CAI-2010-39

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

FATAL MACHINERY ACCIDENT
June 24, 2010

Leeco Incorporated
#68
Jeff, Perry County, Kentucky
I.D. No. 15-17497

Accident Investigators

Robert Ashworth
Coal Mine Safety and Health Inspector

Jack Harris
Coal Mine Safety and Health Inspector

Frank J. Prebeg
Terry L. Garrison
Electrical Engineers
Approval and Certification Center

Deborah K. Combs
Educational Field Services

Originating Office
Mine Safety and Health Administration
District 7
3837 South US Hwy 25E
Barbourville, KY 40906
Irvin T. Hooker, District Manager

## PHOTOGRAPH OF ACCIDENT SCENE

## OVERVIEW

At approximately 1:15 p.m. on Thursday, June 24, 2010, a 29 year old miner with twelve years mining experience was fatally injured when he became trapped between the continuous mining machine he was operating and the coal rib. The victim was tramming the mining machine by remote control along the right rib line to clean up the loose coal on the mine floor. While he was turning the front of the mining machine to the left, he became caught between the mining machine and the coal rib.

## GENERAL INFORMATION

The #68 mine is an underground mine owned and operated by Leeco, Incorporated, a subsidiary of James River Coal Company. The mine is located in Perry County, Kentucky and is being developed in the Amburgey coal seam. The mining height ranges from four to seven feet, with access to the mine being provided by drift openings at two different locations, and by a slope at one location. A total of 150 miners are employed at this mine working two production shifts and one maintenance shift, five days per week, nine hours per shift. There are four active sections with an approximate production of 8,375 tons per day. Coal is extracted from the faces by continuous mining machines and transported by shuttle cars, ram cars, continuous haulage and belt conveyors to the surface. Materials, supplies, and miners are transported via track mounted mantrips, rail motors, and rubber tired mantrips and haulage vehicles.

The principal officials for the mine are:

Joseph Evans ..... President
William Spears ..... Mine Manager
Rick Campbell ..... Superintendent
Patrick Schoolcraft ..... Safety Director

The last regular safety and health inspection (E01) conducted by the Mine Safety and Health Administration (MSHA) was completed on March 30, 2010. The Non Fatal Days Lost (NFDL) incident rate for the #68 mine through the 2nd quarter of 2010 is 3.95, compared to a National NFDL rate of 3.49 for the same time period.

## DESCRIPTION OF ACCIDENT

On Thursday, June 24, 2010 at approximately 6:30 a.m., the 014 section production crew, consisting of nine miners under the direction of Section Foreman, Harry Bronson, entered the mine via track mounted mantrip. The crew arrived on the 014 section at approximately 7:15 a.m. Bronson conducted an on-shift examination of the section and coal production started approximately one hour later.

Coal production was completed in the No. 3 and No. 1 entries and Continuous Mining Machine Operator, Bobby Smith Jr. (victim), began mining in the No. 4 entry. After completing the cut, Smith made a clean up run along the left side of the entry, and then repositioned the continuous mining machine for a clean-up run along the right side of the same entry. At approximately 1:15 p.m., while making the right side-clean up run, he turned the front (inby) end of the continuous mining machine to the left. This resulted in Smith being caught between the right rear corner of the continuous mining machine and the coal rib. Smith was discovered by Thomas J. Campbell, Shuttle Car Operator, pinned by the "cable extender" (a strain relief for the trailing cable and water hose) at the right rear corner of the continuous mining machine against the right coal rib. He was facing toward the machine with the cable extender against his left arm and chest.

The accident resulted in the power cord from the cap lamp battery's power take-off to the remote box being severed and the antenna on the remote control box was broken off, resulting in the continuous mining machine being de-energized. A scoop and shuttle car were used to move the mining machine to free Smith. Bronson, a Mine Emergency Technician, administered first-aid and CPR and used an automatic electronic defibrillator (AED) in an attempt to revive Smith. Smith was transported off the section via scoop and rubber-tired mantrip to the end of the track, located at the 12$^{th}$ crosscut adjacent the No. 9 belt. He was then transported to the surface via track mounted mantrip, accompanied by Harry Bronson, Section Foreman, Chris Wagers, Belt Foreman, and Keith Hubbard, Foreman/Electrician. Upon arrival on the surface, Smith was transported via ambulance to the Hazard ARH Regional Medical Center, where he was pronounced dead by Deputy Coroner John Collett at 3:00 p.m.

## INVESTIGATION OF THE ACCIDENT

The MSHA Call Center was notified of the accident at 1:20 p.m. on Thursday, June 24, 2010, by Patrick Schoolcraft, Safety Director for Leeco, Inc. The Call Center notified the Barbourville District Office. The District office immediately notified Kevin Bruner, Hazard Field Office Supervisor, of the accident. A 103(j)

Order was issued at 2:00 p.m. by Rick Suffridge, Coal Mine Inspector, to insure the safety of the miners and to preserve the accident scene.

MSHA personnel from the Hazard and Barbourville offices were immediately dispatched to the mine site. The 103(j) Order was modified to a 103(k) Order after MSHA arrived at the mine site. The accident investigation was conducted in cooperation with the Kentucky Office of Mine Safety and Licensing (OMSL) with the assistance of the mine operator and employees. A list of those persons participating in or present during the investigation is included in Appendix A.

MSHA accident investigators, along with KY OMSL personnel, gathered preliminary information and conducted an investigation of the existing physical conditions. Photographs and relevant measurements were taken of the accident scene.

Frank Prebeg and Terry Garrison, Electrical Engineers from MSHA Technical Support, Approval and Certification Center (A&CC), Electrical Safety Division, in Triadelphia, West Virginia, and Deborah Combs from MSHA Educational Field Services, also participated in the accident investigation.

Formal interviews were conducted on June 25, 2010 at the Kentucky Office of Mine Safety and Licensing (KOMSL) in Hazard, Kentucky. A list of persons interviewed is provided in Appendix B.

## DISCUSSION

The accident occurred in the No. 4 (belt) entry on the 014 section, approximately 100 feet inby survey station number 6667 (see Appendix D). At the time of the accident, the mine floor was damp to dry; mining height ranged from 71 to 82 inches, and the entry was from 18 feet 7 inches to 19 feet 2 inches in width.

The victim was operating a Joy Manufacturing Continuous Mining Machine, Model 14CM9-100X, Serial No. JM4371A, MSHA Approval No. 2G-4159A-0, by remote control. The remote control unit was a Matric Limited Permissible Radio Transmitter, Model TX3, P/N 14204AK001 F, Frequency 458 MHz, MSHA Approval No. 2G-4096-0. Functional testing of the continuous mining machine with the radio-controlled remote box demonstrated that the machine and the remote control system functioned properly, with no reported or observed problems. All critical functions of the machine, with emphasis on the tram functions, were tested. The emergency stop function on the remote control box was tested to ensure it was operating correctly. The emergency stop function on the remote box operated properly by opening the circuit breaker for the continuous mining machine on the section power center.

An evaluation was made to determine the potential for other sources of radio frequency in the mine to affect the operation of the continuous mining machine. There were no other sources of radio frequency in close proximity of the active section. The wireless communication and tracking system for the mine was on order and had not yet arrived from the manufacturer. Communication with the section was provided by hard-wired phone along the belt entry. The emergency communication system located in the primary escapeway is also hard-wired. The next closest continuous mining machine was located approximately two miles away at another working section in the mine. It was concluded there was no known potential for other radio frequencies in the mine to interfere with the operation of the continuous mining machine on the section.

The antenna on the remote control box was broken off at the connection point to the remote. Each of the control switches returned to the neutral position when toggled and released, and no restricted or sticking switches were observed during testing. The remote box was taken to Matric Ltd. for inspection and testing. The visual examination of the box indicated there were no abnormalities, other than the antenna was broken off and the power input cord twist connector was severely worn. The functional test of the box demonstrated that the remote box operated properly, with no reported or observed problems.

The investigation found that at the time of the accident, Bobby Smith Jr. (victim) was positioned in the "Red Zone" along the right side rear of the continuous mining machine, adjacent to the machine's cable stand-off anchor. He was making the final clean-up run along the right rib line when he turned the front of the continuous mining machine to the left, pinning himself between the machine and the right coal rib, causing fatal crushing injuries. There were no eyewitnesses to the accident. The mine operator failed to ensure that the continuous mining machine operator remained in a safe location, away from the machine, and away from pinch points created by either the continuous mining machine and/or haulage equipment.

**ROOF CONTROL PLAN**: Precautions for remote control operations of continuous mining machines are included on Page 10 of the Roof Control Plan, approved April 1, 2010. Item 1 states, "While using the remote controls, the continuous mining machine operator and all other persons will position themselves: (a) Under permanently supported roof, (b) No closer than the second "full row" of installed roof bolts outby the face, and (c) When the continuous mining machine is in operation, in a safe location away from such machine and away from pinch points created by either the continuous mining machine and/or haulage equipment."

**EXAMINATIONS:** The Pre-shift and On-shift Examinations required by 30 CFR, Part 75 were conducted by an agent of the operator, and no hazardous conditions were recorded. The on-shift examination was conducted on the 014 section by Harry Bronson, Section Foreman, prior to beginning coal production that day.

**TRAINING:** Training records were reviewed for the victim and it was determined that the information on the records complied with Part 48 training requirements. Bobby L. Smith, Jr. had a total of 12 years mining experience with 1 year and 37 weeks as a continuous mining machine operator at this mine (See Appendix C).

## ROOT CAUSE ANALYSIS

An analysis was conducted to identify the underlying cause or causes of the accident that were correctable through reasonable management controls. Listed below is the root cause identified during the analysis and corresponding corrective actions implemented to prevent a recurrence.

**Root Cause:** The operator did not ensure compliance with provisions of the Approved Roof Control Plan, requiring that all persons be in a safe location away from the continuous mining machine and away from pinch points created by either the continuous mining machine and/or haulage equipment when the continuous mining machine is in operation.

**Corrective Actions:** Management developed and trained all miners on an Action Plan implemented as company policy that addresses "Red Zone Hazards," "Safe Work Practices," and "Panic Switches," prior to resuming normal mining operations. The Action Plan requires: 1) training for all miners on proper positioning out of harm's way when cutting coal or tramming the continuous mining machine; 2) that a Red/Danger Zone card, with danger zone precautions be attached to the continuous mining machine remote boxes; 3) reinforcement of training during future safety meetings and monitoring of compliance; 4) The Roof Control Plan has been revised to include enhanced precautions for the "Red/Danger Zones;" 5) A proximity system (Matric) has been installed by Joy Manufacturing on a continuous mining machine that was put in operation in January, 2011. The requirements for this system have been incorporated into the Roof Control Plan. These revisions have been included in the "Precautions for Remote Control Operation of Continuous Mining Machines," for the 014 section (See Appendix E). Mine management has proposed, and MSHA has accepted the proposal, that all new or rebuilt continuous mining machines put into production in this mine be equipped with proximity systems, designed to prevent miners from being injured by being caught in pinch points or being struck by the continuous mining machine.

## CONCLUSION

An accident occurred that resulted in fatal injuries to the continuous mining machine operator on the 014 section because of work being performed in a pinch point area in the "Red Zone," while the continuous mining machine was in operation. This unsafe practice resulted in the miner operator receiving crushing injuries caused by being caught between the continuous mining machine and the coal rib. Management failed to ensure compliance with the Approved Roof Control Plan regarding miners being positioned in a safe location when the continuous mining machine is in operation.

_____ _____

**Irvin T. Hooker** **Date**
**District Manager**

## CONCLUSION

An accident occurred that resulted in fatal injuries to the continuous mining machine operator on the 014 section because of work being performed in a pinch point area in the "Red Zone," while the continuous mining machine was in operation. This unsafe practice resulted in the miner operator receiving crushing injuries caused by being caught between the continuous mining machine and the coal rib. Management failed to ensure compliance with the Approved Roof Control Plan regarding miners being positioned in a safe location when the continuous mining machine is in operation.

Irvin T. Hooker
**District Manager**

March 14, 2011
**Date**

## ENFORCEMENT ACTIONS

Order No. 8345007 was issued to Leeco Inc. on June 24, 2010 under the provisions of Section 103(j) of the Mine Act:

An accident occurred at this operation on June 24, 2010 at approximately 1:30 p.m. As rescue and recovery work is necessary, this order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity on the 014 MMU until MSHA has determined that it is safe to resume normal mining operations in this area. This order applies to all persons engaged in the rescue and recovery operation and any other persons on-site. The order was initially issued orally to the mine operator at 13:30 p.m., and has now been reduced to writing.

A 104(a) Citation, No. 8359591, was issued to Leeco Inc. for a violation of 30 CFR, § 75.220(a)(1)

The operator failed to ensure that the Approved Roof Control Plan developed for this mine was being complied with on the 014 MMU. The approved plan requires that when the continuous mining machine is in operation, the continuous mining machine operator and all other persons will be positioned in a safe location away from such machine and away from pinch points created by either the continuous mining machine and/or haulage equipment in Item 1 (c) on Page 10. The continuous mining machine operator was positioned in the "Red Zone" danger area while mining in the No.4 entry approximately 100 feet inby Survey Station No. 6667. The operator's failure to ensure the safe work practice of operator location during machine operation resulted in the continuous mining machine operator being caught between the continuous mining machine and the coal rib resulting in fatal crushing injuries to the mining machine operator.

## APPENDIX A

List of persons furnishing information and/or present during the investigation

### Leeco Incorporated

Joseph Evans ..... President
John M. Williams ..... Company Attorney
Ricky L. Campbell ..... Superintendent
Eugene Pennington ..... Electrician
Jeremy J. Adams ..... Roof Bolter Operator
Gary W. Amburgey ..... Roof Bolter Operator
Keith P. Hubbard ..... Electrician
Chris Wagers ..... Belt Foreman
Chester May Jr ..... Scoop Operator
Michael J. Lewis ..... Shuttle Car Operator
Thomas J. Campbell ..... Shuttle Car Operator
Harry E. Bronson ..... Section Foreman
Joshua Roark ..... Continuous mining machine Operator
Joshua Joseph ..... Belt Man

### Kentucky Office of Mine Safety and Licensing

Greg Goins ..... Deputy Chief Accident Investigator
Randy Lewis ..... Electrical Inspector

### Mine Safety and Health Administration

Irvin T. Hooker ..... District Manager
Jim Langley ..... Assistant District Manager
Dennis J. Cotton ..... Staff Assistant/Accident Coordinator
Dannie W. Lewis ..... Accident Investigator Supervisor
Robert F. Ashworth ..... CMS&H Inspector/Accident Investigator
Jack E. Harris ..... CMS&H Inspector/Accident Investigator
Rick L. Suffridge ..... CMS&H Inspector/Accident Investigator
Harry Hall ..... CMS&H Electrical Inspector
Randall L. Lewis ..... CMS&H Electrical Inspector
Lantre Combs ..... CMS&H Inspector
Deborah K. Combs ..... Educational Field Services
Frank J. Prebeg ..... Electrical Engineer Pittsburgh Safety and Health Technology Center
Terry L. Garrison ..... Electrical Engineer Pittsburgh Safety and Health Technology Center

**APPENDIX B**
**List of Persons Interviewed**

| | |
|---|---|
| Jeremy J. Adams | Roof Bolter Operator |
| Gary W. Amburgey | Roof Bolter Operator |
| Keith P. Hubbard | Electrician |
| Chris Wagers | Belt Foreman |
| Chester May Jr | Scoop Operator |
| Michael J. Lewis | Shuttle Car Operator |
| Thomas J. Campbell | Shuttle Car Operator |
| Harry E. Bronson | Section Foreman |
| Ricky L. Campbell | Superintendent |
| Joshua Roark | Continuous mining machine Operator |

# APPENDIX C
# Victim's Experience

Accident Investigation Data - Victim Information
Event Number: 6 4 1 4 3 1 6

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

**Victim Information: 1**

| 1. Name of Injured/Ill Employee: | 2. Sex | 3. Victim's Age | 4. Last Four Digits of SSN: | 5. Degree of Injury: |
|---|---|---|---|---|
| Bobby L. Smith Jr. | M | 29 | 0474 | 01 Fatal |

6. Date(MM/DD/YY) and Time(24 Hr.) Of Death: a. Date: 06/24/2010 b.Time: 15:00

7. Date and Time Started: a. Date: 06/24/2010 b.Time: 13:15

8. Regular Job Title: 036 Continuous miner operator

9. Work Activity when Injured: 073 Operate undergound equipment NEC

10. Was this work activity part of regular job? Yes X No

| 11. Experience | Years | Weeks | Days | | Years | Weeks | Days | | Years | Weeks | Days | | Years | Weeks | Days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. This Work Activity: | 1 | 37 | 2 | b. Regular Job Title: | 1 | 37 | 2 | c: This Mine: | 1 | 37 | 2 | d. Total Mining: | 12 | 0 | 0 |

12. What Directly Inflicted Injury or Illness? 077 Underground mining machine

13. Nature of Injury or Illness: 170 Crushing

14. Training Deficiencies: Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task: |

15. Company of Employment:(If different from production operator) Operator

Independent Contractor ID: (if applicable)

16. On-site Emergency Medical Treatment: Not Applicable: | First-Aid: X | CPR: X | EMT: | Medical Professional: | None: |

17. Part 50 Document Control Number: (form 7000-1)

18. Union Affiliation of Victim: 9999 None (No Union Affiliation)

**Victim Information:**

| 1. Name of Injured/Ill Employee: | 2. Sex | 3. Victim's Age | 4. Last Four Digits of SSN: | 5. Degree of Injury: |
|---|---|---|---|---|
| | | | | |

6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:

7. Date and Time Started:

8. Regular Job Title:

9. Work Activity when Injured:

10. Was this work activity part of regular job? Yes | No |

| 11. Experience: | Years | Weeks | Days | | Years | Weeks | Days | | Years | Week | Days | | Years | Weeks | Days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. This Work Activity: | | | | b. Regular Job Title: | | | | c: This Mine: | | | | d. Total Mining: | | | |

12. What Directly Inflicted Injury or Illness?

13.Nature of Injury or Illness:

14. Training Deficiencies: Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task: |

15. Company of Employment: (If different from production operator)

Independent Contractor ID: (if applicable)

16. On-site Emergency Medical Treatment: Not Applicable: | First-Aid: | CPR: | EMT: | Medical Professional: | None: |

17.Part 50 Document Control Number: (form 7000-1)

18. Union Affiliation of Victim:

**Victim Information:**

| 1. Name of Injured/Ill Employee: | 2. Sex | 3. Victim's Age | 4. Last Four Digits of SSN: | 5. Degree of Injury: |
|---|---|---|---|---|
| | | | | |

6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:

7. Date and Time Started:

8. Regular Job Title:

9. Work Activity when Injured:

10. Was this work activity part of regular job? Yes | No |

| 11. Experience: | Years | Weeks | Days | | Years | Weeks | Days | | Years | Week | Days | | Years | Weeks | Days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. This Work Activity: | | | | b. Regular Job Title: | | | | c: This Mine: | | | | d. Total Mining: | | | |

12. What Directly Inflicted Injury or Illness?

13. Nature of Injury or Illness:

14. Training Deficiencies: Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task: |

15.Company of Employment:(If different from production operator)

Independent Contractor ID: (if applicable)

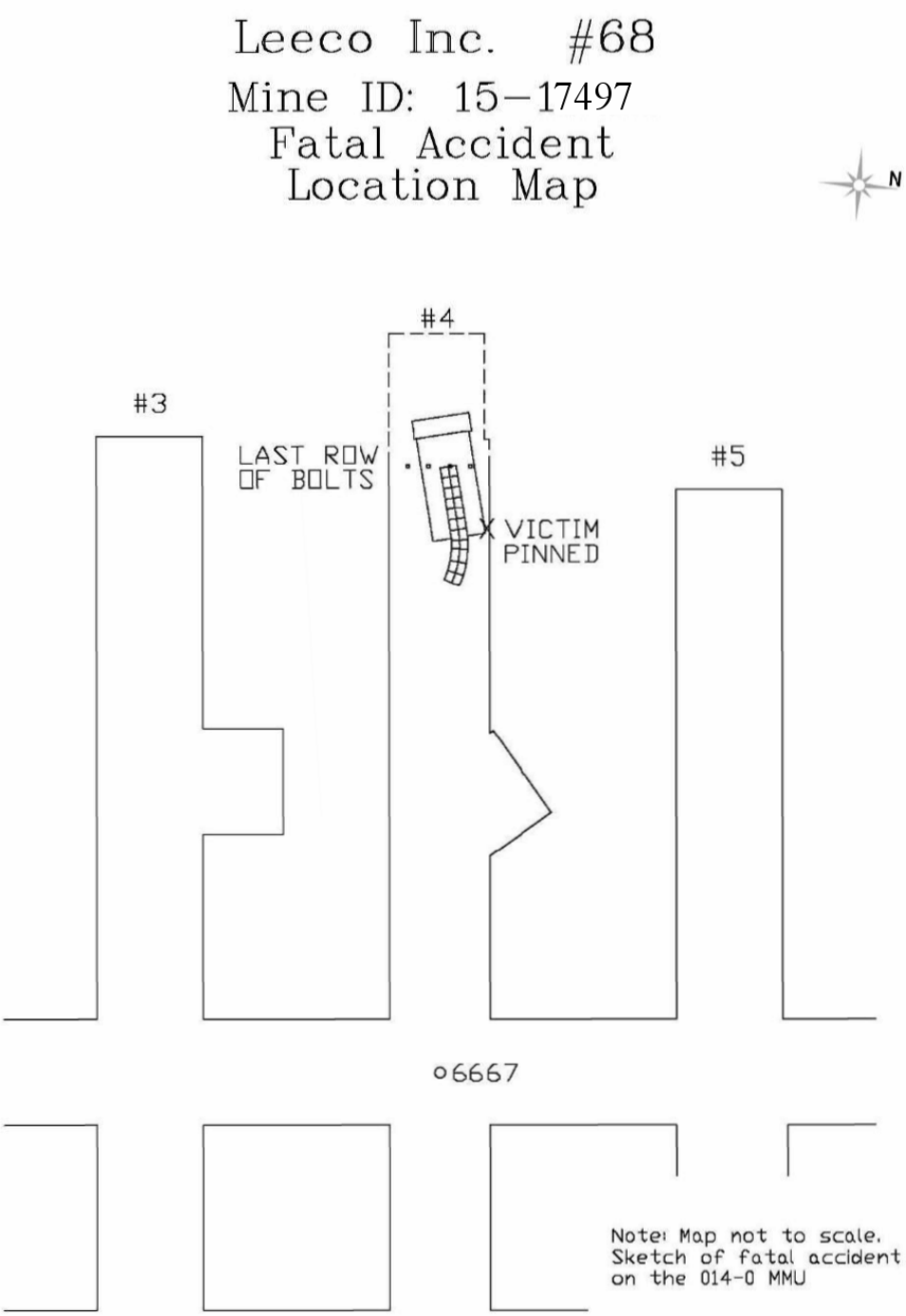
16. On-site Emergency Medical Treatment: Not Applicable: | First-Aid: | CPR: | EMT: | Medical Professional: | None: |

17. Part 50 Document Control Number: (form 7000-1)

18. Union Affiliation of Victim:

MSHA Form 7000-50b, Dec 1994

**APPENDIX D**


Leeco Inc. #68
Mine ID: 15-17497
Fatal Accident
Location Map
N
#4
#3
#5
LAST ROW
OF BOLTS
X VICTIM
PINNED
06667
Note: Map not to scale.
Sketch of fatal accident
on the 014-0 MMU

## APPENDIX E

### Precautions for Remote Control Operation of Continuous Mining Machines

1. A "Red/Danger Zone" card will be attached to the continuous miner remote box with danger zone precautions.
2. Operators will position themselves in a safe position when tramming or mining with the continuous miner. The operator will position themselves away from any pinch point locations associated with the continuous miner.
3. During mining and place changing, all persons shall be positioned in an area that will afford maximum protection to themselves and others from moving equipment.
4. A proximity detection system should not be considered a single line of defense against accidents but should be considered a training aid that creates an educational and technological barrier against crushing and pinning accidents.
5. A proximity detection system does not replace "Red Zone Precautions." Miners will continue to stay out of the turning radius (red zone) when operating or working near a continuous mining machine. This should include both when the machine is being trammed as well as when it is cutting and loading coal.
6. Due to the proximity detection system being an experimental system as stated by the manufacturer, the proximity detection system may be shut down until a Joy Mining Machinery certified technician can analyze and repair the system.
7. Basic parts will be stocked in the warehouse such as a sensor, a power supply, and tracking nodules. Repairs to the system with these parts will be done on the first available 3rd Shift. If there is a software/computer problem, or any other unknown component failure, Joy Manufacturing will be contacted for service and repair. If it is a soft/ware or computer problem, Joy Mfg. has stated that it may be anywhere from 1 day to 3 weeks to have a software upgrade.
8. Mine management will contact MSHA if repairs can't be made by the first available 3rd shift and keep them informed of the status of the problem.
9. If the system has to be disabled due to a malfunction of the system, a safety meeting will be held with all miners affected to inform them that the system is down and that all Red Zone precautions will be used. Some type of a visual indicator will be present on the continuous miner when the proximity system is down and all personnel will be notified of the indicator and its meaning.