Brown	Mine Safety and Health Training Specialist
Steven Horseman	Mine Safety and Health Inspector
Todd Seilhymer	Mine Safety and Health Inspector

APPENDIX B – Drawing of Accident Scene



APPENDIX C – Photo of Accident Scene

