

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Fall of Roof Accident
July 12, 2005

NEWCO #1 Mine
Sunrise Coal Company, LLC
Jefferson County, Alabama
I.D. No. 01-03102

Accident Investigators

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Mining Engineer

Timothy Foster
Mine Safety and Health Inspector

Michael Gauna
Mining Engineer

Paul Tyrna
Mining Engineer

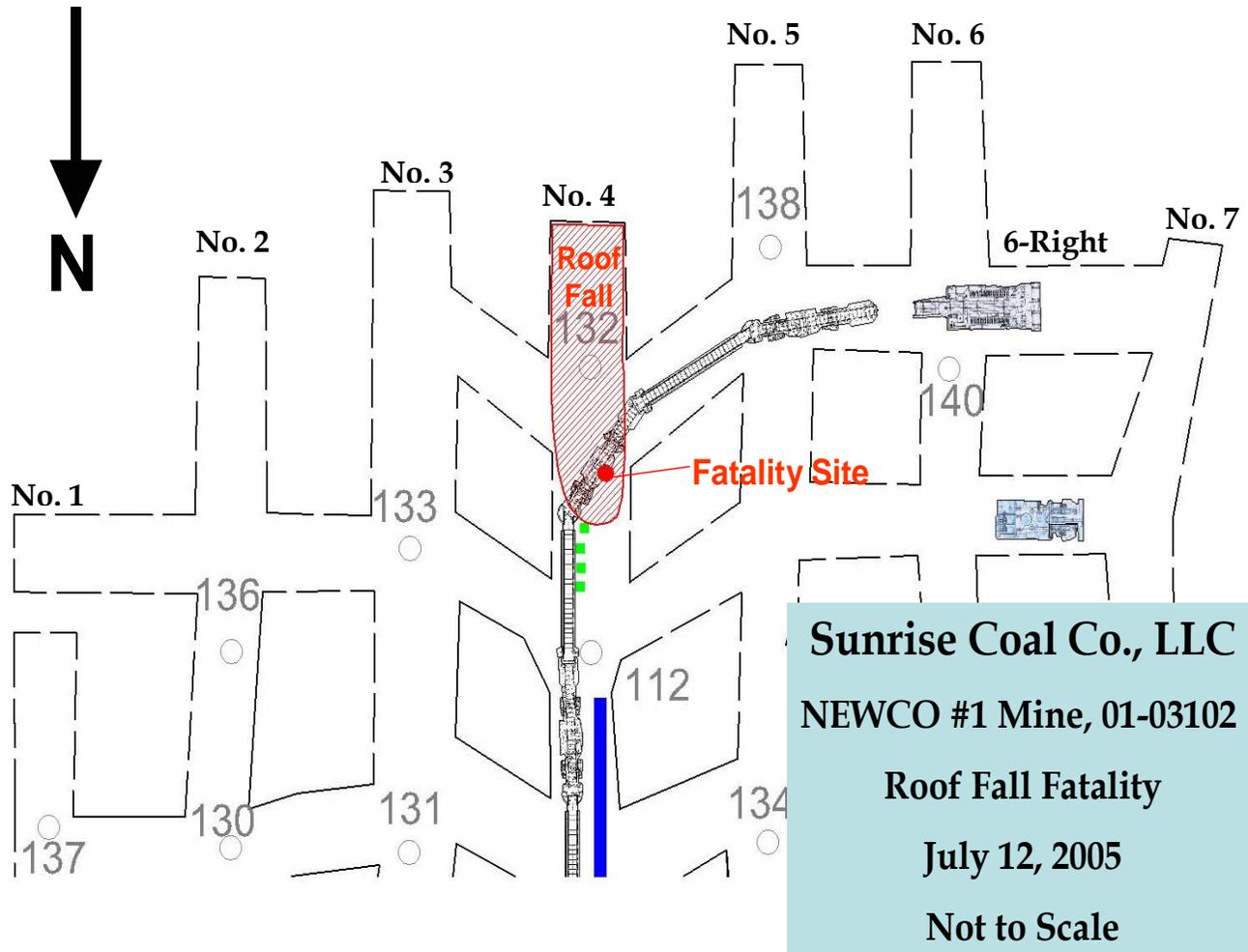
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SECTION SKETCH
Location of Accident and Equipment Position at Time of Accident





OVERVIEW

At approximately 10:45 a.m. on Tuesday, July 12, 2005, a 28-year old mobile bridge conveyor operator was fatally injured in a roof fall. The victim, positioned in an intersection under permanently supported roof, was operating the No. 3 mobile bridge conveyor when a drag fold (horseback) fell in the intersection and inby toward the face. The victim had 13 months total mining experience, all at the NEWCO #1 Mine, and 12 months experience as a mobile bridge conveyor operator.

The accident occurred because the operator did not recognize the presence of a drag fold (horseback) and failed to comply with provisions of the approved roof control plan regarding specific actions to be taken when adverse roof conditions, including horsebacks, were encountered.

GENERAL INFORMATION

Sunrise Coal Company, LLC (Sunrise), officially assumed control of the mine, I.D. No. 01-03102, and changed the name to NEWCO #1 Mine (NEWCO), on February 24, 2004. Previous operators had mined the majority of the active and sealed workings prior to Sunrise acquiring the mine. The mine is located in Jefferson County, Alabama, near the city of Graysville.

NEWCO provided employment for 43 persons and operated an average of 5-½ days per week. Production was conducted on two 10-hour shifts per day with hot-seat change-out between the day and evening production shifts. An 8-hour maintenance shift overlapped both production shifts. The mine produced an average of 1,300 raw tons per day in June, 2005. Miners were not represented by organized labor.

The mine operated in the Pratt coal seam with an average seam height of 31 inches and an average mining height of 38 inches. Four portals are located at seam level to provide access into the mine. The mine operated one advancing continuous mining machine section, 2nd Left (MMU 001-0), to room-and-pillar the Pratt seam.

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

Jimmie R. Ryan.....	Principal Owner
Franklin D. Dearien.....	Superintendent
Everett E. Ballard.....	Manager

A Safety and Health Inspection was completed on June 27, 2005, and another was ongoing at the time of the accident. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine for the previous quarter was 0.00 compared to the national NFDL rate of 5.44.

DESCRIPTION OF THE ACCIDENT

On July 12, 2005, the day shift began at 6:00 a.m. Roberto Estrada (accident victim) and the rest of the production crew entered the mine with section foreman John Bentley and traveled to the 2nd Left Section (MMU 001-0) on battery-powered rubber-tired man-trips. Franklin D. Dearien, Mine Superintendent, entered the mine shortly after the production crew and traveled to the section.

Mining began in the No. 7 entry. After completing the cut in No. 7, the continuous mining machine was moved to mine the No. 6 entry. After the roof was supported in No. 7 and mining was completed in No. 6, the continuous mining machine was backed out of No. 6 and turned to the right to mine the 6-Right crosscut. The roof-bolting

machine was moved outby to the first open crosscut between the Nos. 6 and 7 entries. The roof-bolting crew was waiting until mining was completed in 6-Right before bolting No. 6 and 6-Right.

At approximately 10:00 a.m., the cable supplying power to the bridge system became grounded. After repairs were completed at approximately 10:30 a.m., Bentley went to the roof-bolting machine to discuss work activities with the roof-bolting crew. Dearien, after waiting to ensure the bridges were operating normally, started crawling outby in the No. 3 entry toward the man-trips. Everett E. Ballard, Mine Manager, entered the mine between 10:00 a.m. and 10:30 a.m. and was traveling to the section.

Mining resumed in 6-Right at approximately 10:30 a.m. and the 6-Right crosscut was holed into No. 7. At approximately 10:45 a.m., while the bridges were backed up and the continuous mining machine was being re-positioned, a roof fall occurred in the first intersection outby the No. 4 face (see SECTION SKETCH on page 1) where Estrada was operating the No. 3 bridge.

Bentley and Dearien heard the fall and proceeded to the No. 4 entry. Ballard arrived on the section immediately after the fall. They saw Estrada's cap light in the fall area and attempted to communicate with him. There was no response. The section crew began building cribs starting outby the roof fall in the No. 4 entry and working inby. Additional roof material fell approximately two minutes after the initial fall.

Estrada was extricated from the operator's compartment approximately three hours after the roof fall occurred. No vital signs were present. The victim was transported out of the mine, reaching the surface at 2:00 p.m. Emergency services personnel were waiting at the portal entrance and immediately checked for vital signs. A heart monitor was connected to the victim and the results indicated that there was no pulse. This information was communicated to Dr. Deny of UAB Medical West Hospital, who pronounced the victim dead at 2:03 p.m.

INVESTIGATION OF THE ACCIDENT

At 11:10 a.m. on July 12, 2005, Mike Ryan called the MSHA District 11 Office and informed Terry Langley, Coal Mine Safety and Health Supervisor, of a roof fall accident. An order pursuant to §103(k) of the Federal Mine Safety & Health Act of 1977 was issued to ensure the safety of the miners until an investigation could be conducted. MSHA conducted the investigation with the assistance of state investigators, mine management, and employees. Nine persons were interviewed during the investigation.

DISCUSSION OF THE ACCIDENT

Roof Control Plan

The Roof Control Plan in effect for NEWCO at the time of the accident was approved on May 25, 2005. The primary roof support system used at the mine consisted of the following:

- Jennmar roof bolts – 36-inch long, 5/8-inch diameter, grade 40 rebar installed in 1-inch holes
- Jennmar roof plates – 6-inch x 6-inch x 5/32-inch
- Minova Lokset Super Fast resin - 23mm diameter cartridges for 5/8-inch bolt in 1-inch hole, actual cartridge length of 32-7/8 inches for 3-foot equivalent grout length

For normal roof conditions, the plan specified that spacing between roof bolts would be a maximum of five feet. Measurements and observations made on the section indicated that the mine was following the minimum plan requirements for roof bolt components and spacing in normal conditions. Generally, roof bolts were installed on 4-1/2-foot, or less, centers.

The plan specified that when adverse roof conditions were encountered, including horsebacks, the following actions were required but had not been implemented at the accident site where a drag fold (horseback) was present:

- reduce roadway width to 18 feet by installing crossbars or J-channels on posts or cribs across the opening with four feet maximum spacing between supports
- roof bolts longer than four feet installed in conjunction with the crossbars or J-channels and on centers less than four feet

Plan criteria specified that entries and crosscuts were to be mined no greater than 20 feet wide except for the belt entry, which could be mined 22 feet wide. Measurements made in the areas around the accident site indicated that mining widths were less than or equal to the maximum approved widths.

The minimum center-to-center pillar size specified in the plan was 50 feet. The mine generally developed pillars on 50-foot centers with crosscuts turned out of the belt entry at 65° angles to facilitate the continuous haulage system. The other crosscuts were turned at 90° angles. The maximum approved depth-of-cut was 40 feet. Observations made in the areas around the accident site indicated that pillar dimensions met the plan criteria.

Mining Equipment

The mine operated one advancing continuous mining machine section. This section, referred to as 2nd Left, utilized an EIMCO-0 continuous mining machine and a Fairchild Hi-Cap XL continuous haulage system to mine seven places. The Fairchild Hi-Cap XL continuous haulage system consisted of four mobile bridge conveyors with an operator for each. The bridges were numbered sequentially from one to four starting at the section low belt conveyor tailpiece. The four bridges are hinged together but are not attached to the continuous mining machine. Movement of an individual bridge section can cause the other sections to be pulled or pushed. Mining height precluded the use of cabs or canopies on the self-propelled electric face equipment, including the mobile bridge system, used on the section.

Geology

Mine cover ranged from 100 feet to approximately 250 feet. The depth of cover was approximately 160 feet at the accident site. There are no known mine workings above or below NEWCO. One roof fall, which occurred on May 27, 2003, had been reported since January 1, 2002.

Roof conditions were generally good throughout the section with bit marks visible over nearly all exposed roof. No significant pillar deterioration was observed. Miners reported that they did not hear the roof working and that there were no obvious visible signs of deterioration in roof competency at any time prior to the accident. Supplemental roof support had not been installed anywhere on the section prior to the roof fall.

Two joint sets with orientations of approximately N10°E and N70°W were present on the 2nd Left section. Jointing was widely spaced and vertical with individual joints tight and generally non-persistent. The presence of jointing did not appear to degrade roof competency. Face cleat in the coal seam was parallel to jointing at N70°W. At the accident site, the immediate mine roof consisted of hard, thinly bedded micaceous siltstone with thin lenses of lighter colored mica concentrations.

Groundwater inflow in the form of dripping was visible from the fall cavity on the left side of the intersection at survey spad 132. Dripping from point sources was also present at the outby edge of the intersection at survey spad 112 and in the No. 6 working place. Sporadic water inflow from the roof was common at this mine but had not been associated with visibly obvious deteriorated roof conditions. Dripping had been present in the accident site intersection from the time it was mined until the accident. Water inflow had been greatest along the left side of the intersection. According to persons interviewed, the roof fall started along the left side of the intersection and almost immediately fell across the intersection to the right. No changes

in water inflow characteristics were observed from the time the intersection was mined around July 7, 2005, until the accident occurred.

The total length of the roof fall was estimated to be 75 to 80 feet. It extended from approximately 34 feet in by survey spad 112 to the No. 4 face. The roof fall spanned the survey spad 132 intersection to within a few feet of the rib lines and was bounded by steeply dipping slickensided limbs of a drag fold (horseback) that closely paralleled the entry. In by the intersection, the fall appeared to span the entry from rib to rib. The height of the fall was estimated to be six to eight feet above the mine roof. Visible fall material consisted of slickensided wedge blocks up to two feet thick and seven feet wide. Additional roof material fell during the investigation on July 13, 2005.

The roof failed above the anchorage horizon of the 3-foot resin grouted roof bolts. The interior roof bolts were contained in the fallen rock material. The roof bolts closest to the ribs and along the rib-lines were pulled out of the roof as it fell.

Evidence of the drag fold prior to the fall would have been difficult to detect for persons unaccustomed to identifying such geological conditions. Miners and management did not recognize that the roof conditions at the accident site differed from those previously encountered on the section without incident and took no action to reduce the entry width and install longer roof bolts on reduced centers.

Work History and Training

Roberto Estrada was hired as an inexperienced miner and had a total of 13 months experience as a miner. He had 12 months experience as a mobile bridge operator. Records indicated that Estrada had received all required training. No training deficiencies were found that would have contributed to the cause of the accident.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident that were correctable through reasonable management controls. During the analysis, a causal factor was identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Causal Factor: The operator failed to recognize adverse roof conditions that would have prompted installation of longer roof bolts on reduced centers and reduction in entry width in compliance with the approved roof control plan. The presence of a slickensided drag fold (horseback) running nearly parallel to the No. 4 entry was not identified by mine personnel. The maximum thickness of the wedge block beneath the drag fold exceeded roof bolt anchorage by three to

five feet. Roof competency was further degraded by localized areas of water inflow. The primary roof support system was not adequate to prevent the roof fall.

Corrective Action: The operator is in the process of abandoning the NEWCO #1 Mine. However, the operator has acquired another mine and has requested that Technical Support conduct hazard mapping to identify potential roof problems. This will assist the operator by providing knowledge and awareness of potential hazards that can be expected at the mine. Hazard mapping will also provide miners and management with the knowledge needed to identify potential roof problems on working sections and in outby areas so that suitable support can be used to prevent roof failures. Hazard mapping will be recommended and should be conducted if the mine associated with I.D. No. 01-03102 is re-opened for operations in the future.

CONCLUSION

The accident occurred because the operator did not recognize the presence of a drag fold (horseback) and failed to comply with provisions of the approved roof control plan regarding specific actions to be taken when adverse roof conditions, including horsebacks, were encountered. The victim was located in a permanently supported intersection when the roof failed above the anchorage horizon of the roof bolts. The primary support system was not adequate to prevent the roof fall.

Approved by:

ORIGINAL SIGNED BY

Richard A. Gates
District Manager

9/15/2005

Date

ENFORCEMENT ACTIONS

§103(k) Order No. 7685388: Issued to Sunrise Coal Company, LLC, NEWCO #1 Mine

A fatal accident occurred at this mine. This order is issued to protect the health and safety of the miners until an investigation can be completed.

§104(a) Citation No. 7671292: Issued to Sunrise Coal Company, LLC, NEWCO #1 Mine for violation of §75.220(a)(1)

The operator failed to comply with item 6 on page 16 of the current Roof Control Plan approved November 12, 2004, and granted continuing approval on May 25, 2005, following a six-month review. This item specified that the operator was to take the following actions when adverse roof conditions, including horsebacks, were encountered: 1) reduce opening width to 18 feet by installing crossbars or J-channels across the opening on posts or cribs on 4-foot centers and 2) install roof bolts longer than 4 feet long on centers less than 4 feet.

One miner received fatal injuries on July 12, 2005, when a drag fold (horseback) fell out of the roof in the intersection just outby the No. 4 (belt) entry face near survey spad 132 on the 2nd Left Section (MMU 001-0). The outby end of the roof fall was approximately 34 feet inby survey spad 112 and the fall was estimated to have extended to the No. 4 face, a total distance of 75 to 80 feet. The outby end of the fall extended across the entry to within a few feet of the rib lines and appeared to span the entry from rib to rib, a width of approximately 22 feet, inby the survey spad 132 intersection. The fall was estimated to be 6 to 8 feet above the mine roof. The primary roof support system, consisting of 3-foot long, 5/8-inch diameter, grade 40 resin-grouted roof bolts installed on 5-foot maximum centers, was not adequate to support the roof. The operator had not implemented the provisions specified in item 6 on page 16 of the approved Roof Control Plan for supporting areas where adverse roof conditions, including horsebacks, are encountered.

**APPENDIX A
Persons Participating in the Investigation**

SUNRISE COAL COMPANY, LLC

<u>Name</u>	<u>Title</u>
Franklin D. Dearien.....	Superintendent
Everett E. Ballard.....	Manager

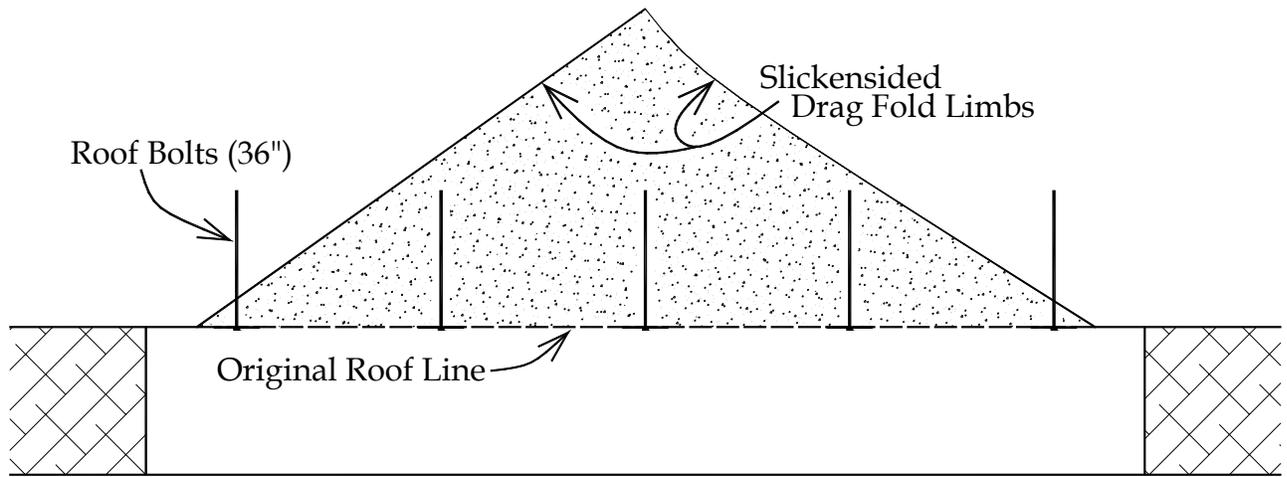
**ALABAMA DEPARTMENT OF INDUSTRIAL RELATIONS
MINE SAFETY AND INSPECTION**

<u>Name</u>	<u>Title</u>
Don Keith.....	Chief, Mine Safety Inspector
Ricky Evans.....	State Inspector

MINE SAFETY AND HEALTH ADMINISTRATION

<u>Name</u>	<u>Title</u>
Johnny P. Calhoun.....	Supervisory Mine Safety and Health Specialist
David H. Allen, Jr.....	Mining Engineer
Timothy Foster.....	Mine Safety and Health Inspector
Ronny Jones.....	Education and Training Specialist
Mike Gauna.....	Mining Engineer, Technical Support Roof Control Division
Paul Tyrna.....	Mining Engineer, Technical Support Roof Control Division

APPENDIX B
Drag Fold Sketch



Not to Scale