

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Coal Mine

Fatal Powered Haulage Accident
November 9, 2004

at

Grays Fork
J R Mining
Manchester, Clay, Kentucky
ID No.15-18755

Accident Investigators

Charlie Fields
Coal Mine Safety and Health Inspector

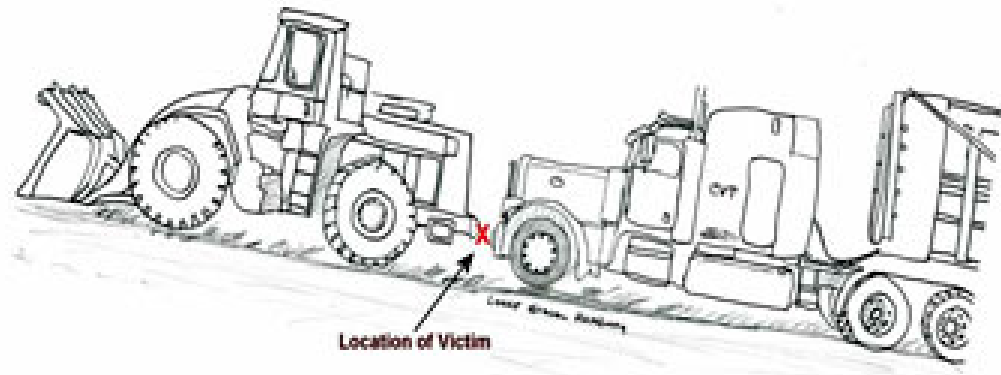
Ronald Medina
Mechanical Engineer

Originating Office
Mine Safety and Health Administration
District 7
3837 South U.S. Hwy. 25 E.
Barbourville, Kentucky 40906
Charles H. Grace, Acting District Manager

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ACCIDENT SITE



“Not to scale”

OVERVIEW

At approximately 9:00 a.m. Tuesday, November 9, 2004, Earl Reed, Jr. a 57-year old mine owner with 30 years of mining experience was fatally injured at J R Mining's Grays Fork surface mine. The accident occurred while the victim was helping to install a steel pull rope (tow rope) from the rear of a Caterpillar 980C front end loader to the front pull hook of a stalled Peterbilt tractor-trailer coal truck. The front end loader inadvertently rolled backwards down the inclined roadway towards the tractor-trailer, pinning the victim between the two pieces of equipment. The accident resulted from working in a hazardous location, failure to secure (set parking brakes) the front end loader, and failure to maintain visual contact between the equipment operator and miners working in the area.

GENERAL INFORMATION

The Grays Fork mine is a surface coal mine, owned and operated by J R Mining located in Manchester, Clay County, Kentucky. Coal is mined from the Jellico coal seam from one pit utilizing the contour method. The mine normally operates one production shift per day, six days per week. The mine employs five persons and produces an average of 500 tons of coal per day.

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

Earl Reed, Jr.....President

Prior to the accident, the Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection on August 24, 2004. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine is 0.00. The National NFDL rate is 5.48.

DESCRIPTION OF ACCIDENT

On the day of the accident, Brent Reed, surface mine foreman (son of the victim) reported for work at approximately 6:30 a.m. After arriving at the coal pit, Brent Reed started the Caterpillar 988B front end loader to allow it to warm up. At approximately 7:00 a.m. James Gibson, highwall drill operator, Marshall Smith, general laborer, and Jeff Brantley, general laborer arrived at the site. Brent Reed instructed Gibson and Smith to travel to the drill area and start drilling the top bench. Brantley was instructed to clean out the fuel filter on the Caterpillar 980C end loader and start filling gravel into an area where a drain tile had been installed the day before. Brantley cleaned the fuel filter, added oil to the end loader, made a preoperational check and then conducted the work at the drain tile.

Gibson and Smith returned to the coal pit and told Brent Reed the drill would not tram. Gibson and Smith then returned to the drill location. Brent Reed called his father Earl Reed, Jr. (victim) on his cell phone and told him of the problem with the drill. Earl Reed, Jr. instructed his son on how to repair the drill. Earl Reed, Jr. was at another job location during this time. Brent Reed traveled to the drill location and observed the drill being trammed into place to conduct the drilling. He returned to the coal pit and started moving coal with the Caterpillar 988B end loader.

Brantley returned to the coal pit after completing his work on the drain tile. Reed started cleaning up loose coal from the base of the highwall with a hand shovel while Brantley assisted him using the 980C end loader. As this work continued, Billy R. Breeding, Jr., truck driver, walked onto the work site. Breeding informed Brent Reed that as he was trying to drive his Peterbilt tractor trailer coal truck up the hill to the pit area, the truck lost traction on the hill of the gravel roadway. Breeding told Brent Reed he had tried to back the truck back off the hill but the trailer jack knifed across the road preventing any other vehicles from getting past it.

Brent Reed instructed Brantley to take a steel pull cable and the 980C end loader and pull the truck from the stuck position. A steel cable measuring 20 feet in length and 1-inch in diameter was obtained and loaded into the bucket of the front end loader. Breeding rode with Brantley as he trammed the loader along the road to the top of the hill. After reaching the top of the hill Breeding got out of the end loader and Brantley turned it around. Breeding hooked the steel cable to the rear of the end loader with a steel pin at the hitch and draped the rope over the rear counter weight of the loader. Breeding walked downhill to his truck. Brantley backed the end loader down hill toward the front of the truck.

At approximately 9:00 a.m., as Breeding and Brantley arrived at the front of the truck they observed Earl Reed, Jr. walking up to the front of the truck. After the end loader was positioned in front of the truck, Brantley stated he placed the loader in forward gear and placed his right foot on the accelerator pedal and his left foot on the right brake pedal. Breeding and Earl Reed, Jr. got between the end loader and truck to hook the cable to the truck. Breeding stated he and Reed (victim) had their backs to the loader and facing the truck. Reed was lifting the hinged front license to allow access to the trucks tow hook. Brantley was in the loader and was turned looking over his right shoulder towards the front of the truck. Brantley stated Breeding and Reed were not in his sight.

As Brantley was looking back he observed the loader started rolling downhill this time he applied more pressure to the brake and accelerator and the loader started tramping back up hill. Breeding stated just as he got the cable attached to the truck hook he felt the end loader against his right arm and he fell to the ground. When Breeding looked up, he saw the end loader moving back up hill. Breeding observed Reed falling over the installed pull cable. Breeding ran to the rear of the end loader and uncoupled the pull cable and flagged Brantley to pull forward. As Brantley pulled forward he observed Reed lying on the ground.

Brantley trammed the loader to the top of the hill, parked it. He then got into his pickup and traveled to the coal pit to get Brent Reed. Breeding stayed with Earl Reed, Jr. and stated that Reed was awake and was moaning. Brent Reed and Brantley arrive at the accident scene. Brent Reed, who is a Mine Emergency Technician (MET), rendered first aid to his father. Brent Reed stated there were no visible wounds, but Earl Reed, Jr. did speak and complain that his back was hurt. Brent Reed used Breeding's cell phone to call 911. Brantley ran downhill to the home of Bob Murray, landowner, and had him call 911 also. The Clay County Ambulance Service was notified at 9:13 a.m. and arrived at 9:22 a.m. and transported Earl Reed, Jr. to the Manchester Memorial Hospital, at 11:00 a.m. he was transferred to the University of Kentucky Medical Center in Lexington, Kentucky where he died of his injuries.

INVESTIGATION OF THE ACCIDENT

At approximately 3:20 p.m. on Thursday, November 9, 2004, Johnny Greene, accident investigator for the Kentucky Office of Mine Safety and Licensing notified John M. Pyles, Coal Mine Safety and Health, Assistant District Manager, Barbourville, Kentucky District office that a mine accident had occurred at approximately 9:00 a.m. this date at the J R Mining, Grays Fork mine. Pyles promptly contacted Jim Langley, Coal Mine Safety and Health Supervisor, Barbourville, Kentucky field office and Arthur V. Smith CMS&H inspector and dispatched them to the scene. Smith issued an order pursuant to 103(k) of the mine act to ensure the safety of persons at the mine until an investigation of the accident could be completed.

MSHA and the Kentucky Office of Mine Safety and Licensing jointly conducted the investigation with the assistance of mine management and other miners. Formal interviews were conducted at the mine site and at the Kentucky Office of Mine Safety and Licensing office in Barbourville, Kentucky on November 10 and 11, 2004. Four interviews were conducted. None of those interviewed requested their statements be kept confidential.

On November 11 and 12, Ronald Medina, Mechanical Engineer, Mechanical and Engineering Safety Division, Approval and Certification Center along with members of the accident investigation team conducted an on-site investigation and subsequent testing and evaluation of the Caterpillar 980C front end loader.

DISCUSSION

Physical Factors

- The day of the accident was only the second day of production from the mine site.
- The weather conditions on the day of the accident were clear and dry.
- The tow cable was a steel cable one 1-inch in diameter and 20 feet long.

- The roadway where the accident occurred consisted of a bed of new loosely packed gravel.
- The sloped roadway was measured at 19 percent grade.

MACHINE INFORMATION

- The front end loader had an articulated frame and was powered by a six-cylinder, Model 3406, Caterpillar diesel engine.
- The operating weight of the loader was approximately 65,000 pounds.
- The electronically controlled transmission had four forward and four reverse speeds and a neutral position.

SERVICE BRAKE AND PARKING BRAKE SYSTEMS DESIGN

- The front end loader was equipped with four-wheel, oil-enclosed, multiple-disc, air-over-hydraulic service brakes.
- The loader was equipped with two brake master cylinders that converted air pressure into hydraulic pressure.
- An individual hydraulic reservoir supplied each master cylinder. One master cylinder supplied the front axle service brakes and the other supplied the rear axle.
- One pedal was on the right side of the steering column and the other on the left. Pushing the left side pedal also neutralized the transmission in addition to applying the brake.
- The parking brake consisted of a spring-applied, air-released, fully enclosed, multiple-disc brake, bolted to the output transfer gear case.
- The control valve for the parking brake is on the steering column.
- The parking brake is applied by pulling the control knob outward.
- The parking brake control valve is designed to automatically activate if the air system pressure falls below approximately 40 psi.

SERVICE BRAKE AND PARKING BRAKE SYSTEM TESTS

- Service brake and parking brake grade holding tests were conducted.
- The tests were conducted with the bucket empty and with the bucket facing uphill, to duplicate the conditions at the time of the accident.

- The transmission was in neutral during the tests.
- The service brake stopped and held the machine on a 22% grade for a ten-minute period while the right side service brake pedal was held applied.
- The test was repeated using the left side service brake pedal and the service brake again stopped and held the machine stationary on the 22% for a ten-minute period.
- Following each test on the 22% grade, the brake air pressure was intentionally depleted.
- The service brake continued to hold the machine on the grade as the air pressure was depleted, until the parking brake automatically applied due to low air pressure.
- The parking brake also had the capability of holding the wheel loader on the 22% grade.

SERVICE AND PARKING BRAKE VISUAL INSPECTION

- At the start of the testing, the master cylinder reservoir for the front axle brakes was found to be approximately one half full and the rear axle master cylinder reservoir was approximately one third full. During the testing the brake fluid levels were frequently rechecked and visibly dropped, indicating a leak.
- Occasionally, oil overflowed out of the front axle breather port. The master cylinder for the front axle had a small leak but the largest portion of the leaking oil apparently leaked from the wheel brakes into the axles. The service manual (SENR7762-02, Testing and Adjusting, Air System and Brakes) stated that oil leakage around the wheel brake seals can enter the axle, and if the leakage is large enough, the axle will be overfilled.
- The service manual described the procedure to correct this leakage. The total depth of the brake reservoirs was 4 inches and the service manual (SENR7762-02, Testing and Adjusting, Air System and Brakes) recommended maintaining an oil level ½ inch below the top edge of the reservoirs.

TRANSMISSION EVALUATION

- While the wheel loader was on the 22 percent grade with the bucket facing uphill, and the transmission in first gear, a stream of fluid leaked from the transmission at an approximate rate of one gallon every 5 to 10 minutes.
- The total transmission capacity was 16 gallons

- The leakage occurred in the area where the torque converter case was bolted to the engine flywheel housing, near the starter.
- The service manual stated that a low transmission fluid level could cause operational problems, such as slippage.
- No defects were found in the operational characteristics of the transmission during the testing that was done.

STEERING

- The steering wheel was mechanically linked to a steering valve.
- The steering valve controlled the hydraulic oil flow to the steering cylinders.
- No steering defects were found.
- The throttle pedal was evaluated and no defects were found.

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, causal factors were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

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

1. *Causal Factor:* At the time of the accident, the victim was located in a hazardous position between the Caterpillar 980C front end loader and the Peterbilt coal haul truck with his back to the front end loader which was on a grade of approximately 19 percent.

Corrective Action: Procedures and work practices were developed to make it unnecessary for miners to work between mobile equipment. Training was provided for miners.

2. *Causal Factor:* The park brake on the Caterpillar 980C front end loader was not set while the equipment was on an approximate 19 percent grade.

Corrective Action: Miners and equipment operators were retrained to set the park brake when there is danger of inadvertent movement of machinery when persons are near.

3. *Causal Factor:* The end loader operator did not have visual contact with the persons on the ground while the end loader and the truck were being connected by the pull rope.

Corrective Action: Procedures were established and miners were retrained to maintain visual communications between equipment operators and any miner working in the area.

CONCLUSION

At approximately 9:00 a.m. Tuesday, November 9, 2004, Earl Reed, Jr. a 57-year old mine owner with 30 years of mining experience was fatally injured at J R Mining's Grays Fork surface mine. The accident occurred while the victim was helping to install a steel pull rope from the rear of a Caterpillar 980C front end loader to the front pull hook of a stalled Peterbilt tractor-trailer coal truck. The front end loader inadvertently rolled backwards down the inclined roadway towards the tractor-trailer, pinning the victim between the two pieces of equipment. The accident resulted from working in a hazardous location, failure to secure (set parking brakes) the front end loader, and failure to maintain visual contact between the equipment operator and miners working in the area.

Approved By:

Charles H. Grace
Acting District Manager

Date

ENFORCEMENT ACTIONS

Order No. 7542986 was issued on November 9, 2004, under the provisions of section 103(k) of the Mine Act.

A fatal accident occurred at this operation on November 9, 2004, when a miner was caught between a Caterpillar 980C front end loader and a truck. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the Grays Fork mine until MSHA has determined that it is safe to resume normal mining operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area.

A 104(a) Citation, S&S, Low negligence, No. 7514353, was issued to JR Mining Company for a violation of 77.1607(b).

The mobile equipment operator of the Caterpillar 980C front end loader did not have full control of the end loader on an approximate 19 percent grade haul road. The rear-end of the end loader was being attached to the front of a stalled Peterbilt tractor-trailer truck with a steel pull cable measuring 1-inch in diameter by 20 feet long. The end loader inadvertently rolled backwards down hill and pinned a worker between the two pieces of equipment, causing fatal crushing injuries.

A 104(a) Citation, S&S, Low negligence, No. 7514360, was issued to JR Mining Company for a violation of 77.1607(g).

The mobile equipment operator of the Caterpillar 980 C front end loader did not make certain by signal or other means, that all persons were clear before the end loader moved. The end loader moved backwards resulting in a worker being pinned between two pieces of equipment, which caused fatal crushing injuries.

Appendix A
Persons Participating in the Investigation

Kentucky Office of Mine Safety and Licensing

<u>Name</u>	<u>Title</u>
Gene Adams.....	Surface Mine Safety Analyst
Herman Williamson.....	Mine Inspector
Tracy Stumbo.....	Chief Accident Investigator
Johnny Greene.....	Deputy Chief Accident Investigator

Mine Safety and Health Administration

<u>Name</u>	<u>Title</u>
Charlie Fields	CMS&H Inspector/Accident Investigator
Lester Cox, Jr.....	CMS&H Inspector/Supervisor
John Dishner.....	CMS&H Inspector/Surface
Arthur V. Smith.....	CMS&H Inspector/Surface
Ron Medina.....	Mechanical Engineer