

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Roof Fall  
August 15, 2011

Mingo Logan Coal Company  
Mountaineer II Mine  
I.D. No. 46-09029

Accident Investigators

Albert B. Clark  
Ventilation Specialist/Accident Investigator

Clifton C. Adkins, Sr.  
Electrical Specialist/Accident Investigator

Brian Morris  
Roof Control Specialist

Michael Gauna  
Roof Control Specialist/Tech Support

Elmer Bourne  
Coal Mine and Health Inspector

Originating Office  
Mine Safety and Health Administration  
District 12  
1301 Airport Road  
Beaver, West Virginia, 25813-9426  
Timothy R. Watkins, District Manager

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## OVERVIEW

On August 15, 2011, at approximately 5:50 a.m., Charles M. Hall (Victim), a 46-year old general laborer on the Move Crew, was killed during installation of cribs in the face area on the 1 Right Headgate. Hall was struck by falling rock from the mine roof while building a wooden crib where the No. 8 longwall shield had been removed.

The accident was caused by failure to follow the approved roof control plan for the recovery of the longwall shields. The roof control plan required that a crib, constructed of wooden blocks, be installed near the longwall face (within 5 feet of installed roof bolts) prior to the installation of the inby (gob) crib. Instead of following this procedure, after the recovery of the No. 8 shield, a wooden crib was first installed near the gob (fallen roof material), in excess of 10 feet from roof bolts. Failure to follow the approved roof control plan exposed the victim to hazards of unsupported mine roof. Additionally, several cribs had not been installed in the prescribed locations between the No. 8 and 11 shields.

## GENERAL INFORMATION

The Mountaineer II Mine, operated by Mingo Logan Coal Company, is located at Sharples, in Logan County, West Virginia. The underground mine employs 305 persons, including 25 surface personnel. The mine produces approximately 32,000 tons of coal daily from the five continuous mining machine sections and one longwall section, during two production shifts and one maintenance shift.

The mine is operated in the Alma coal seam, which is accessed by one slope and five shaft openings. The seam height is approximately 72 inches. The slope, elevator, supply yard, coal stock pile, and the preparation plant are located near the community of Sharples, West Virginia. Mine personnel were transported by track-mounted rail carriers. The mine is ventilated with three main mine fans and the mine produces approximately five million cubic feet of methane in a 24-hour period.

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

Jeff Roberts..... Mine Manager  
Carlos Porter..... Superintendent  
Dave Marcum..... General Foreman

## DESCRIPTION OF THE ACCIDENT

On Sunday, August 14, 2011, at approximately 11:00 p.m., the midnight shift at the Mountaineer II Mine began their regular shift. The shift began with a ten-minute safety talk and at 11:10 p.m., the workers entered the mine by elevator. At 11:17 p.m., Jeff Golden, Section Foreman, Hall and the rest of the 1 Right Crew: Tim Casto, Bryon Washington, Johnny Hatfield, Jason Fuller, Clayton Hicks, and Brian Simpkins, left the bottom of the elevator shaft and started toward the main line of the track and traveled toward the 1 Right Section. The crew arrived at the 1 Right track switch at 11:42 p.m., where traffic was congested. While the crew waited for the track congestion to clear, Golden gave another brief safety talk. Thereafter, the crew continued to the 1 Right longwall face, arriving at approximately 11:50 p.m.

The crew began removing the remaining eighteen (18) shields on the longwall face. The 1 Right Crew removed Shields 18 through 9 and transported them to the end of the track. At 5:50 a.m., the No. 8 Shield was removed and the crew began to install roof supports in that area. Assistant Mine Foreman, Kenny Evans, was directing the shield removal process at the time of the accident.

Hall began stacking the crib closest to the gob area, which is an area adjacent to and at the midway point of the side of No. 7 longwall shield. As the crib was being

constructed, the immediate roof collapsed, striking Hall. Evans, and miners on the 1 Right Crew, attempted to remove the rock from Hall; however, the rock was too heavy for the workers to remove manually with metal pry bars and mechanical jacks. Evans immediately directed the crew to use the shield mule, an electrically-powered piece of equipment capable of lifting heavy loads, to assist in lifting the rock. Golden was at the end of the track overseeing shield transport at the time of the accident. At approximately 5:57 a.m., the crew had removed sufficient rock to free Hall. Evans began CPR, while the rest of the crew administered first aid to Hall.

Hall was placed on a back board and transported to the elevator in a track-mounted mantrip. General Laborer and Emergency Medical Technician, (EMT), Chris Cook, assisted Evans in administering CPR while they were in transport. Evans and Cook arrived at the bottom of the elevator with Hall at 6:14 a.m., where they placed Hall in the elevator and accompanied him to the surface.

At 6:16 a.m., the elevator arrived on the surface and Hall was transported to Logan Regional Hospital by the Logan Ambulance Authority. The ambulance departed the mine site at 6:30 a.m., arriving at the Logan Regional Hospital at 6:55 a.m. At approximately 8:26 a.m., Hall was pronounced dead by the Emergency Room Physician.

## **INVESTIGATION OF THE ACCIDENT**

On August 15, 2011 at 6:10 a.m., the accident was reported to MSHA's National Call Center by Ralph Evans. At 6:19 a.m., Larry Cook, District 4\* Electrical Supervisor, received notification from the call center that a serious accident had occurred at the Mingo Logan Coal Company, Mountaineer II Mine. Cook issued a verbal 103(j) Order to Keith Goins, Continuous Mining Coordinator, at 6:55 a.m., to prevent the destruction of evidence and to preserve the accident scene. District 4 inspectors traveled to the accident site and reduced the verbal 103(j) Order to writing and modified the 103(j) Order to a 103(k) Order, to ensure the safety of persons at this operation.

*\*Note: During this accident investigation, jurisdiction for the Mountaineer II Mine shifted from MSHA District 4 to MSHA District 12. Personnel from both districts participated in the investigation.*

## DISCUSSION

### Longwall Shield Removal

The longwall face was approximately 1,000 feet wide and utilized 176 shields. Removed shields were being transported from both the headgate and tailgate panels. The plan for removal of these shields required that removal start at the middle shield, and the removal progressed outward, toward both the headgate and tailgate sides. At the beginning of the shift in which the accident occurred, the headgate side of the longwall had 18 shields remaining. Two cribs were required to be set after each shield removal, and two temporary supports were to be set prior to the construction of each crib. Evidence indicates that only one crib had been set in the prescribed location after the removal of the Nos. 11, 10, and 9 shields. Upon removal of the No. 8 shield, Hall started to build a crib in the previous location of the No. 8 shield, when the accident occurred. This was the first attempt during this shift to construct a crib in the inby (gob) location. The other cribs constructed previously during the shift for shield removal were located further outby the gob, or within the area that had been roof bolted (See Appendix D).

### Approved Roof Control Plan

Drawing No. 10, Page 33, of the approved roof control plan states: "1) Shield will be lowered, (the shield that is currently being removed), moved forward, turned, and moved along face in the direction indicated. 2) A minimum of two (2) cribs shall be installed for each shield removed, as space permits during the moving cycle. Temporary supports shall be installed for protection while the cribs are being constructed. 3) A minimum of two (2) cribs shall be installed, progressively as each remaining shield is removed. Cribs are to be installed in the sequence shown during normal shield removal operations and may be changed if conditions warrant. 4) In lieu of cribs, Strata Products Propsetter Systems or Heitzmann Steel Props may be used." A Copy of this portion of the mine's roof control plan is located in Appendix C.

### Accident Scene

The 1 Right longwall headgate is oriented on an azimuth (The horizontal angle of the observer's bearing in surveying, measured clockwise from a referred direction, as from the north) of approximately 12 degrees (North 12 degrees East), with the face oriented approximately South 78 degrees East. The longwall panel width is approximately 1,018 feet (measured from the center of the headgate entry to the center of the tailgate entry). The 1 Right longwall face support system consisted of 176 two-leg shields manufactured by Joy Mining Machinery. The face line shields are 1,700 MM (66.9 inches) width and rated at 1040-ton support capacity. Overburden at the accident location is approximately 1,000 feet, with no over-mining or under-mining in the area.

The longwall move activity began on Wednesday, August 11, with face recovery positioned at Crosscut 6. Prior to the accident, all longwall shields were removed from the face line, except for Shield Nos. 1 through 7. Shield recovery was progressing toward the headgate entry, with a Petitto (shield) Mule. The area of each extracted shield was to be supported by wooden cribs constructed of alternating wood blocks, measuring 6-inch, by 6-inch, by 30 inches long, (two blocks per layer). The wooden crib installation was intended to support the mine roof and prevent caving of the roof rock, so the next longwall shield could be safely removed. No other means of permanent roof support was used during this process.

The mining height at the accident location was approximately 8 feet (94 inches). The distance from the shield tip to the face was approximately 9 feet. The distance from the shield tip to the face was supported by two rows of ¾-inch diameter, 4-foot, grade 40, fully-grouted resin bolts, on 4 foot spacing. Each roof bolt also had a 6-inch, by 16-inch bearing plate, with a 17-inch, by 17-inch spider plate for roof skin control. There was no wire mesh installed on the mine roof for the shield recovery.

The immediate roof consisted of bedded dark gray shale that had near vertical roof fractures, which ran parallel to the longwall face. The vertical fractures became evident approximately 12 feet from the longwall face and had a spacing of approximately 1½, to 2 feet.

### Training and Experience

Accident investigators reviewed training records and the employees on the Move Crew. All crew members had received the required Annual Refresher and Task Training (associated with their assignments). Hall had worked at this mine for 4 years and 40 weeks. All of his time at this mine had been with the Move Crew. Hall had several task training forms on file for the mobile equipment used underground to facilitate his duties on the Move Crew. He had received Task Training specific to pulling longwall shields and setting cribs on August 12, 2011.

Golden had worked with the Move Crew and had worked on longwall moves for 15 years. The mine operator had documented Task Training specifically on longwall moves for Golden on eight occasions in that time frame.

Training records indicate that Evans had received his most recent Task Training specific to longwall moves in 2008.

## ROOT CAUSE ANALYSIS

A root cause analysis was conducted. Root causes were identified that could have mitigated the severity of the accident or prevented the loss of life. Listed below are root causes identified during the analysis and their corresponding corrective actions to prevent a recurrence of this type of accident.

*Root Cause:* The mine operator failed to follow the approved roof control plan. At the time of the accident, the victim was constructing an inby (gob) crib at a distance of approximately 10 feet from permanent roof support bolts (where the No. 8 shield had been removed) and within approximately 5 feet of the No. 7 shield. Temporary supports (screw jacks) were being used to support the roof where the crib was being constructed. The attached sketch (Appendix D) shows the location of the victim, the crib being constructed, and the approximate 10-foot distance from the primary roof support bolts to the location of the crib. The mine operator did not utilize the proper sequence of installation for cribs being constructed adjacent to the next shield to be removed. The approved roof control plan required that the sequence of installation of cribs progress from the permanently supported area toward the gob. Instead, it was found upon investigation of the accident, that the inby (gob) crib was being installed prior to the installation of a crib within 5 feet of permanent roof support bolts.

*Corrective Action:* See below

*Root Cause:* The mine operator failed to follow the approved roof control plan. The majority of cribs, which were installed during the removal of Shields No. 11 through No. 8, were installed under permanently supported (roof bolted) area near the face. Because the cribs were installed at this location, the cribs did not serve their intended purpose of supporting the roof, located adjacent to the next shield to be removed. The attached sketch (Appendix D) shows the approximate location of each crib, as observed during the investigation of the accident. No crib blocks were visible within the fall area.

*Corrective Action (Addresses the Previous Two Root Causes):* The operator submitted a revised longwall shield recovery plan. The revised plan was approved by MSHA. The revised plan requires the utilization of geo-synthetic mesh roof support during the removal of all longwall shields. The revised plan also provides for the use of walking shields or mobile roof supports as the primary method of shield removal. This method provides additional protection for miners constructing cribs adjacent to the next shield to be removed and under areas of roof that have not been permanently supported. The Move Crew employees were trained in the revised shield recovery plan requirements, including the support installation sequence prior to the subsequent longwall

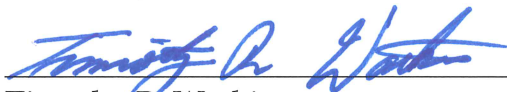


move. The training for the miners on the revised roof control plan was documented by the mine operator.

## CONCLUSION

The cause of the accident was a failure by the mine operator to follow the approved roof control plan for support of the roof during the removal of shields in longwall recovery operations. The operator failed to ensure that supports were installed in their specified locations and in the proper sequence.

Approved by:



\_\_\_\_\_  
Timothy R. Watkins  
District Manager  
Coal Mine Safety and Health, District 12

3-12-2012

Date

## ENFORCEMENT ACTIONS

1. A 103(j) Order, No. 8120237, was issued over the phone verbally at approximately 6:48 a.m. on August 15, 2011, to Mingo Logan Coal Company.

### Condition or Practice:

An accident occurred at this operation on 8/15/2011, at approximately 05:50. This order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the 009-0 MMU Longwall Section until MSHA has determined that it is safe to resume normal mining operations in this area. This order was initially issued orally to the Mine Operator at 06:48 and has now been reduced to writing.

The 103(j) Order, No. 8120237, was modified to a 103(k) Order at 7:40 a.m., to ensure the safety of workers until the investigation could be completed.

### Condition or Practice:

A roof fall accident has occurred on the 009-0 MMU Longwall Section, at the Mingo Logan Coal Company, at the Mountaineer II Mine. Only those persons specifically designated as part of the investigation team by MSHA shall be allowed to enter the mine/or area of the accident for the specific purpose of investigating the accident: Representatives of the Company; Representatives of the Miners; Representatives of the State; and Representatives of MSHA. No work can be performed until prior approval from MSHA.

2. A 104(d)(1) Citation is being issued to Mingo Logan Coal Company for violation of 30 CFR § 75.220(a)(1).

### Condition or Practice:

The Approved Roof Control Plan was not being complied with on the 009-0 MMU, 1<sup>st</sup> Right Longwall Section, which has resulted in a fatality. Evidence collected during the investigation of the accident revealed that visible cribs, constructed during the removal of the previous four longwall shields, (Shields 9-12) had been constructed primarily in the bolted walkway, instead of in the designated area adjacent to the shields being removed. Additionally, the crib installation after the removal of longwall Shield No. 8 did not adhere to the approved plan, in that the crib nearest to the gob (caved area) was being built first and preparations were being made to build a second crib between the gob line crib and the immediate longwall face. As shown in the approved roof control plan, Drawing No. 10, page 33, Item 3, referring to the sequence in which the cribs are

to be installed; the first crib is to be built within a 5-foot spacing from the face area roof bolts prior to construction of the crib closer to the gob line. Mine management engaged in aggravated conduct, constituting more than ordinary negligence, by allowing the cribs to be built in violation of the approved roof control plan, which exposed workers to unsupported roof. This violation is an unwarrantable failure to comply with a mandatory standard.

**APPENDIX A**  
Persons Participating in the Investigation

Mingo Logan Coal Company

Carlos Porter .....	Superintendent
Keith Goins .....	Mine Foreman
Bill Merritt.....	Safety Technician
Tim Casto.....	General Labor
Johnny Hatfield.....	General Labor
Jason Fuller.....	General Labor
Bryon Washington.....	General Labor
Chris Cook.....	Labor/EMT
Clayton Hicks.....	Electrician
Brian Simpkins.....	Electrician
Kenny Evans.....	Assist Mine Foreman
Jeff Golden.....	Section Foreman

West Virginia Office of Miners' Health, Safety & Training

John Kinder.....	Inspector-at-Large
Danny Jarrell.....	Assistant Inspector-at-Large
Wayne Pauley.....	District Inspector

Mine Safety and Health Administration

Albert Clark .....	Ventilation Specialist/ Accident Investigator
Clifton Adkins Sr.....	Electrical Specialist/ Accident Investigator
Brian Morris.....	Civil Engineer/Roof Control
Michael Gauna.....	Roof Control Specialist/Tech Support
Elmer Bourne.....	Coal Mine Safety and Health Inspector

## APENDIX B Victim Information

### Accident Investigation Data - Victim Information

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



Event Number: 6 2 9 2 0 2 2

**Victim Information:** 1

1. Name of Injured/Ill Employee: <i>Charles M. Hall</i>		2. Sex <i>M</i>	3. Victim's Age <i>46</i>		4. Degree of Injury: <i>01 Fatal</i>				
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 08/15/2011 b. Time: 8:26</i>				6. Date and Time Started: <i>a. Date: 08/15/2011 b. Time: 5:50</i>					
7. Regular Job Title: <i>016 General Labor</i>			8. Work Activity when Injured: <i>029 Setting cribs after removing shield</i>			9. Was this work activity part of regular job? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
10. Experience:		a. This		b. Regular		c. This		d. Total	
Years	Weeks	Days	Job Title:	Years	Weeks	Days	Years	Weeks	Days
<i>4</i>	<i>40</i>	<i>0</i>	<i>4 40 0</i>	<i>4</i>	<i>40</i>	<i>0</i>	<i>4</i>	<i>40</i>	<i>0</i>
11. What Directly Inflicted Injury or Illness? <i>090 Roof fall after shield removal</i>					12. Nature of Injury or Illness: <i>170 Crushed to floor</i>				
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>									
14. Company of Employment: (if different from production operator) <i>Operator</i>					Independent Contractor ID: (if applicable)				
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input checked="" type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>									
16. Part 50 Document Control Number: (form 7000-1)					17. Union Affiliation of Victim: <i>9999 None (No Union Affiliation)</i>				

**Victim Information:**

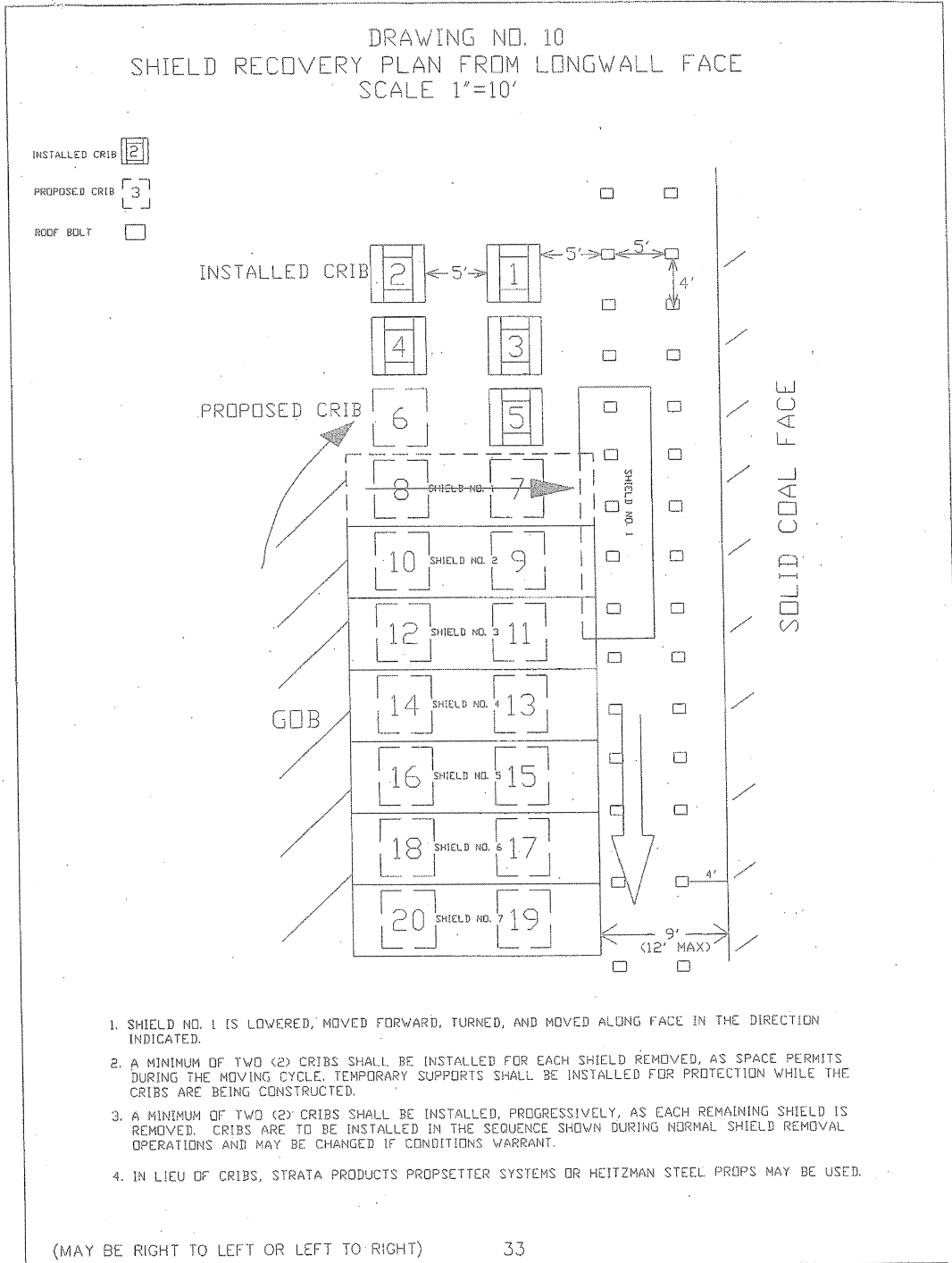
1. Name of Injured/Ill Employee:		2. Sex	3. Victim's Age		4. Degree of Injury:				
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:				6. Date and Time Started:					
7. Regular Job Title:			8. Work Activity when Injured:			9. Was this work activity part of regular job? <input type="checkbox"/> Yes <input type="checkbox"/> No			
10. Experience:		a. This		b. Regular		c. This		d. Total	
Years	Weeks	Days	Job Title:	Years	Weeks	Days	Years	Weeks	Days
11. What Directly Inflicted Injury or Illness?					12. Nature of Injury or Illness:				
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>									
14. Company of Employment: (if different from production operator)					Independent Contractor ID: (if applicable)				
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>									
16. Part 50 Document Control Number: (form 7000-1)					17. Union Affiliation of Victim:				

**Victim Information:**

1. Name of Injured/Ill Employee:		2. Sex	3. Victim's Age		4. Degree of Injury:				
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:				6. Date and Time Started:					
7. Regular Job Title:			8. Work Activity when Injured:			9. Was this work activity part of regular job? <input type="checkbox"/> Yes <input type="checkbox"/> No			
10. Experience:		a. This		b. Regular		c. This		d. Total	
Years	Weeks	Days	Job Title:	Years	Weeks	Days	Years	Weeks	Days
11. What Directly Inflicted Injury or Illness?					12. Nature of Injury or Illness:				
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>									
14. Company of Employment: (if different from production operator)					Independent Contractor ID: (if applicable)				
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>									
16. Part 50 Document Control Number: (form 7000-1)					17. Union Affiliation of Victim:				

## APPENDIX C

### Roof Control Plan Excerpt



**APPENDIX D**  
Schematic of Accident Scene

