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 March 28, 2018

D-11 Panther Mine Blackjewel, L.L.C. Cumberland, Harlan County, Kentucky ID No. 15-18198

Accident Investigator
Jack E. Harris
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
District 7
3837 S. U.S. Hwy. 25 E
Barbourville, KY 40906
Dennis J. Cotton, Acting District Manager

TABLE OF CONTENTS

OVERVIEW	1
GENERAL INFORMATION	1
DESCRIPTION OF ACCIDENT	2
INVESTIGATION OF ACCIDENT	4
DISCUSSION	5
Mine Operator Maintenance	5
Underground Conveyor Belts	5
Conveyor Belt Splicing Method	5
Lock Out and Tag Out Procedure	5
Belt Switch Electrical Wiring	6
Training and Experience	6
ROOT CAUSE ANALYSIS	7
CONCLUSION	8
ENFORCEMENT ACTIONS	9
APPENDIX A - Persons Participating in the Investigation	0
APPENDIX B - Drawing of the Accident Scene	1
APPENDIX C - Drawing of the Area of the Accident	2
APPENDIX D - Belt Switch Wiring and Splice Diagrams	3
APPENDIX E - Victim Information Form	4



PHOTOGRAPH OF ACCIDENT SCENE

OVERVIEW

On Wednesday, March 28, 2018, at approximately 2:15 a.m., Hubert Grubbs Jr., a 29-year-old Belt Foreman with 8 years of mining experience, was fatally injured when a conveyor belt on which he was working started unexpectedly. Grubbs became entangled in the conveyor belt clamp ratchet chain and was fatally injured when the conveyor belt started. At the time of the accident, Grubbs and a coworker were splicing the conveyor belt.

The accident occurred because the operator allowed employees to engage in repair and maintenance work on a conveyor belt without implementing proper lock-out and tag-out procedures to ensure the electrical power was off. The conveyor belt started because a mine examiner improperly repaired a remote cable and belt switch wires, which he had damaged during his examination. The mine examiner had not been trained to repair this electrical circuit.

GENERAL INFORMATION

The Blackjewel, L.L.C., D-11 Panther Mine, ID No. 15-18198, is an underground coal mine located near Cumberland, Harlan County, Kentucky. The mine started producing coal from the Owl coal seam on September 1, 1999. The mining height is 5½ feet and the mine is accessed by one main portal location. At the time of the accident, the mine employed 56 underground miners and 3 surface miners. The mine produces coal on two production shifts, five to six days per week. Maintenance is performed on the third shift.

The mine uses two mechanized mining units (MMUs), and produces an average of 1,600 tons of raw coal per day. Coal is mined with continuous mining machines and transported to the surface on 48-inch wide conveyor belts and hauled away from the mine by trucks. Rubber-tired diesel equipment is used to transport miners and supplies underground.

The mine is ventilated by an exhaust mine fan. The last air sample on January 31, 2018, showed that the mine produced no measureable amount of methane in a 24 hour period. The principal officers for Blackjewel, L.L.C. at the time of the accident were:

Jeffery A. Hoops	President
David Runyon	Vice-President

The last regular safety and health inspection (E01) was completed on March 20, 2018. The mine's non-fatal days lost (NFDL) incidence rate for 2017 was 4.09 compared to the national average of 3.66 for mines of this type.

DESCRIPTION OF ACCIDENT

On Tuesday, March 27, 2018, Anthony Boggs, Mine Foreman, gave Grubbs; Travis Saylor, Mine Examiner; and Josh Fuller, Section Foreman, their work assignments on the Section 004 MMU. The miners were working the third shift that started at 10:30 p.m. One of Grubb's duties was to replace the bad conveyor belt splice on the No. 7 conveyor belt.

At 10:00 p.m., Saylor began to conduct a pre-shift examination of mine seals, located about 1,050 feet away from the main portal. This examination is required to be completed before other third shift miners are allowed to enter the mine. After completing this examination, Saylor returned to the surface area of the main portal.

At approximately 10:30 p.m., Fuller and seven section maintenance crew members – Keaton Dillman, Scoop Operator; Gary Kirby, Roof Bolter; James Brown, Scoop Operator; Brent Raleigh, Roof Bolter; Donnie Burton, Continuous Mining Machine Operator; and Johnny Ray and Richard Baker, Electricians – traveled to the section in a personnel carrier. They arrived at the section at about 11:45 p.m. and began their assigned tasks. Tim Combs, Electrician, arrived at the section at 1:00 a.m.

Grubbs and James Belt, Scoop Operator/Outby General Laborer, who was assigned to work with Grubbs to replace the bad conveyor belt splice on the No. 7 conveyor belt, waited on the mine surface for a personnel carrier to take them into the mine. At 12:28 a.m., a carrier became available and they entered the mine. On their way to the No. 7 conveyor belt, they stopped at the No. 1 conveyor belt to check previous splices and the No. 2 conveyor belt to gather splicing tools and materials.

At 11:43 p.m., Saylor reentered the mine to conduct on-shift examinations of all mine conveyor belts. His plan was to start with the No. 1 conveyor belt and work his way to the No. 12 conveyor belt. All conveyor belts were running at this time. He stopped at the No. 7 conveyor belt head drive at crosscut 128 to take his lunch break. Grubbs and Belt arrived while Saylor was eating lunch. While Saylor and Grubbs talked, Belt adjusted the take-up at the No. 7 conveyor belt head drive to prepare for the conveyor belt splice.

Grubbs and Belt then traveled inby to crosscut 142 of the No. 7 conveyor belt entry to replace the bad conveyor belt splice. Belt stopped the conveyor belt switch by using a belt switch located at crosscut 141 and positioned the splice at approximately 38 feet away from the center of crosscut 142. Grubbs and Belt worked together to secure the conveyor belt clamps on both ends of the splice. Once the conveyor belt clamps were secured, Grubbs and Belt used two chain ratchets in conjunction with the conveyor belt clamps to pull slack in the conveyor belt. They then removed the splice by cutting between the clamps. Belt planned to install new splicing materials to the outby end of the conveyor belt, and Grubbs would then do the same to the inby end.

Belt completed the outby end of the conveyor belt splice. Grubbs knelt on the bottom conveyor belt to start installing the inby side of the conveyor belt splice. Belt was handing tools and supplies to Grubbs across the beltline.

Meanwhile, Saylor finished his lunch at the No. 7 conveyor belt head drive and traveled inby along the conveyor belt entry to continue his examination. At crosscut 135, the clearance between the conveyor belt and the rib narrowed. Saylor's personnel carrier got stuck on the outby corner of the block of coal, causing the rear wheel to lose contact with the mine floor. Saylor placed a bottom roller hanger and rocks under the wheels to regain traction. When he maneuvered to regain traction, the personnel carrier pulled apart the conveyor belt switch wires where a splice had been made to connect the wires to the remote cable. Saylor decided to repair the switch wires and remote cable by splicing the matching colors of the wires and remote cable together. This inadvertently started the No. 7 conveyor belt at about 2:15 a.m.

As the conveyor belt began to move, Grubbs became entangled in one of the loose ends of a ratchet chain used as part of the clamping process and was dragged over the top troughing rollers. Belt saw Grubbs being pulled by the belt and immediately crossed under the conveyor belt, jumped onto the personnel carrier, and headed toward the head drive to disconnect power to the No. 7 conveyor belt.

Still at crosscut 135, Saylor heard a noise, which he surmised was from a bad conveyor belt splice. The noise became louder and sounded more like the conveyor belt was broken and was contacting the troughing rollers. He saw reflective material on the conveyor belt and realized that something was wrong. He instinctively flipped the conveyor belt switch in the opposite direction, but the conveyor belt did not immediately stop. Saylor then pulled apart the conveyor belt switch wires he had just spliced. The portion of the conveyor belt where Grubbs was located coasted to a stop at crosscut 135. The belt had traveled a total of about 585 feet (see Appendix B) with Grubbs on it.

Saylor observed that Grubbs was seriously injured, but was conscious and talking. Saylor ran into the adjacent roadway and used his cap light to signal for help. Belt saw Saylor in the roadway and continued to crosscut 135 where Grubbs was located. He remained with Grubbs while Saylor drove to the nearest mine phone located approximately 630 feet away. At about 2:20 a.m., Saylor called Dallas Halcomb, Dispatcher, and directed him to contact emergency services and notify appropriate federal and state officials of the accident. Saylor also asked Halcomb to ask all miners on the section to come to the accident scene and bring first aid supplies. Saylor traveled back to assist Belt in freeing Grubbs.

Halcomb contacted local emergency services for an ambulance, and at 2:27 a.m. called the Department of Labor National Contact Center (Contact Center) to report the accident. He also called Mike Dempsey, Mine Superintendent.

Anthony Boggs, Mine Foreman, entered the mine at 1:32 a.m., arriving on the section at 2:26 a.m. Soon after arriving, he learned about the accident from Halcomb. Boggs then told Fuller, who was also an emergency medical technician, about the accident and ordered some of the crew to gather first aid supplies and travel to the accident site. At 2:30 a.m., Boggs and Fuller, as well as crew members Dillman, Kirby, Brown, Combs, and Raleigh, traveled to the accident site. Three other miners, Burton, Ray, and Baker, remained on the section.

While waiting for help to arrive, Saylor and Belt continued their efforts to free Grubbs from the conveyor belt and ratchet chains. Belt took measures to control his bleeding, while Saylor traveled to the power center and disconnected the plug for the No. 7 conveyor belt drive and take-up. He also began clearing all supplies out of his personnel carrier so Grubbs could be transported out of the mine. During this time, Grubbs remained conscious and was talking.

At about 2:50 a.m., Boggs, Fuller and the other crew members from the section arrived at the accident scene. Fuller conducted a medical assessment of Grubbs, while the miners worked together to remove Grubbs from the conveyor belt structure and ratchet chain. By this time, Grubbs had stopped talking but still had a pulse and was breathing. The miners placed Grubbs on a backboard and onto a personnel carrier to be transported to the surface. Kirby drove the personnel carrier, while Fuller and Brown continued to treat Grubbs' injuries. Belt was also with Grubbs, stabilizing his spine. Boggs, Saylor, Dillman, Combs, and Raleigh followed in separate personnel carriers.

At about 3:05 a.m., Grubbs stopped breathing. Fuller checked for a pulse but found none and immediately began cardio pulmonary resuscitation (CPR), which he continued until they reached the surface at approximately 3:15 a.m. Grubbs was placed in the waiting ambulance by members of the TranStar Emergency Medical Service (EMS).

Moments later, an EMS crew member notified the surrounding miners that Grubbs did not survive. EMS personnel contacted their dispatcher to request the coroner to travel to the mine. Philip Bianchi, Harlan County Coroner, arrived at the mine at approximately 4:20 a.m. Bianchi recorded 3:17 a.m. as the time of death.

INVESTIGATION OF ACCIDENT

After receiving Halcomb's call that a miner had been injured in a conveyor belt accident, the Contact Center contacted Russel Weekly, Birmingham Field Office (FO) Supervisor. Weekly notified Marvin Hoskins, Hazard FO Supervisor, of the accident. Hoskins sent James Daniels, Hazard FO Coal Mine Inspector (CMI), to the mine to issue a 103(k) order. Daniels issued the order at 4:00 a.m.

Hoskins contacted Samuel R. Creasy, Acting District Manager, and Creasy assigned Jack E. Harris, Barbourville FO CMI, as the lead accident investigator. Creasy also directed Sean G. Davenport, Electrical Inspector, to assist in the investigation and Kevin D. Bruner, Sr., Barbourville FO Supervisor, to act as the family liaison. Creasy, Harris, Davenport, and Bruner traveled separately to the mine to begin the accident investigation. Harris arrived at 6:15 a.m. and the others arrived shortly afterward. Accident investigators from the Kentucky Division of Mine Safety (KDMS) were at the mine and participated in the investigation.

After being briefed by Daniels, investigators from MSHA and KDMS jointly conducted informal interviews of the miners. Creasy, Harris, Davenport, and Bruner then traveled underground to the

accident scene with representatives of the mine operator and KDMS investigators. They took photographs and pertinent measurements.

Deborah B. Combs, Educational Field and Small Mine Service's Training Specialist, traveled to the mine to review training records and the company's training plan on March 28, 2018.

MSHA conducted formal interviews on March 30, 2018, at the MSHA Harlan FO. See Appendix A for a list of those that were interviewed.

DISCUSSION

Mine Operator Maintenance

The mine operator conducted mine maintenance on the third shift, beginning at 10:30 p.m. and ending at 6:00 a.m. This work included splicing and aligning conveyor belts, changing defective conveyor belt rollers, moving/servicing mining equipment, and other non-production activities.

A three-person crew is usually assigned to do outby conveyor belt maintenance, including conveyor belt splicing. On the date of the accident, the crew consisted of only Grubbs and Belt because the third member of the crew was absent.

Underground Conveyor Belts

All underground outby mine conveyor belts were 48-inches wide. At the time of the accident, there were 28,140 feet of conveyor belt and 12 conveyor belt drives. The No. 7 conveyor belt drive, where the accident occurred, was manufactured by AMS. The belt drive had 480-volt dual 200 horsepower motors, and a starter box manufactured by Trey K. Investigators determined that the conveyor belt speed was 610 feet per minute. After investigators turned a conveyor belt switch to the "off" position, it took about 8 seconds for the conveyor belt drive to stop rotating. During this timeframe, the conveyor belt traveled about 42 feet.

Conveyor Belt Splicing Method

Conveyor belt splices were made in the following manner at this mine, after power was removed: (1) conveyor belt clamps were secured, about 10 feet apart, to the conveyor belt and then were joined together with chain ratchets near each edge of the conveyor belt; (2) the ratchets were tightened to pull slack in the conveyor belt, and then the bad conveyor belt splice was cut out between the clamps; (3) on each cut end of the conveyor belt, a mechanical splice was affixed to join the conveyor belt back together; (4) the ratchets were then released at the same time, putting tension on the conveyor belt; and (5) the process is complete once the ratchets and clamps are removed.

The belt splicing materials used at the accident site included conveyor belt clamps, manufactured by Flexco (60-inch belt clamp bar set), and chain ratchets, manufactured by Harrington (3-ton sets; one had a 15 foot chain and the other a 20 foot chain).

Lock Out and Tag Out Procedure

The investigators determined that, in preparation for the conveyor belt splicing work, the belt switch was turned to the "off" position to stop the conveyor belt. Grubbs and Belt did not open, lock out, and suitably tag the visual disconnect for the cable that supplied electrical power to the conveyor belt drive, which was located about 1,350 feet away – or a 10-minute ride in a personnel carrier. Had they done so, no other miner would have been able to re-energize the conveyor belt drive while repairs were performed.

In his interview, Belt stated that most of the time before starting to splice a conveyor belt, a crew member would lock and tag-out the electrical power to the conveyor belt drive. He said that on the day of the accident, the lock out and tag out procedure was not performed because the third member of the crew was not present. Belt remembered that Grubbs did have a padlock on his mining belt to lock out the power.

Belt Switch Electrical Wiring

By using on/off switches, a miner could stop and then restart the No. 7 conveyor belt, located several hundred feet from the electrical controls at the belt drive. These on/off switches, or belt switches, installed approximately every 500 feet along the No. 7 conveyor belt, were inby the No. 7 conveyor belt drive. The belt switches were electrically connected or spliced into a cable (No. 16 AWG, type S/O) with black, white, and green insulated wires. This cable is called a remote cable.

The belt switches were spliced into the remote cable by separating either the white or black insulated wire. Each switch was connected so that it was between the two ends that were made when the black or white wire was separated. See the "TYPICAL WIRING" drawing in Appendix D. The Appendix shows that the wires of the switch, which are black and white, are not the same wires in the remote cable. The black and white wires of the switch are spliced into the black wire of the remote cable. The conveyor belt would run only when all belt switches were closed as shown. A belt switch was closed when it was in the "on" position. The electrical power to the belt drive would be deenergized when one of the belt switches was moved to the "off" position because this would open the switch. The green wire was used for grounding purposes only.

Saylor attempted to repair the damaged splice at crosscut 135 by connecting white wire to white wire and black wire to black wire. See the "WIRING AFTER SPLICE REPAIR AT TIME OF ACCIDENT" drawing in Appendix D. This placed the belt switch in parallel with the No. 7 conveyor belt switches. Since the switch was in the closed or "on" position, all of the inby belt switches were electrically bypassed and the No. 7 conveyor belt started.

Training and Experience

Grubbs received his latest annual refresher training on February 24, 2018. He had a total of 8 years mining experience of which 1 year, 17 weeks, and 5 days were at this mine. Investigators found no deficiencies in the training Grubbs received.

Saylor had not been trained to perform repairs on wiring related to the damaged remote cable and belt switch wires. The operator violated 30 CFR §§ 75.512 and 48.7 because it did not train Saylor to perform repairs on electrical circuits.

ROOT CAUSE ANALYSIS

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

Listed below are the root causes identified during the analysis and the corresponding corrective actions which were implemented to prevent recurrence.

1. Root Cause: The mine operator performed repair and maintenance work on a conveyor belt, and did not properly lock and tag-out to ensure the electrical power was off while the work was being performed. The operator was splicing the No. 7 conveyor belt using only the belt switch to stop the conveyor belt. The mine operator did not have appropriate lock and tag-out policies and procedures.

<u>Corrective Action</u>: The mine operator submitted a written action plan, which was reviewed and acknowledged by MSHA. On April 4, 2018, the operator adopted the action plan as company policy and put it in the training plan. The policy contains the following provisions:

Electrical or mechanical repairs or maintenance that can result in injuries to miners due to the movement of conveyor belt shall not be performed until the following steps are taken to prevent inadvertent or unexpected motion of the conveyor belt:

- 1) The person performing the work shall lock and tag the visible disconnect.
- 2) The tag will state the date and the name of the person performing repairs or maintenance.
- 3) The key to the lock shall be kept by the person performing repairs or maintenance.
- 4) Only the person performing the repairs or maintenance shall remove the lock after repairs or maintenance is completed.
- 5) The mine operator shall insure that no miner is in harm's way before starting the conveyor belt or belts.

The mine operator trained all employees on the new policy and procedures.

2. <u>Root Cause</u>: The operator performed an improper repair of the remote cable and belt switch wires, which had been damaged during the on-shift examination. The repair caused the belt to start. The mine examiner had not been trained to repair the electrical circuit.

<u>Corrective Action</u>: The electrical circuit was repaired by a miner who was qualified to perform this repair. The mine operator retrained all miners that repairs and maintenance on any electrical circuit must be performed by a qualified electrician.

CONCLUSION

On Wednesday, March 28, 2018, at approximately 2:15 a.m., Hubert Grubbs Jr., a 29-year-old Belt Foreman with 8 years of mining experience, was fatally injured when a conveyor belt on which he was working started unexpectedly. He became entangled in the conveyor belt clamp ratchet chain and was fatally injured when the conveyor belt started. At the time of the accident, Grubbs and a coworker were splicing a conveyor belt.

The accident occurred because the operator allowed employees to engage in repair and maintenance work on a conveyor belt without implementing proper lock-out and tag-out procedures to ensure the electrical power was off. The conveyor belt started because a mine examiner improperly repaired a remote cable and belt switch wires, which he had damaged during his examination. The mine examiner had not been trained to repair this electrical circuit.

Dennis J. Cotton	Date
Acting District Manager	

ENFORCEMENT ACTIONS

1. A 103(k) Order No. 9131853 was issued to Blackjewel L.L.C. on March 28, 2018.

This mine has experienced a fatal accident on 3/28/2018 at approximately 2:15 a.m. This order is being issued 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/or restore operations in 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 of causes of the accident.

2. 104(d)(1) Citation No. 8373338 was issued to Blackjewel L.L.C., for a violation of 30 CFR § 75.1725(c).

On March 28, 2018, a belt foreman was fatally injured while he and a coworker were making a conveyor belt splice. While the foreman was on the belt, the conveyor belt started unexpectedly. He became entangled in the belt clamp ratchet chain and received fatal injuries as the conveyor belt moved.

Repair of the conveyor belt was being performed without turning the power off (opening a manual visual disconnect switch in the circuit for the conveyor belt) and blocking the conveyor belt against motion. This violation is an unwarrantable failure to comply with a mandatory standard.

3. 104(a) Citation No. 8373339 was issued to Blackjewel L.L.C., for a violation of 30 CFR § 75.512.

On March 28, 2018, a belt foreman was fatally injured while he and a coworker were making a conveyor belt splice. While the foreman was on the belt, the conveyor belt started unexpectedly. He became entangled in the belt clamp ratchet chain and received fatal injuries as the conveyor belt moved.

The conveyor belt started because a mine examiner improperly repaired the remote cable and belt switch wires he had damaged while conducting his examination. As soon as he made the improper repair, the belt started. The mine examiner had not been trained to repair this electrical circuit. This training is also required by 30 CFR § 48.7.

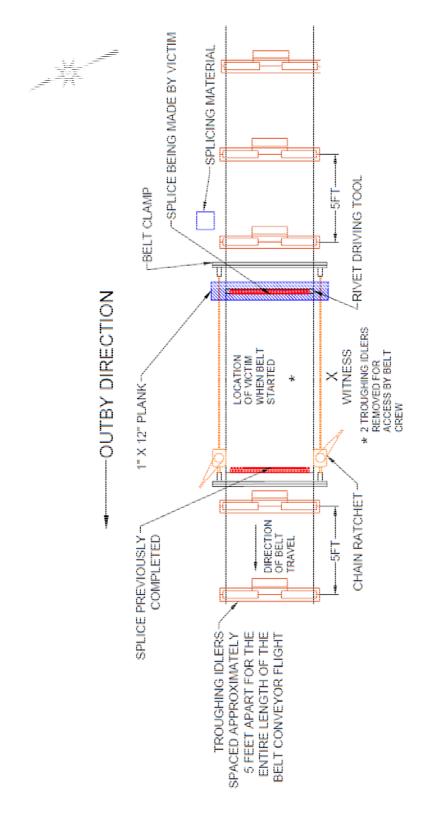
APPENDIX A

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

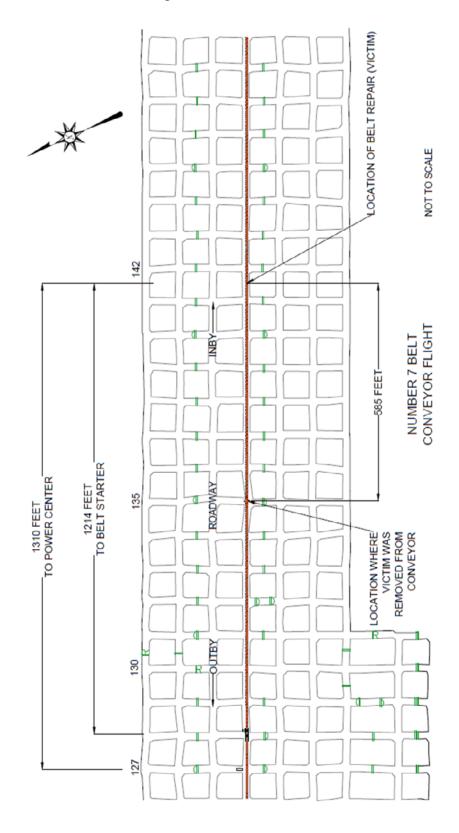
Blackjewel L.L.C.; D-11 Panther Mine Officials and Employees

Steven Countiss Mike Dempsey *Anthony Boggs *Josh Fuller	Risk Manager Safety Planner Mine Superintendent Mine Foreman Section Foreman
	DispatcherMine Examiner
•	Scoop Operator
	Scoop Operator
	Roof Bolter
_	Roof Bolter
*James Belt	Scoop Operator/Outby General Laborer
Timothy L. Fugate John Dixon Dustin Clem Todd Middleton	Chief Accident Investigator Electrical Supervisor Investigator Investigator Investigator
Dennis J. Cotton	
Deborah B. Combs	

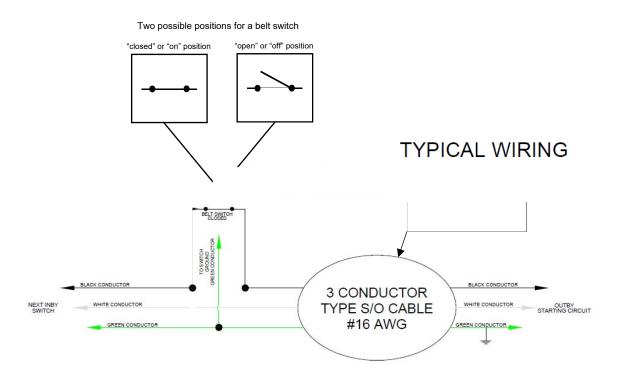
APPENDIX B
Drawing of the Accident Scene



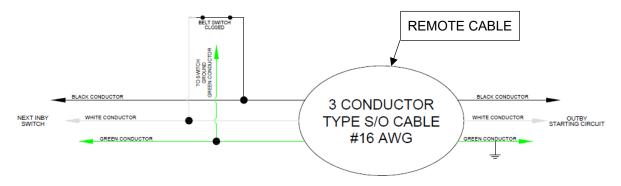
APPENDIX C
Drawing of the Area of the Accident



APPENDIX D Belt Switch Wiring and Splice Diagrams



WIRING AFTER SPLICE REPAIR AT TIME OF ACCIDENT



APPENDIX E Victim Information Form

Accident Investigation Data - Victim Information									
Event Number:	4	4	5	4	7	0	5		
									•

U.S. Department of Labor Mine Safety and Health Administration

None (No Union Affiliation)



Victim Information: 1													
Name of Injured/III Employee:	2. Sex	3. Victim's	s Age	4. Degree	of Injury	<i>[</i> .							
Hubert Grubbs	M	29		01 Fa	tal								
5. Date(MMDD/YY) and Time(24 Hr.) Of Death: 6. Date and Time Started:													
a. Date: 03/28/2018 b.Time: 3:17 a. Date: 03/27/2018 b.Time: 22:00													
7. Regular Job Title: 8. Work Activity when Injured: 9. Was this work activity part of regular job							b?						
001 Belt Foreman			023 Spli	cing Belt						Yes	X No		
10. Experience Years Weeks a. This	Days	b. Regular	Years	Weeks	Days	c: This	Years	Weeks	Days	d. Total	Years	Weeks	Days
Work Activity: 1 4	1	Job Title:	1	4	1	Mine:	1	4	1	Mining:	8	0	0
11. What Directly Inflicted Injury or Illness? 12. Nature of Injury or Illness:													
035 Belt conveyors 180 Cut/laceration/puncture/opn wound/infect													
13. Training Deficiencies:													
Hazard: New/New	ly-Employe	ed Experien	ced Miner:				Annual:		Task:				
14. Company of Employment: (If different	from produ	action opera	ator)										
Operator							Ir	ndependent	Contractor ID): (if applic	able)		
15. On-site Emergency Medical Treatmen	it:												
Not Applicable: First-Aid	i: X	C	PR: X	EMT:	X	Medi	ical Profes	sional:	X None:				
16. Part 50 Document Control Number: (fi	orm 7000-	1)			17. Uni	on Affiliatio	n of Victim	n: 9999	None	(No Union	Affiliation)		