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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
January 10, 2006

Mine #1
Maverick Mining Company, LLC
Pikeville, Pike County, Kentucky
ID No. 15-18674

Accident Investigators

Robert J. Newberry
Mining Engineer

William Gray
Mining Engineer

Raymond Mazzoni
Mechanical Engineer

Originating Office
Mine Safety and Health Administration
District 6
100 Fae Ramsey Lane
Pikeville, KY 41501
Kenneth A. Murray, District Manager

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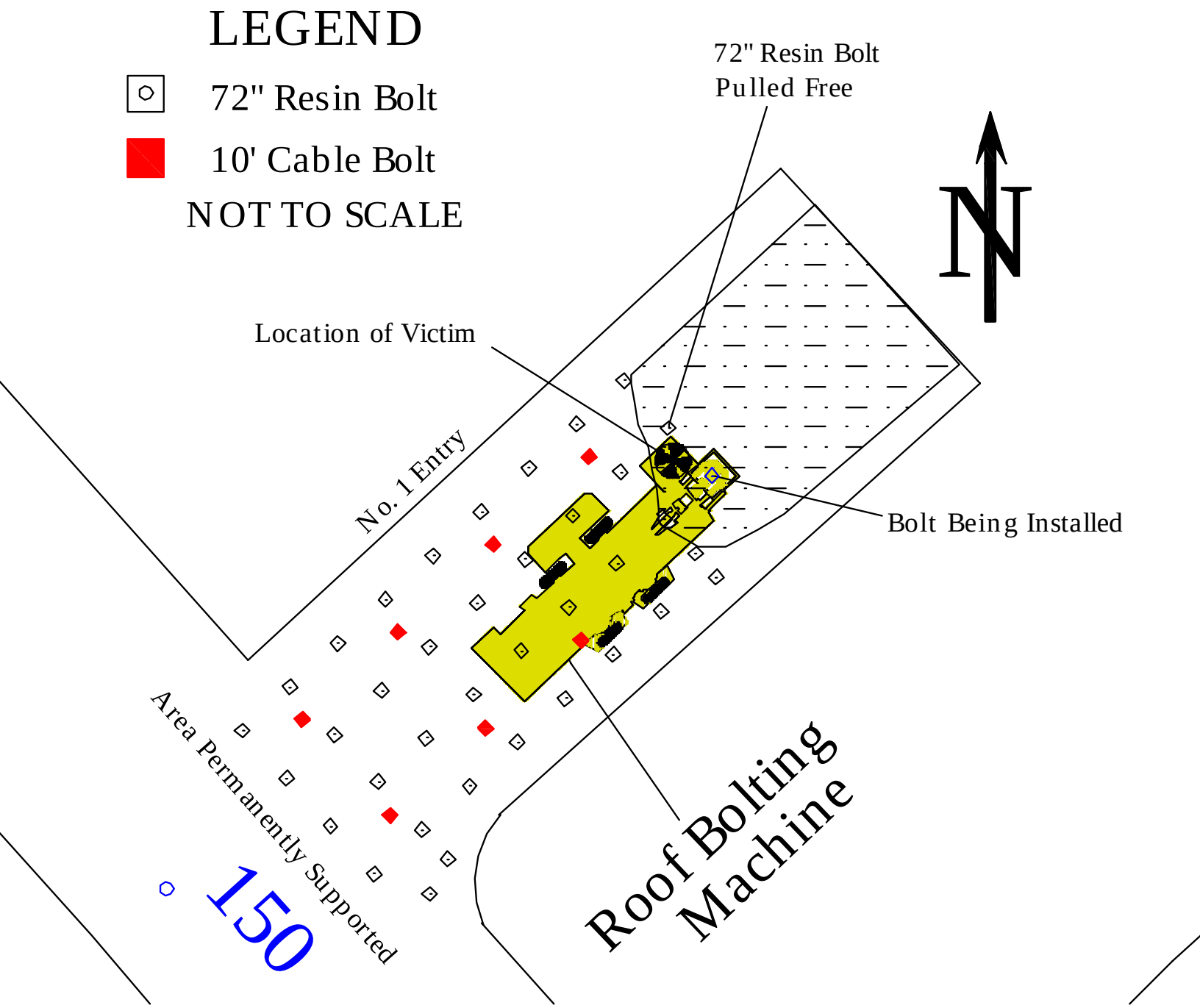

Sketch of Accident Scene
Fatal Fall of Roof Accident
Maverick Mining Company, LLC
Mine #1
MSHA ID No. 15-18674
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Photograph of Accident Scene
Showing Galis 320 Roof Bolting Machine

OVERVIEW

On January 10, 2006, Cornelius Yates, a 44-year old roof bolting machine operator, was fatally injured in a roof fall accident on the 002-0 MMU Section. Yates had 15 years total mining experience and had worked six weeks at this mine.

The accident occurred as Yates was drilling a hole in the roof to install the third roof bolt of a row in the normal roof bolting cycle in the No. 1 heading. A section of unsupported roof rock measuring approximately 14 feet by 20 feet by 3 feet thick fell against the Automated Temporary Roof Support (ATRS) and operator's canopy on the Model 320 Galis Roof Bolting Machine. The ATRS and canopy collapsed under the weight of the rock pinning Yates underneath resulting in fatal crushing injuries.

The accident occurred because mine management failed to ensure that additional measures were taken to control the roof where adverse conditions existed. Mine examinations did not identify hazards existing in the mine roof.

GENERAL INFORMATION

Maverick Mining Company, LLC, Mine #1, is located at the intersection of Powder House Road and Town Mountain Road within the city limits of Pikeville, Pike County, Kentucky. The principal officers for Maverick Mining Company, LLC, at the time of the accident were:

James H. Blevins	Owner
William Spears	Mine Manager
William Dixon	Section Foreman

Maverick Mining Company, LLC, Mine #1 is opened into the Elkhorn No. 2 coal seam, which averages 50 inches in height. The mine has been in active status since October 3, 2005. Coal is produced on one active section using a Joy remote control continuous mining machine with shuttle cars. Underground conveyor belts are utilized to transport the coal to the surface. The mine produces an average of 140 tons of raw coal per day.

This mine employs 9 persons. The continuous mining machine unit operates one 8-hour shift, five days per week.

A regular safety and health inspection by the Mine Safety and Health Administration (MSHA) was completed on December 28, 2005.

DESCRIPTION OF ACCIDENT

On Tuesday, January 10, 2006, at approximately 6:30 a.m., William Dixon, Section Foreman, entered the mine and walked approximately 900 feet to the 002 Mechanized Mining Unit (MMU). Dixon conducted a pre-shift examination of the section and walked back to the surface to record the results. At 7:00 a.m., the section crew walked the travelway to the working section to begin coal production. The mine had been idle for approximately one month and mine management had changed. Keith Roberts, continuous mining machine operator began the shift mining the No. 2 heading and then mined the No. 1 heading. While the No. 1 heading was mined, Dixon operated a shuttle car and made several trips transporting coal from this working place to the section loading point. After coal extraction was completed in the No. 1 heading, Roberts moved to the 3 right cross cut. Yates had completed installing roof bolts in the No. 2 heading and moved the roof bolting machine into the No. 1 heading.

Yates began installing roof bolts in the No. 1 heading on the left side in the normal bolting pattern. He installed two six-foot roof bolts and was drilling a 1" diameter hole to install the third roof bolt when a section of roof approximately 14 feet by 20 feet by 3 feet thick fell.

Rodrick Adkins, repairman, and Roberts were in the No. 3 heading splicing a shuttle car

cable when they heard the roof fall at approximately 2:45 p.m. Adkins and Roberts went to the accident scene where they found the victim trapped by the fallen rock. According to Adkins and Roberts, the victim was conscious and complaining of difficulty breathing. Earlier that shift, Dixon had gone to the surface to get a cap light because his had lost charge. Realizing that they could not remove the rock, Roberts went to the mine phone and notified Dixon. Dixon ran to the accident scene to assist in the recovery effort.

INVESTIGATION OF ACCIDENT

William Spears, Mine Manager for Maverick Mine Company, LLC, Mine #1, notified MSHA of the accident at 3:00 p.m. on January 10, 2006. A 103(k) order was issued to secure the accident scene while the investigation was conducted and to ensure the safety of any persons in the mine. An investigation was conducted in cooperation with State officials. Interviews were conducted with six miners and management officials deemed to have knowledge of the facts regarding the accident on January 10, 2006. The interviews were conducted at the State Office of Mine Safety and Licensing office and on January 23, 2006, at the MSHA District 6 office in Pikeville, Kentucky.

DISCUSSION

Geologic Conditions

The immediate roof at the Maverick Mining LLC, Mine #1 is comprised of gray shale. The No. 2 Elkhorn coal seam thickness reportedly averages 50 inches, but depending on the amount of roof rock mined, the actual mined height can range up to 92 inches.

Maximum overburden depth over the active section was approximately 220 feet, with overburden at the accident site estimated to be 100 feet. The mining height just outby the accident site was typically 55 inches across the section and the entry width was 18 feet.

Roof Control

The maximum cut depth permitted by the roof control plan is 20 feet. The cut depth at the accident scene was 20 feet. The roof was supported with 6-foot long, fully grouted, grade 60, No. 5 rebar and 8-inch by 8-inch plates. Bolts were installed on 4-foot centers with a row of two, 10-foot long cable bolts installed in between every other row of the 6-foot long bolts. While the No. 1 heading was mined, Dixon operated a shuttle car and made several trips transporting coal from this working place to the section loading point. Consequently, management had several opportunities to notice and correct the obvious hazardous roof condition that was exposed during the mining process. Management was also aware that a persistent bedding plane weakness was present at the 3-foot roof horizon throughout the mine. Even though management had this first

hand knowledge, they failed to take appropriate measures to identify and correct these conditions.

Roof Fall Conditions

The roof fall occurred in the No. 1 entry, and extended outby from the face for a distance of approximately 20 feet. The fall was approximately 3 feet thick, extended 14 feet across the entry, and was estimated to weigh 126,000 pounds.

The left side of the fall was bounded by a drag fold which ran roughly parallel to the entry, approximately 2 to 3 feet from the rib. A drag fold (often referred to as a "horseback") is an area of intersecting faults that results in rock wedges being formed. One limb of the drag fold extended into the roof on a roughly 45 degree angle. Approximately 3 feet into the roof the drag fold intersected the failure horizon which contained numerous visible slickensided surfaces. The drag fold dismembered the roof beam and the low cohesion along the numerous slickensided surfaces at the fall horizon weakened the immediate roof and made it susceptible to failure.

Approximately one month had elapsed from the time that the cut immediately outby the roof fall was mined until it was bolted. This cut was originally mined approximately 55 inches high, but during the one month interval a 3-foot thick layer of the immediate roof fell across most of the cut. This resulted in a roof line that sloped down on the left side of the entry, on a 45-degree angle about 3 feet from the rib. Also, the roof sloped down towards the face for a distance of approximately 4 feet, creating a 3-foot thick brow.

The last row of 6-foot bolts in this cut was installed in the brow. This row had 5 bolts across installed across the heading. Also, prior to installing this row, the slickensides from the drag fold had fallen out resulting in a gutter that had formed approximately 3 feet horizontally from the rib to approximately 3 feet high. This appeared to be a continuation of the gutter that was observed outby which had resulted from the drag fold. A bolt was installed in the gutter which was 3 feet higher than the horizon of other bolts in the row.

The victim had installed two roof bolts in the first row of the recently mined cut, and was drilling the hole for the third bolt when the roof fall occurred. The victim was under the drill station canopy while drilling the roof.

The second bolt in the row (the last bolt installed by the victim) had pulled completely out of the roof when the fall occurred. This was the only bolt installation that failed. The fall extended outby to the last bolt row of the previous cut, where the rock broke around several of the bolts. No bolts had broken and all others remained anchored in the roof.

Roof Bolting Machine

The roof bolting machine used at the accident site was a Galis 320 single-boom bolter (serial number 3209773590), manufactured in 1977. The subject machine was equipped with both a main tram station canopy and a drill station canopy. Neither of these canopies had a certification tag attached as required by 30 CFR 75.1710-1 (e).

The Galis 320 was equipped with a "safety-arm" style Automated Temporary Roof Support (ATRS) system. The ATRS roof contact device was a "ring"-type structure, 25 ¾ inches wide by 26 ¼ inches long.

A single hydraulic cylinder pressurized the ATRS against the roof. The cylinder was attached to the ATRS safety arm structure with a 1-in. diameter steel pin through a clevis welded to the underside of a cross plate connecting the two safety arms.

The outby end of the ATRS system was attached to the machine via rollers which moved along an open-ended 8-in. long guide track welded to the machine frame.

Subsequent to the accident, it was observed that half of the clevis was broken off, which allowed the attachment pin to fail or become dislodged. This in turn allowed the ATRS structure to move outby, away from the hydraulic cylinder. When the ATRS frame shifted outby, the rollers on the end of the frame slipped out of the track on the machine and allowed the ATRS to collapse.

The inby end of the ATRS was observed in a collapsed position with the ring structure perpendicular to the safety arms. The outby end of the ATRS was free of the guide track, with the roller pins approximately 18 inches from the roof. The hydraulic cylinder was observed still in its extended position and appeared to be undamaged.

The single-boom bolter ATRS system was required by 30 CFR 75.209 (e) (1) to elastically support a dead weight load of 11,250 pounds. Due to the second bolt in the row having insufficient anchorage, the ATRS system would have in effect been subjected to a rock load almost twice what it was intended to support. Based on this observation, and an analysis of the roof bolt spacing and the ATRS position, the ATRS was subjected to a load of at least 19,000 lbs.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident. Root causes were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below are root causes identified during the analysis and their corresponding corrective actions implemented to prevent a recurrence of the accident:

Root Cause: Mine management did not take additional measures to protect persons when an unusual roof hazard was encountered. A persistent bedding plane weakness was present at the 3-foot roof horizon throughout the mine. In addition, a drag fold was present that roughly paralleled the entry. Both of these factors weakened the immediate roof and made it susceptible to failure and were evident in the cut just outby the accident site. The standards, policies, and administrative controls in use at the mine did not ensure that additional measures were taken to identify and correct conditions associated with the occurrence of the draw rock.

Corrective Actions: The roof control plan was revised to show 3 feet of draw rock taken during coal extraction, limit the depth of cuts to 12 feet, use 8" by 8" plates, and use a dual boom roof bolting machine equipped with a t-bar type ATRS.

Root Cause: The on-shift examination conducted in the working places of the 002 MMU working section failed to detect and subsequently correct the hazardous roof condition created by the presence of a drag fold and unconsolidated draw rock which separated from the overlying strata.

Corrective Actions: The operator had all working places and work areas examined and all underground personnel were trained in workplace examination and recognizing roof cracks and separations.

CONCLUSION

The accident occurred when the victim was installing roof bolts in an unsupported area where hazardous roof conditions existed. The combination of the plane of weakness in the overlying strata coupled with the area of unsupported roof created by the 20-foot cut depth overloaded the ATRS system. The accident resulted from failure to identify hazards associated with weak laminated roof strata and the slickensided drag fold, inadequate examinations and failure to take additional measures to control unconsolidated strata.

APPROVED BY:

_____ _____

Kenneth A. Murray Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) Order, No. 7415703, was issued on January 10, 2006.

   Condition or Practice: "This mine has experienced a fatal roof fall accident on the 002 Section. This order is issued to assure the safety of all persons at the mine. It prohibits all activity at the mine until MSHA has determined that it is safe to resume normal mining operations. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area."

2. A 104(d)(1) Order, No. 7425414, was issued to Maverick Mining Company, LLC for a violation of 30 CFR 75.220(a)(1).

   Condition or Practice: "On January 10, 2006, a roof bolting machine operator was fatally injured when he was struck by draw rock as he was installing permanent roof supports at the face area of the No. 1 heading on the MMU 002 working section.

   Obvious adverse roof conditions were encountered on the MMU 002 working section in the face of the No. 1 heading. Unconsolidated draw rock approximately 3 feet thick was present from the last row of permanent roof support to the face, a distance of approximately 20 feet in depth and 18 feet wide. This draw rock subsequently fell and struck the victim as he was in the process of installing the third roof bolt in the normal roof bolting cycle.

   A 20 feet deep cut, 18 feet wide had been mined from the face of the No. 1 heading and approximately 3 feet of draw rock had not been taken as the cut was mined. The 3 feet of unconsolidated draw rock had fallen in the cut prior to the cut in which the fatal accident occurred. Mine management did not take additional measures to protect persons when the unusual hazard associated with the unconsolidated draw rock was encountered. Reasonable care was not taken to cut the draw rock during the extraction of coal or to reduce the depth of cut from 20 feet to a more suitable depth to control the hanging draw rock that was left as the cut was mined. The unconsolidated draw rock subsequently fell and struck the victim while he was installing the permanent supports, resulting in fatal injuries.

   The section foreman was present in the working place for the entire duration of the extraction process of the mining cycle when he was operating the shuttle car as the cut was mined.

   30 CFR 75.220(a)(1) stipulates that additional measures beyond the minimum requirements of the Approved Roof Control Plan be taken to protect persons when unusual hazards are encountered."

3. A 104(d)(1) Order, No. 7425415, was issued to Maverick Mining Company, LLC for a violation of 30 CFR 75.362.

Condition or Practice: "On January 10, 2006, a roof bolting machine operator was fatally injured when he was struck by draw rock as he was installing permanent roof supports at the face area of the No. 1 heading on the MMU 002 working section.

The on-shift examination conducted on January 10, 2006, in the working places of the 002-0 MMU working section failed to detect and subsequently correct the hazardous roof condition created by the presence of unconsolidated draw rock. The condition was widespread and obvious and should have been detected by a reasonable prudent mine examiner. Previous mining activity in the immediate area revealed that this condition is unstable and could not be controlled with routine mining practices. The cut immediately outby had similar conditions and had fallen before permanent roof supports could be installed. Unconsolidated draw rock approximately 3 feet thick was present from the last row of permanent roof support to the face of the No. 1 heading, a distance of approximately 20 feet in depth and 18 feet wide. The draw rock subsequently fell and struck the victim as he was in the process of installing the third roof bolt in the normal roof bolting cycle.

Draw rock approximately 3 feet thick was not cut down while mining the cut nor was the cut depth shortened to control the draw rock. The mine examiner was engaged in other work activities including equipment repair and shuttle car operation while these hazardous conditions were developing. The unconsolidated draw rock subsequently fell and struck the victim while he was installing permanent supports, resulting in fatal injuries. Management was aware of the roof conditions immediately prior to the roof bolting machine operator being fatally injured

30 CFR 75.362, stipulates that at least once each shift, or more often if necessary for safety, a certified person designated by the operator shall conduct an on-shift examination of each section."

APPENDIX A

List of Persons Participating in the Investigation

Maverick Mining Company, LLC Officials

William Spears	Mine Manager
William Dixon	Section Foreman
Wayne Hall	Outside Utility
Timothy Keith Roberts	Continuous Mining Machine Operator
Michael Neal Howard	Electrician
Roderick Allen Adkins	Repairman
Christopher Brandon Duff	Belt Man
William Gillis Dixon	Section Foreman
Michael A. Wynn	Belt Man

Kentucky Office of Mine Safety and Licensing

Mike Elswick	District Supervisor
Brad Fuller	Accident Investigator
Randy Bentley	Accident Investigator
Tracy Stumbo	Chief Accident Investigator
Worley Taylor	Safety Inspector

Mine Safety and Health Administration

William Gray	Mining Engineer
Raymond Mazzoni	Mechanical Engineer
Robert Bellamy	Mining Engineer
Darrell E. Hurley	Mine Safety and Health Specialist
Kenneth A. Murray	District Manager
Robert Newberry	Mining Engineer
Timothy R. Watkins	Assistant District Manager - Technical
Danny Harmon	Supervisory Mine Safety and Health Specialist