

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Powered Haulage Accident
October 11, 2013

Prosperity Mine
Five Star Mining Inc.
Petersburg, Pike County, Indiana
ID No. 12-02249

Accident Investigators

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OVERVIEW

On Friday, October 11, 2013, at approximately 2:20 p.m., 59-year-old Larry W. Schwartz (victim), Utility Man, received crushing injuries when he was pinned between a shuttle car and a coal rib on the No. 5 Unit. The victim died approximately 2 hours later. The victim was in the crosscut between the No. 6 and No. 7 entries. This crosscut and adjoining entries were used to gain access to rooms being mined on the right side of the section.

GENERAL INFORMATION

Five Star Mining Inc. operates the Prosperity mine. The mine is located in Pike County, Indiana, approximately eight miles west of Petersburg, Indiana. At the time of the accident, the mine employed 377 miners, of which, 282 worked underground. The mine is accessed via a box cut pit and a slope. The mine operates 3 shifts per day, 6 days per week in the Springfield No. 5 coal seam.

The mine produces coal during two 9-hour shifts and has one 8-hour maintenance shift. The daily average coal production is 17,500 tons. The last regular inspection was completed by MSHA on September 26, 2013. MSHA was

conducting a spot inspection (E16) at the time of the accident. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine operator in 2012 was 4.01 compared to a National NFDL rate of 3.24.

The principal officials for Prosperity Mine were:

Larry Klobuka..... General Manager
Kevin Whitehead..... Mine Superintendent
Shane Meadows..... Safety Manager

DESCRIPTION OF ACCIDENT

On Friday, October 11, 2013, Schwartz reported to work at the Prosperity Mine on the day shift. His normal work assignment was to operate a shuttle car on the No. 5 Unit. The No. 5 Unit crew left the surface at approximately 7:00 a.m. and arrived on the unit at approximately 7:54 a.m.

After arriving on the unit, Schwartz was told by section foreman Chris Tooley that he (Schwartz) and Bryan Truelove, Shuttle Car Operator, would be working outby the unit to assist Derek Kolb, Outby Laborer, with building ventilation stoppings and installing equipment doors. Schwartz also assisted maintenance technicians with some of the work they were doing at the time.

During the time that Schwartz was outby the unit, production was normal for the most part. The No. 5 Unit encountered water coming out of the mine roof, which caused the mine floor to become muddy. These conditions were difficult to mine through, and a decision was made a few days prior to move the mining equipment outby the face and mine in a different direction.

The No. 5 Unit includes MMU 005 and MMU 007. MMU 005 was on the left side of the unit, and MMU 007 was on the right side. The MMU 005 equipment had been removed except for one roof bolting machine. A small set of rooms on MMU 007 were set up to allow mining through the weekend when a move was more convenient for production.

Two shuttle cars were used, during the day shift, to haul the coal from the rooms mined on MMU 007. Joel Meece, Continuous Mining Machine Operator, had been operating the continuous mining machine during the first half of the shift. Terry Baker, Lead Man, took over operating the mining machine so Meece could take his lunch break. Following his lunch break, Tooley told Meece that either Meece or Baker should operate the third shuttle car to try to complete the room setup. Meece returned to the mining machine and discussed operating the third shuttle car with Baker. Baker and Meece decided that Meece would operate the

shuttle car. Tooley told Meece to have Kevin Western, Shuttle Car Operator, task train Meece on the shuttle car. After Meece spoke to Western about his need for task training, Western proceeded to task train Meece on the shuttle car's operation and safety features. As part of the task training, Western watched Meece transport a load of coal from the mining machine to the coal feeder to make sure Meece operated the shuttle car safely.

Meece was cleaning the cab of the shuttle car in crosscut 47 between entries 5 and 6 when Schwartz walked up to Meece, engaged in general conversation, and asked Meece where he was heading with the shuttle car. Meece told Schwartz that they just finished mining No. 3 room and that the continuous mining machine was being moved to the next location for mining. Meece explained that he was going to tram towards No. 8 entry and turn where the shuttle car operated by Brian Rodriguez was parked. (See Appendix A)

Schwartz told Meece that he was going to walk past the shuttle car. He then walked through a ventilation curtain as he was walking past the shuttle car. When Schwartz was clear, he was out of Meece's line of sight, so he turned and verbally told Meece that he was clear. Schwartz also gave a signal with his cap lamp to let Meece know that he was clear. Meece started the pump motor of the shuttle car, rang his warning bell, and flashed his headlights two times in the direction of travel. Meece then began tramping through the curtain and towards the No. 7 entry. Meece saw that there was another shuttle car cable laying in the entry. As he trammed forward, Meece steered away from the cable, which was on the operator's side of his shuttle car. As he trammed closer to the cable, he heard Schwartz yell. Meece stopped the shuttle car and began to exit the operator's cab when he heard Schwartz tell him to back the shuttle car up because he was hurt. Meece got back in the shuttle car and moved it backwards away from Schwartz.

Rodriguez was sitting in his shuttle car at crosscut 47 between entries 7 and 8 waiting for the continuous mining machine to be set up and mining to begin. Rodriguez heard Schwartz yell and went to investigate. Rodriguez walked through a ventilation curtain and saw Schwartz lying on his left side, next to the inby rib with his head towards No. 7 entry. Rodriguez ran to Schwartz to help him. Meece exited his shuttle car and also went to help Schwartz. Rodriguez and Meece realized that Schwartz needed more help than they could provide, so Meece went to find Tooley. Meece saw Travis Vories, Roof Bolter, near the dinner hole and told him that Schwartz had been injured. Vories went to Schwartz and tried to help Rodriguez in responding to the accident. Vories then went back to the dinner hole and paged the surface communication center on the mine phone. The communication center did not respond. Vories asked if anyone could hear him. An unidentified miner from the No. 1 Unit told Vories that they

could hear him. Vories told the miner on the No. 1 Unit that Schwartz had been injured. The miner said that he would call the communication center and inform them of the accident. A citation that did not contribute to the accident was issued for a violation of 30 CFR 75.1600-1 because the responsible person in the communication center on the surface did not respond immediately in this emergency situation.

Vories obtained the backboard and went to Schwartz's location. Rodriguez left and travelled toward the faces to get other miners to help. Rodriguez told Baker and Western that Schwartz had been injured. They both ran to Schwartz's location. Rodriguez continued to look for more help. Rodriguez found Truelove on the battery-powered scoop. Rodriguez told him that Schwartz had been injured and to take the scoop to the accident site to assist transporting Schwartz outby the unit. Truelove trammed the scoop to the intersection of No. 5 entry and crosscut 46. Tooley met Truelove at the coal feeder and they discussed the location of the accident. Tooley traveled to Schwartz's location with Truelove tramping the scoop behind Tooley. Truelove parked the scoop at the intersection of the No. 6 entry and crosscut 47. Truelove then exited the scoop and went to help other miners care for Schwartz. Tooley went to the mine phone to alert the communication center that Schwartz possibly had internal injuries and then went to get the stretcher.

Tom Rainey, Communication Center Dispatcher, called 911 and reported that Schwartz had internal injuries. Rainey also called Keith Brock, Belt Coordinator, who was underground. Rainey told him that Schwartz had been hurt, and that Brock was needed to drive the underground ambulance to the No. 5 Unit to transport Schwartz from the unit to the surface. Vories, Baker, Jeff Dreiman, Roof Bolter, and Tooley placed Schwartz on the stretcher. Tooley examined Schwartz for major injuries and did not find any serious external injuries. Tooley sent Western to the mine phone to inform the communication center that Schwartz had been placed on the battery-powered scoop and was being transported outby the unit to meet the underground ambulance. Rainey asked about Schwartz's vital signs and Tooley said that he would check them. Tooley sent Baker to the medical box to get the blood pressure cuff and stethoscope. Schwartz told Tooley that the strap was too tight across his chest. Tooley loosened the strap to give Schwartz some comfort. Brock and Tom Bailey, Outby Roof Bolter, arrived with the underground ambulance. Truelove, Rodriguez, Baker, Brock, and Dreiman moved Schwartz from the scoop bucket and placed him in the ambulance. Baker returned with the stethoscope but Schwartz had already been loaded onto the ambulance and was being transported to the surface. As Bailey drove the ambulance, Brock was tending to Schwartz and Truelove was riding in the passenger seat. After arriving on the surface at 3:26 p.m., Bailey drove the ambulance to the helicopter pad where Pike County EMS

and AirEvac 17 were waiting. When transferred to EMS, vital signs were still present for the victim. While Schwartz was being transported to the University of Louisville Hospital, at 4:31 p.m. EMS could not measure vital signs. Schwartz was pronounced dead at 4:51 p.m. by Megan M. Bertke, M.D.

INVESTIGATION OF THE ACCIDENT

On the day of the accident, Kevin Whitehead, Mine Superintendent, called Sylvester DiLorenzo, MSHA Assistant District 8 Manager, at 4:57 p.m. to state that an accident had occurred and to ask if the accident was reportable. DiLorenzo told him that the accident was reportable and that he was issuing a 103(j) order at that time. The mine operator then notified the MSHA Call Center at 5:30 p.m. A citation, which did not contribute to the accident, was issued for a violation of 30 CFR § 50.10 because MSHA was not notified immediately, at once, without delay, and within 15 minutes.

DiLorenzo notified Robert Simms, District 8 Manager. George Heacock, Field Office Supervisor, called Dustin Galloway, Accident Investigator, and informed him about the accident. Galloway then traveled to the mine to begin the investigation.

DiLorenzo, Galloway, and Dean Cripps, Accident Investigator, travelled to the accident site on October 12, 2013, took photos, measurements, and sketched the accident scene. Interviews were conducted at the district office in Vincennes, Indiana on October 15, 2013, and October 23, 2013. Eight miners and one section foreman were interviewed. (See Appendix B) This investigation was conducted in conjunction with personnel from the Indiana Bureau of Mines.

DISCUSSION

Location of the accident

The accident site is located at crosscut 47, between entries 6 and 7, of the 5E panel off the Main West 2 entries.

No. 5 Unit

The No. 5 Unit or working section was mining the 5E panel off the Main West 2 entries. The section had nine entries on 70-foot centers from entry to entry and 70-foot centers from crosscut to crosscut. There were six room entries in MMU 007, which was on the right side of the unit. The rooms were mined on 70-foot centers from entry to entry and 60-foot centers from crosscut to crosscut. Mining is normally conducted with two radio-remote control continuous mining machines, operating independently on two separate air splits. The continuous

mining machine on the left side (MMU 005) of the section normally mines entries No. 1 to No. 5, but had encountered wet conditions and was in the process of moving to a different location in the mine. The continuous mining machine on the right side (MMU 007) of the section normally mines entries No. 5 to No. 9, but was mining a set of room entries to the right of the section. Three shuttle cars, two double boom roof bolting machines, and a battery-powered coal scoop were assigned to the right side mining machine. The accident involved one shuttle car from the left side of the unit that was assigned to the right side to assist in completing the right side room entries.

No. 28 Shuttle Car

Meece was operating the No. 28 shuttle car when the accident occurred. The No. 28 shuttle car is a NARCO shuttle car. The model number is N12110, and the serial number is N13A7991. This shuttle car was just purchased and was a new style for the mine. This was Meece's first time operating this type of shuttle car.

The operator's deck is on the left side (facing the dumping end while standing at the loading end) in the center of the shuttle car. The deck is equipped with two seats and two sets of controls for tramping and braking to allow the operator to face the direction of travel at all times. The brake pedal is located on the left side of either seat and the tram pedal is located on the right side of either seat in a standard automotive design. One steering lever allows the operator to control the steering from either seat. The control switches for the pump motor, start/stop, lights, and the electrically powered conveyor are located on the side between the seats and are accessible to the operator from either seat. The deck is equipped with panic bars, which are readily accessible at either seat. The shuttle car is supplied with 600 volts direct current (VDC) via a trailing cable. The cable reel is located on the right side on the dump end of the shuttle car.

Machine Dimensions

The shuttle car is 29 feet and 11 inches in length, and the width is 10 feet and 5 inches at the dump end. The width on the load end is 10 feet and 1 inch. The width of the operator's deck extends 15 inches outside the main body of the car. The height of the canopy measured 53 inches from the mine floor, 43 inches from the floor of the operator's deck.

Visibility

The shuttle car is typically loaded with a load of coal to within 3 to 4 inches of the mine roof. The mining height is approximately 60 to 68 inches. The shuttle car was originally equipped with bar grating positioned in the sideboard at the operator's compartment, which allowed an approximately 3-inch by 75-inch window of visibility into the conveyor area and the offside of the shuttle car

(Appendix D). The operator's compartment had been altered in the following manner: The bar grating had been removed and replaced with solid metal sideboard extensions to prevent coal from spilling into the operator's compartment. This completely closed the 3-inch by 75-inch window. Accordingly, testing showed that a person standing at the load end of the empty shuttle car, where the victim was struck, was not visible to the operator.

Lights

The illumination system on the shuttle car has an MSHA Statement of Test and Evaluation (STE) No. 5005531-0. A copy of the MSHA STE letter was located in the operator's parts manual at the mine. The shuttle car was equipped with a STE plate. The lighting system is designed with two headlamps on the dump end and two headlamps on the load end. The shuttle car, as found after the accident, was correctly equipped with four headlights. The locations of the lights conformed to the drawings for the illumination system documented in the MSHA STE No. 5005531-0 issued for this machine.

Tram System

The shuttle car is equipped with a variable frequency drive tram system and two accelerator pedals. The two accelerator pedals allow the operator to face either direction. In addition, the two pedals provide speed control from zero to approximately 5 mph. No tram-system defects were found.

Steering

The steering was found to be functioning properly when examined and tested.

Braking System

The service brake system, emergency-park brake system, and panic bars were tested. These tests were conducted with the shuttle car empty, as conditions existed when the accident occurred. The shuttle car was equipped with panic bars that are easily accessible at each seat in the operator's deck. When actuated, the panic bars de-energized the pump motor and applied the emergency-park brake. The emergency-park brake stopped and held the shuttle car appropriately. The service brake would also quickly stop and hold the empty shuttle car. No brake defects were found.

Audible Warning Device

The audible warning device for this machine is an electric horn. This was not functional when tested after the accident. A secondary audible warning device in the form a bell equipped with a pull cord was also installed on the shuttle car. The bell functioned as designed when tested after the accident occurred and could be heard over ambient noise.

Roof Control Plan

The roof control plan has a supplement that was approved on May 25, 2012. The plan supplement requires all miners on foot inby the section loading point to wear flashing lights on the upper third of their body so that it is visible from the back. Roof bolters and shuttle car /hauler operators may turn the flashing lights off when operating their equipment. This supplement also says that Five Star Mining, Inc. will research camera systems for the cars and haulers.

Strobe Lights

On October 16, 2013, an inspection was performed on the mining belt and hardhat the victim was wearing at the time the accident occurred. The mining belt and hardhat were located in the mine safety office. The bill was broken off the approved hardhat and reflective tape and stickers were on the hard hat. A working strobe light was clipped to the back of the hard hat as well. Schwartz normally wore his strobe light in this location.

Not all miners that were interviewed could recall if Schwartz had his strobe light turned on before, or at the time of, the accident. When interviewed, Meece could not recall if Schwartz's strobe light was on when Schwartz spoke to Meece less than a minute before the accident. Meece, one of the first miners to arrive at the accident scene, said that the strobe light was not on when he arrived at Schwartz's location.

Height of Victim

Schwartz was 5 feet and 8 inches tall. Therefore, his head was at the same height as the mine roof where people in the area should have easily seen the reflective material and flashing strobe light on his hardhat.

Cameras on Shuttle Cars

All shuttle cars on the No. 5 Unit have video cameras mounted on both ends of the offside and close to the headlights. The camera's view is displayed on a pair of screens inside of the operator's cab. The camera screens in the operator's cab are located at each end so that the screen that should be viewed for the direction of travel is in front of the operator.

During the investigation, the shuttle car was trammed through the curtain between #5 and #6 entries with the load end through the curtain. The end of the shuttle car camera was extending through the curtain, as it would have been just before the accident. A person standing in front of the car near where the victim was found was easily visible. From Meece's testimony, investigators determined

that he was concerned about the other shuttle car's cable that was running down the crosscut.

Meece told investigators he flipped his lights from reverse to forward when he went through the curtain and the camera may not have picked up the light in front of the car instantaneously. There may have been a short lag time before the camera focused. He also stated the victim may have been located out of the peripheral view of the camera. Meece said that he was also focused on the cable that ran through the crosscut. In addition, he said that the victim may have been in the corner where the corner of the pillar had been trimmed off.

Previous Accident

On May 22, 2012, a miner was operating a continuous mining machine and was checking his sight lines before he began cutting with the mining machine. He was struck by a battery-powered coal hauler, which caused his leg to be amputated.

MSHA required the mine operator to revise the approved roof control plan after this accident. The revisions included safety procedures of operating equipment, strobe lights being installed on the upper third of a miner's body when that miner is traveling on foot inby the loading point, research into cameras being installed on shuttle cars and battery-powered coal haulers, and proximity devices being installed on continuous mining machines.

This revision also required the mine operator to submit a plan to implement proximity detection systems with a timeline of implementation and completion. On July 6, 2012, the mine operator submitted a plan. The plan requires proximity detection systems to be installed on all new continuous mining machines and on mining machines currently at the mine during each rebuild cycle. The first mining machine was required to be installed with a proximity detection system during the first quarter of year 2013. All mining machine rebuilds are required to be completed by the fourth quarter of CY 2015.

In addition, the mine operator's plan stated that a camera system would be installed on a new fleet of shuttle cars that were delivered during the first quarter of year 2013. The mine operator has initiated the MSHA approval process for installation of camera systems on NARCO shuttle cars.

On May 25, 2012, the supplemental roof control plan was approved by MSHA and miners were trained on May 25, 2012.

Proximity detection systems have been installed on two of six continuous mining machines. Camera systems have been installed on all shuttle cars.

Training

Schwartz had his last annual refresher training on January 5, 2013. On May 25, 2012, Schwartz received training on measures to prevent future accidents on face equipment.

Meece had his last annual refresher training on January 5, 2013. On May 25, 2012, Meece received training on measures to prevent future accidents on face equipment. Meece was task trained on the new style shuttle car on October 11, 2013. On March 29, 2012, Meece received training on the old style shuttle car.

Western had his last annual refresher training on January 5, 2013. On May 25, 2012, Western received training on measures to prevent future accidents on face equipment. On March 29, 2012, Western received training on the old style shuttle car.

Review of the training files did not show any violations of Part 48 record requirements.

ROOT CAUSE ANALYSIS

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

The root causes listed below were identified during the analysis. To prevent a recurrence of the accident mine management implemented corresponding corrective actions:

Root cause: Mine management did not maintain shuttle cars to provide maximum visibility of the offside. Sideboards were added to the conveyor of the shuttle cars to increase production. This limited the visibility of shuttle car operators.

Corrective action: Safeguard No. 8448775 was issued to require all sideboard extensions to be removed and the original factory grating re-installed between the operator's cab and conveyor.

Root cause: The mine operator did not enforce all aspects of the approved roof control plan addendum put in place after the accident on May 22, 2012, in that the victim's strobe light was turned off when he was on foot inby the section loading point.

Corrective Action: Training was performed on October 19, 2013. The topics of discussion were safe operation of shuttle cars, watching camera monitors, hazards involved with operating a shuttle car, being aware of people on foot around the shuttle car, and keeping the strobe light turned on when on foot inby the loading point.

Written company procedure in the roof control supplement approved on May 25, 2012, states that Five Star Mining, Inc. will research proximity detection systems for continuous mining machines. In addition, the supplement specifies that training will be conducted for the wearing of strobe lights by all people located inby the loading point. Training on the approved roof control supplement was conducted on May 25, 2012.

In addition, Five Star Mining, Inc., Prosperity Mine submitted a written notification to the District Manager indicating that proximity detection systems will be installed on their shuttle cars according to a prescribed "Timeline." In summary, this proximity detection will provide slowdown and shutdown of shuttle cars when signals are received from "locators" that are worn by miners

who are within close proximity to the shuttle cars. Proximity detection will be installed during the next shuttle car rebuild cycle.

CONCLUSION

The shuttle car operator's obstructed view resulted in the fatal accident. The shuttle car operator's vision was limited because it was significantly blocked by alterations made to the conveyor sideboards. The miscommunication of intended routes of travel for both machines and foot traffic also contributed to the cause of this fatality.

Approved By:



Robert Simms
District Manager



Date

ENFORCEMENT ACTIONS

1. A 103(j) order was issued to protect the miners and to help preserve the accident scene. It affected everything in by the No. 5 Unit loading point. Dustin Galloway modified it to a 103(k) order upon his arrival at the mine site.

2. A Notice to Provide Safeguard No. 8448775 was issued pursuant to section 314(b) of the Act and in accordance with Title 30 CFR §75.1403. On October 11, 2013, a fatal accident occurred on the Unit No. 5 (MMU-007) when a shuttle car, S/N N13A7991, struck a miner that was located on the left side of the crosscut in which the shuttle car was traveling. Solid metal sideboards were installed between the operator's deck and the machine bed, which prevented the shuttle car operator from having an unobstructed view of the offside of the shuttle car.

The metal sideboards installed on this car were being used to increase the load carrying capacity of the shuttle cars. These sideboards created a hazard in that the shuttle car operator's visibility across the top of the car was obstructed which prevented the car operator's view of the miner. For the safe operation of the shuttle car, it is vital that the shuttle car operator have adequate visibility on the offside of the shuttle car.

Shuttle cars shall be operated at speeds consistent with conditions and the equipment used, and shall be so controlled that they can be stopped within the limits of visibility.

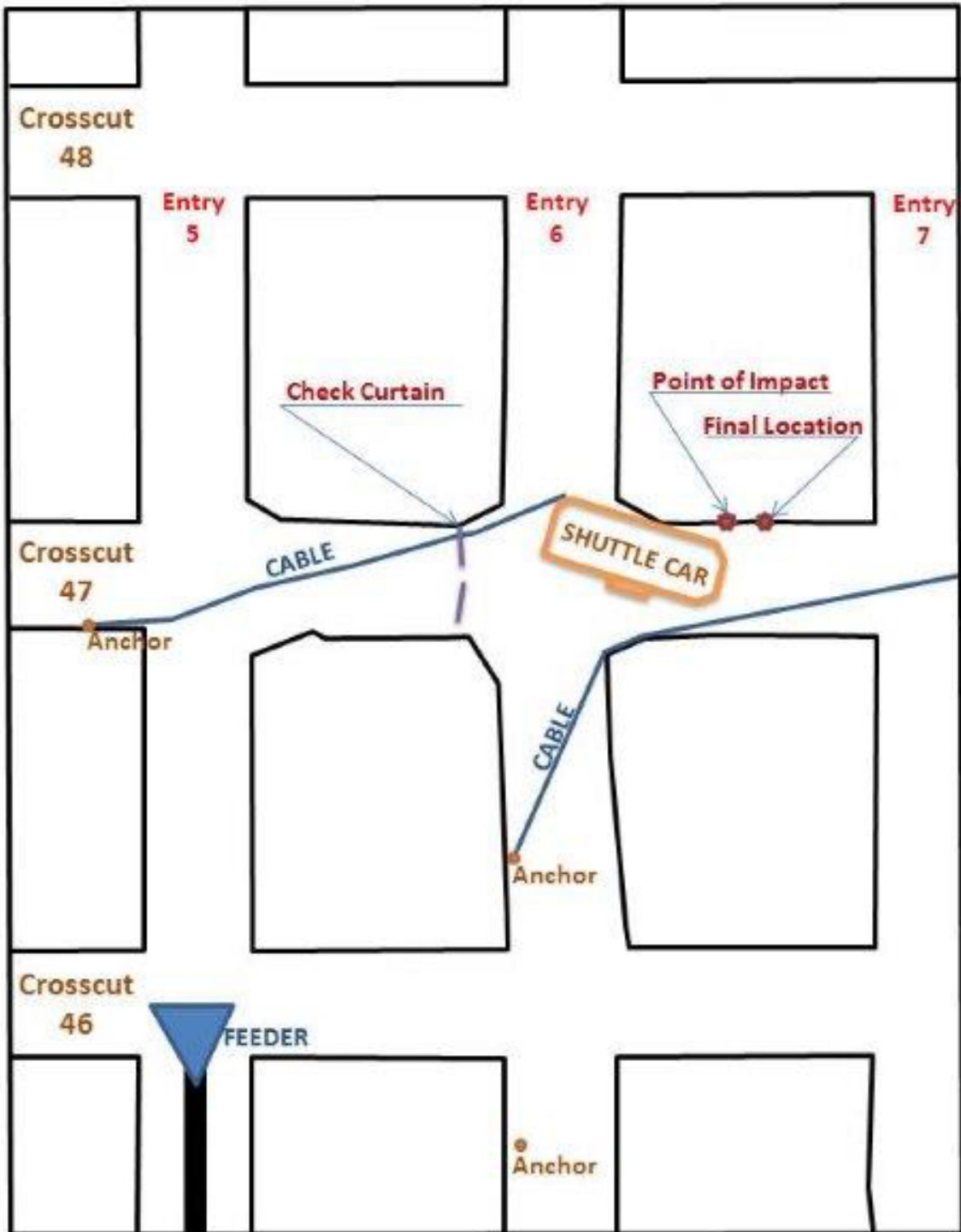
This is notice to provide safeguard(s) requiring that this shuttle car and all other shuttle cars operated at this mine be configured, designed and maintained in such a manner that the shuttle car operator's view is not obstructed during operation of the shuttle car.

Standard 75.1403 was cited 21 times in two years at mine 1202249 (21 to the operator, 0 to a contractor).

3. A 104(a) Citation No. 8448795 was issued for a violation of 30 CFR §75.220(a) (1). On October 11, 2013, a fatal accident occurred on the Unit No. 5 (MMU-007) when a shuttle car struck a miner that was located on the left side of the crosscut in which the shuttle car was traveling. The company's approved roof control plan was not being complied with on the No. 5 working section; in that, a fatal accident had occurred and the flashing light the victim was wearing on the back of his hardhat was not flashing at the time of the accident. Statements indicate that the victim's strobe light was not turned on at the time of the accident. An addendum to the approved roof control plan, approved on May 25, 2012,

requires flashing lights to be installed on the upper third of the body of all people on foot in by the loading point and will be visible from the back.

APPENDIX A - Map of Accident Scene



APPENDIX B - Persons Participating in the Investigation

Prosperity Mine Management

John Denny Head of Maintenance
Shane Meadows Safety Manager
Greg Xanders Accident Investigator

Miners from Prosperity Mine

Nick Adams Shop Foreman
Terry Baker* Lead man
Brian Rodriguez* Shuttle car operator
Kevin Western* Shuttle car operator
Joel Meece* Continuous Mining Machine Operator
Jeff Dreiman* Roof bolter
Travis Vories* Roof bolter
Bryan Truelove* Shuttle car operator
Tom Rainey* Communication center operator
Chris Tooley* Section foreman
Keith Brock* Belt coordinator

Mine Safety and Health Administration

Dustin Galloway Coal Mine Safety and Health Inspector
Dean Cripps Coal Mine Safety and Health Inspector
Sylvester DiLorenzo Assistant District Manager
Terry Hudson Electrical Inspector
Dave Brown Educational Field Services

Indiana State Bureau of Mines

Don McCorkle Deputy Commissioner

* Miners interviewed

APPENDIX D - Photographs

