MAI-2009-09

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Clay)

Fatal Powered Haulage Accident
May 2, 2009

Innovative Environmental Construction
Contractor I.D. No. V401

at

Active Minerals International, LLC
Active Minerals Attapulgite Mine
Climax, Decatur County, Georgia
Mine I.D. No. 09-01192

Investigators

Jeffrey L. Phillips
Supervisory Mine Safety and Health Inspector

Danny Wriston
Mine Safety and Health Inspector

F. Terry Marshall
Mechanical Engineer

Wayne L. Maxwell
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Southeastern District
135 Gemini Circle, Suite 212 Birmingham, Alabama 35209
Wyatt S. Andrews, District Manager


VOLVO
05.03.2009

OVERVIEW

Carroll L. Collins, a 51-year old contractor front-end loader operator, was fatally injured on May 2, 2009. Collins parked a front-end loader on an elevated ramp with the bucket in the raised position. An unauthorized passenger was in the cab of the front-end loader. When Collins exited the machine, his feet became entangled with the passenger causing him to trip onto the left rear tire. At that time, the park brake disengaged allowing the front-end loader to drift backwards. Collins fell to the ground and the machine backed over him.

Management policies, procedures, and controls were inadequate and failed to ensure that persons received training in safe operating procedures regarding mobile equipment and failed to prevent persons from riding in the cab of mobile equipment. Task training was inadequate. The victim parked the front-end loader on a grade with the bucket in a raised position and did not turn the wheels into a bank. In addition, provisions had not been made for secure travel of the passenger riding in the cab of the front-end loader.

GENERAL INFORMATION

Active Minerals Attapulgite Mine, surface clay mine and distribution plant, owned and operated by Active Minerals International, LLC, was located in Climax, Decatur County, Georgia. The principal operating official was Richard Southerland, Vice-President of Operations. The mine operated two 12 hour shifts per day, seven days per week. Total employment was three persons.

Clay was removed from a pit by ripping with a dozer. Excavators loaded the ripped material into haul trucks that transported the material to a stockpile. The clay was removed from the stockpile by front-end loader and transported to the plant's feed hopper. The clay was then transported by trucks to another plant for further processing.

Innovative Environmental Construction was an independent contractor located in Milledgeville, Baldwin County, Georgia. The principal operating official was Nathan Southerland, President. Innovative Environmental Construction was contracted by Active Minerals International, LLC to mine clay from the pit. Seven persons, including the victim, were provided by the contractor to work at the mine.

The last inspection at this operation was completed on February 27, 2009.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Carroll L. Collins (victim) reported to work at approximately 5:45 p.m. His normal starting time was 6:00 p.m. Donald O. Goss, Plant Operator, and the designated person in charge for the mine operator, was already at the plant preparing for the night shift.

At the beginning of the shift, Goss heard noises coming from the plant's screw feeder. Goss removed the screw feeder drive belt guard because it had been rubbing on the pulley. Collins reported to his front-end loader and Goss went to the plant operator's station in the control building to start the plant.

At approximately 7:00 p.m., Goss asked Collins to help him at the screw feeder. Collins arrived and informed Goss that Tina Hartline, a friend of his, was coming to the mine to see him. After the screw feeder was repaired, Goss returned to the control building and again notified Collins that the screw feeder stopped. He asked Collins to meet him there. Goss noticed that Collins' friend was riding in the cab with Collins. Goss called Collins and told him that Hartline should not be on the property; however, Hartline remained on the property and Goss was aware that she was still there.

The two employees then worked on the screw feeder for a second time and there was no further discussion concerning Hartline. When the task was completed, Collins went back to the front-end loader and Goss returned to the control building.

At 9:20 p.m., the screw feeder motor tripped out and Goss went to the master control room to reset the breaker. Goss returned to the control room and radioed Collins asking him to check the motor to determine if there was a problem. Collins stopped the front-end loader on the feed hopper ramp and applied the parking brake. Apparently when Hartline stood and backed against the dashboard to allow Collins to exit the cab, the parking brake inadvertently disengaged. Collins backed out of the cab, had his right foot on the rear wheel of the loader, and was closing the door. When the machine lunged backward, he was thrown onto the rear wheel. Goss radioed Collins but did not receive a reply. Shortly after that, Hartline came to Goss and told him that Collins had been run over by the front-end loader. Goss called for emergency medical services (EMS).

At 9:55 p.m., EMS personnel arrived and Collins was pronounced dead at the scene. The cause of death was attributed to blunt force trauma.

INVESTIGATION OF THE ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified of the accident at 10:26 p.m. on May 2, 2009, by a telephone call from Richard Southerland, Vice-President of Operation, to the MSHA National Call Center. Doniece Schlick, Safety Specialist, was notified and an investigation was started the same day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine and contractor management and employee, and the Decatur County Sheriff's Office.

DISCUSSION

Location

The main plant feed hopper ramp where the accident occurred was located between the pit stockpile and the processing facility.

Feed Hopper Ramp

The grades at the feed hopper ramp ranged from approximately 18 percent where the front-end loader was in position to dump the load into the hopper to approximately 11 percent where the front-end loader finally stopped. The ramp was comprised of dry stone and clay material.

Front-End Loader

The front-end loader involved in the accident was a 2002 Volvo model L90D equipped with a loader bucket. It had a Volvo TD63KBE diesel engine rated at 157 horsepower at 2,200 revolutions per minute.

Transmission, Transmission Controls and Transmission Control Test

The front-end loader had an electronic controlled power shift (automatic type) transmission with four forward and four reverse speeds and the option of selecting shifting characteristics. A transmission selector lever was located on the left hand side of the steering column for directional and speed control (See Appendix C - Photo No. 1). The directional control was lever activated with three positions: forward (lever moved forward); neutral (lever in center position); and reverse (lever moved rearward). The speed control was a rotary switch having four positions (1^{st}, 2^{nd}, 3^{rd} and 4^{th}) located on the end of the directional control. The loader also had an Automatic Power Shift ("APS II") rotary switch control positioned in the right side area of the forward dashboard panel for either electronically controlled automatic shifting or manual shifting of the transmission.

The "APS II" control was found in the automatic position and the rotary speed control in the 1^{st} position. Investigators determined that the transmission's directional, speed, and "APS II" controls functioned adequately. When the front-end loader was positioned on the feed hopper ramp, the transmission would physically start in 1^{st} gear from a standstill in both forward and reverse directions with the speed control in 1^{st}.

Service and Parking Brake System Design

The front-end loader had a dual-circuit hydraulic service brake system (one circuit for the front axle service brakes and one circuit for the rear axle service brakes) with enclosed wet disc brakes at all four wheels. A right and left foot pedal were located in the cab to apply the service brakes. Either foot pedal could be used to apply the service brakes. Both pedals functioned similarly.

The vehicle had a transmission disconnect (neutralizing) feature but it was not integral to the actual brake pedal selected. The front-end loader had a rocker type switch located in the right side area of the front dashboard panel to select the transmission disconnect feature. When the disconnect switch was in the "on" position, an electronic control unit (ECU) monitored brake pressure that would sense when to disconnect the transmission. Applying the service brake using either of the two brake pedals would trigger the ECU to disconnect (neutralize) the transmission if the loader was in gear with service brake pressures over approximately 260 pounds per square inch (PSI). The maximum brake output pressure for the brake valve during hydraulic pressure tests was observed to be approximately 900 PSI with the engine running at low idle.

The front-end loader had a spring-applied, hydraulic-released open caliper dry disc parking brake on the transmission's output shaft for the front axle. A rocker type switch was inset in the left hand side area of the front dashboard panel. This switch had a locking feature (catch tab) requiring two actions to release the switch (See Appendix C - Photo No. 2). These actions included a downward force on a button on the upper face of the rocker switch to release the locking feature (catch tab) and an inward force to cycle (rock) the switch to the released position.

Service Brake System Test

Measurements taken using the wear indicator pin assembly integral to each of the four wheel ends indicated that both enclosed wet disc brakes on the front axle were beyond the manufacturer's wear limits. Tests conducted by investigators indicated that loader remained stationary on the hopper ramp in the area of the accident (effective grades of 11-18 percent) with the service brakes applied, the engine running, the transmission in neutral, and the bucket raised off the ground.

Hydraulic brake pressure tests identified that the two accumulators in the hydraulic service brake system were defective due to ineffective nitrogen pre-charge pressures. The pressures measured were in the range of 50-100 pounds per square inch. The accumulators were a non-serviceable type (non-rechargeable). The loader's service manual stated that accumulators must be replaced when they reached a minimum pre-charge pressure of 508 pounds per square inch. This condition was cited as a non-contributory violation.

Tests conducted with Volvo's electronic service tool indicated the transmission's disconnect (neutralizing) feature functioned as designed. The transmission disconnect switch was found in the "off" position indicating the transmission would not have automatically disconnected with the loader in gear with a service brake application.

Parking Brake System Tests

The operator's manual for the front-end loader recommended a pull through type test to check the performance of the parking brake. These recommendations indicated that the loader should remain stationary with the parking brake applied, the transmission placed in 3rd gear, and the engine running at wide-open throttle (WOT). Tests conducted in this manner indicated that the parking brake held the loader stationary with the parking brake applied, the transmission in either 3rd gear forward or 3rd gear reverse, and the engine at WOT. These tests also verified that the visual indicators, the applied parking brake warning lamp and the central warning lamp, on the forward dashboard panel and the audible alarm functioned as designed.

Tests conducted with the parking brake applied indicated that the front-end loader remained stationary on the feed hopper ramp with the parking brake applied, the engine running, the transmission in neutral, and the loader bucket raised off the ground.

Hydraulic pressure tests were also conducted on the parking brake system. Investigators determined that the elapsed time for the parking brake pressure to apply or release the parking brake once the switch was cycled to either the applied or released positions was approximately 0.5 seconds.

Tests indicated that the parking brake automatically applied in approximately 0.5 seconds whenever the engine was turned off using the key switch.

Other Functional Tests

Other functional tests conducted on the loader demonstrated that the loader could power through the parking brake (i.e., move down slope) with the parking brake applied, the engine at high idle, and the transmission controls in 1st-Reverse. The loader did not move down slope on the ramp in the accident area with the parking brake released, engine speed at low idle (approximately 950 RPM) and the transmission controls in 1st-Forward. The engine low idle speed observed (approximately 950 RPM) was higher than the manufacturer's specifications of 670 +/- 50 RPM.

Cab Configuration

The loader cab did not have accommodations for a second person as there was no additional seat or seat belt.

Weather

The weather conditions on the day of the accident were clear and sunny with a high temperature of 85 degrees Fahrenheit. Weather was not considered to be a factor in the accident.

Training and Experience

Carroll L. Collins had eight weeks, six days of mining experience all at this operation. He had not received task training in accordance with 30 CFR Part 46.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root causes were identified.

Root Cause: Management policies, procedures and control were inadequate and failed to ensure that persons received training in the safe operating procedures regarding operating mobile equipment and task training procedures regarding operating mobile equipment. Task training was inadequate. The victim parked the front-end loader on a grade with the bucket in a raised position and did not turn the wheels into a bank.

Corrective Action: Management has implemented new policies and procedures in regards to training employees on the safe operation of mobile equipment. New check lists have been implemented along with management's plan to conduct safety audits to ensure all employees are following all company policies and procedures. All employees have been retrained regarding management's new policies.

Root Cause: Management failed to establish procedures to ensure that persons operated mobile equipment safely with a second person in the vehicle. Management was aware that a passenger was riding in the operator's compartment of the front-end loader. However, no provision had been made for secure travel of the passenger.

Corrective Action: Management has implemented new zero tolerance policies and procedures to ensure unauthorized persons will not be on mine property at anytime. Management also added new policies stating there will be no person other than the operator seated in mobile equipment at anytime unless authorized by management for training purposes only, provided the equipment is designed for the second person to safely ride in the vehicle.

CONCLUSION

Management policies, procedures, and controls were inadequate and failed to ensure that persons received training in safe operating procedures regarding mobile equipment and failed to prevent persons from riding in the cab of mobile equipment. Task training was inadequate. The victim parked the front-end loader on a grade with the bucket in a raised position and did not turn the wheels into a bank. In addition, provisions had not been made for secure travel of the passenger riding in the cab of the front-end loader.

ENFORCEMENT ACTIONS

Issued to Active Minerals International, LLC

Order Number 7753880 was issued on May 3, 2009, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on May 2, 2009, when an equipment operator was crushed by a Volvo LC90 front-end loader. This order is issued to assure the safety of persons at this operation and prohibits any work in the affected area until MSHA determines that it is safe to resume normal operations as determined by an Authorized Representative of the Secretary of Labor. The mine operator shall obtain approval from an Authorized Representative for all action to recover and/or restore operations in the affected area.

The order was terminated on May 5, 2009. Conditions that contributed to the accident no longer exist and normal operations can resume.

Citation No. 6091419 was issued on August 7, 2009, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.9200(d):

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by a front end loader that he was operating. A person was being transported in the front-end loader with no seat provided. When the operator exited the cab, his feet became entangled with the passenger causing him to trip onto the left rear tire. Additionally the park brake disengaged allowing the front-end loader to move down a grade. Management engaged in aggravated conduct constituting more than ordinary negligence by allowing a person to ride the front-end loader with no provisions made for secure travel of the passenger. This violation is an unwarrantable failure to comply with a mandatory standard.

The citation was terminated on September 1, 2009. Management implemented policies and procedures for the safe operation of mobile equipment. Training was conducted with mine employees.

Order No. 6091420 was issued on August 7, 2009, under the provisions of Section 104(d) of the Mine Act for a violation of 30 CFR 56.14206(b):

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by the end loader he was operating. The victim stopped on the elevated ramp with a loaded bucket in the raised position and exited the front-end loader. Management engaged in aggravated conduct constituting more than ordinary negligence by not correcting a known work practice. This violation is an unwarrantable failure to comply with a mandatory standard.

The order was terminated on September 1, 2009. Management implemented policies and procedures for the safe exiting and operation of mobile equipment. Training was conducted with mine employees.

Order No. 6091421 was issued on August 7, 2009, under the provisions of Section 104(d) of the Mine Act for a violation of 30 CFR 56.14207:

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by a front- end loader he was operating. The victim stopped the front-end loader on the elevated ramp and exited the machine without turning the wheels into a bank or using wheel chocks to prevent the machine from rolling. Management engaged in aggravated conduct constituting more than ordinary negligence by not correcting a known work practice. This violation is an unwarrantable failure to comply with a mandatory standard.

The order was terminated on September 1, 2009. Management implemented policies and procedures for the safe exiting and operation of mobile equipment. Training was conducted with mine employees.

Citation No. 6091422 was issued on August 7, 2009, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 46.7(a):

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by the end loader he was operating. The victim parked the front-end loader on an elevated ramp with the bucket in the raised position, wheels not chocked, and an untrained passenger in the operator's compartment with no provisions made for secure travel. He had not received adequate training to perform the task of operating an end loader in a safe manner.

The citation was terminated on September 1, 2009. Management implemented policies and procedures for the safe operation of mobile equipment. Task training was provided to mine employees.

Issued to Innovative Environmental Construction

Citation No. 6091416 was issued on August 7, 2009, under the provisions of Section 104(d) of the Mine Act for a violation of 30 CFR 46.7(a):

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by a front end loader that he was operating. The victim parked the front-end loader on a grade with the bucket in the raised position, wheels not turned into a bank, and an untrained passenger in the operator's compartment with no provisions made for secure travel. He had not received training in the health and safety aspects of the assigned task of operating a front- end loader. The contractor engaged in aggravated conduct constituting more than ordinary negligence by not providing adequate task training to the victim. This violation is an unwarrantable failure to comply with a mandatory standard.

The citation was terminated on September 1, 2009. Management implemented policies and procedures for the safe operation of mobile equipment. Task training was conducted with mine employees.

Citation No. 6091417 was issued on August 7, 2009, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.14207:

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by a front-end loader that he was operating. The victim parked the front-end loader on a grade and exited the machine without turning the wheels into a bank or using wheel chocks to prevent the machine from moving.

The citation was terminated on September 1, 2009. Management implemented policies and procedures for the safe operation and exiting of mobile equipment.

Citation No. 6091418 was issued on August 7, 2009, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.14206(b):

A fatal accident occurred at this operation on May 2, 2009, when a miner was run over by a front-end loader that he was operating. The victim parked the front-end loader on a grade with a loaded bucket in the raised position and exited the machine.

The citation was terminated on September 1, 2009. Management implemented policies and procedures for the safe operation and exiting of mobile equipment.

Approved: _____ Date:_____
Wyatt S. Andrews
District Manager

APPENDICES

A. Persons Participating in the Investigation
B. Schematic of Accident Scene
C. Layout of the Cab and Controls
D. Victim Data Sheet

APPENDIX A

Persons Participating in the Investigation

Active Minerals International, LLC

Richard Southerland	Vice-President of Operations
Alex Glover	Operations Manager
Donald O"Keith Goss	Plant Operator

Innovative Environmental Construction

Nathan Southerland	President

Decatur County Sheriff's Department

Gale Bowyer	Investigations/Crime Scene
Julian Crowder	Investigator

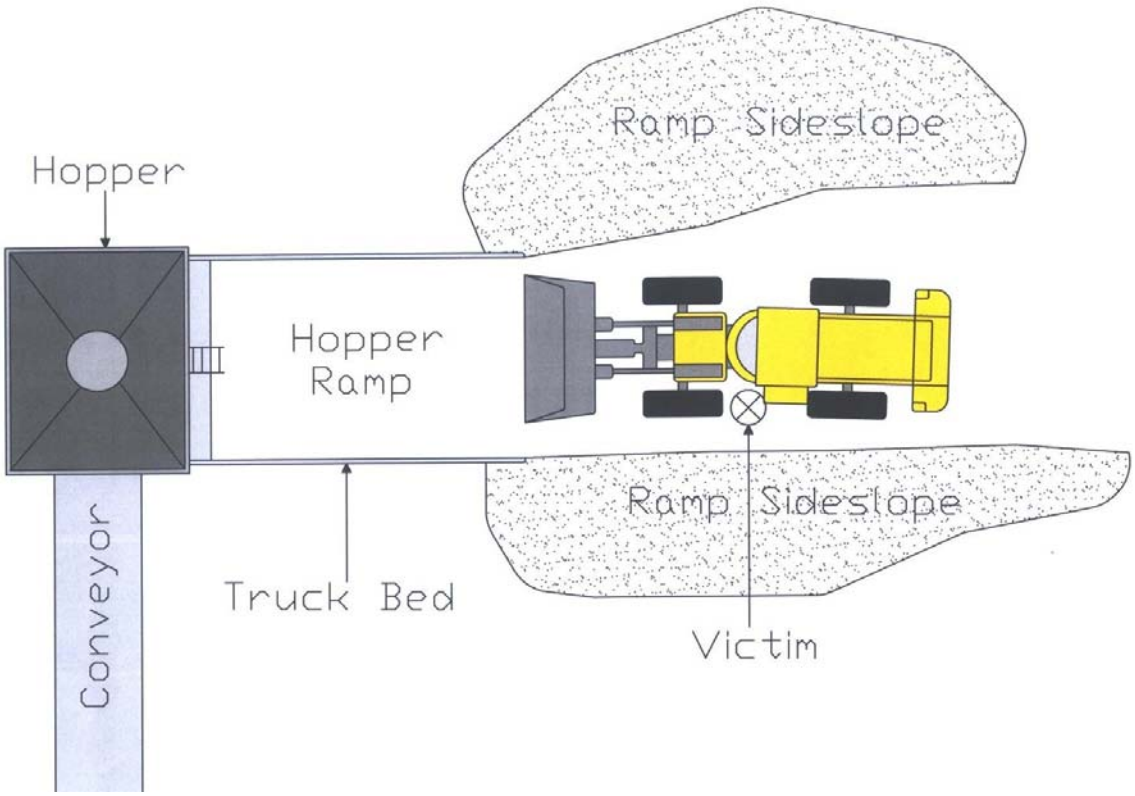
Decatur County First Responder

Bill Hitson	First Responder

Mine Safety and Health Administration

Jeffrey L. Phillips	Supervisory Mine Safety and Health Inspector
Danny Wriston	Mine Safety and Health Inspector
Wayne L. Maxwell	Mine Safety and Health Specialist
F. Terry Marshall	Mechanical Engineer

APPENDIX B


Ramp Sideslope
Hopper
Hopper
Ramp
Ramp Sideslope
Conveyor
Truck Bed
Victim

APPENDIX C

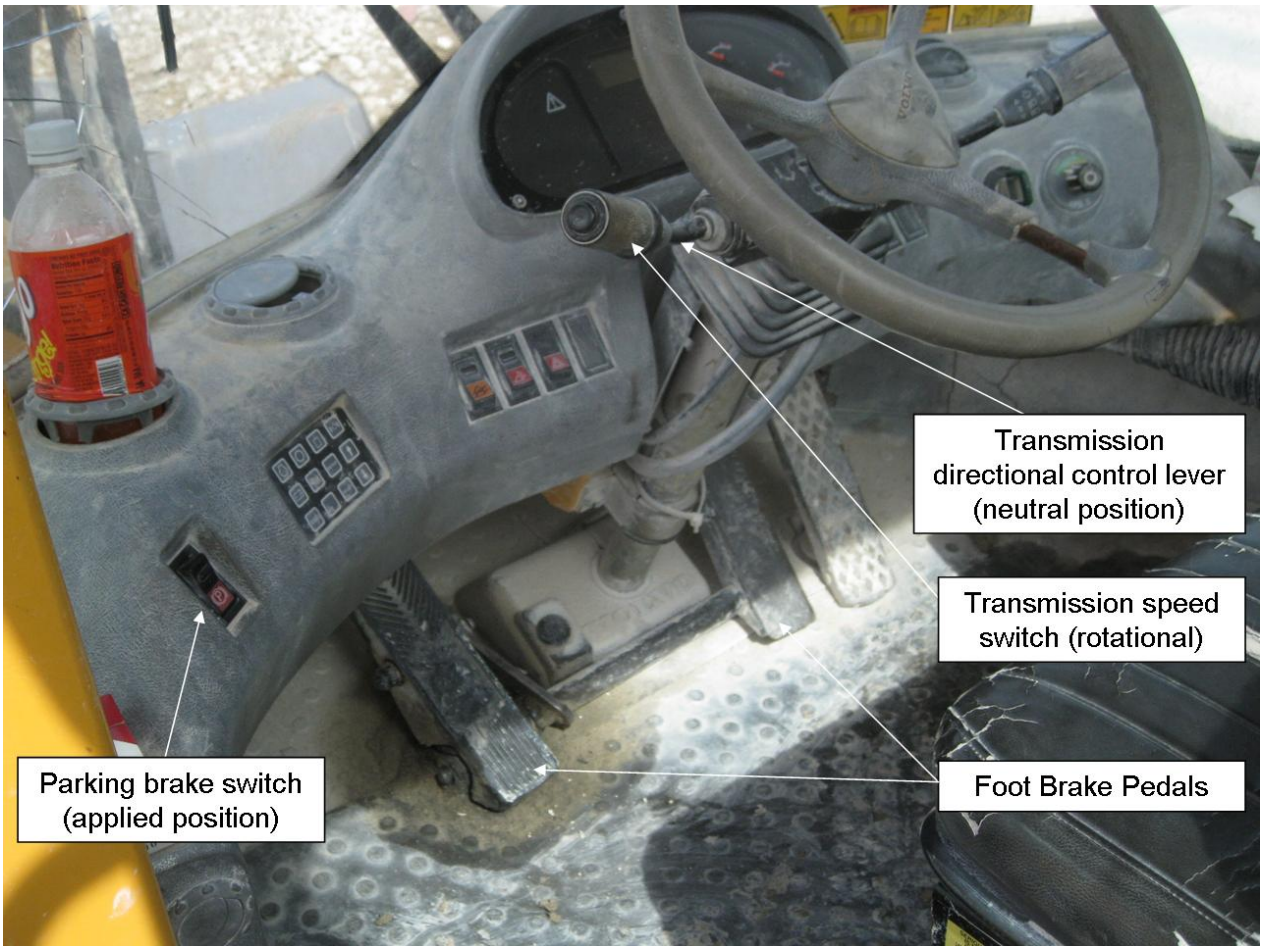


Photo No. 1: General Layout of Cab and Controls

Photo No. 2: Configuration of the Rocker Type Parking Brake Switch in the Applied Position

APPENDIX D

Accident Investigation Data - Victim Information
Event Number: 0 9 5 8 5 0 2

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. Degree of Injury:
Carroll L. Collins	*M*	*51*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 05/02/2009 b.Time: 9:45	*a. Date: 05/02/2009 b.Time: 9:45*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
182 Front-end Loader Operator	*053 Front-end loader operator*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*0*	*8*	*6*	b. Regular Job Title:	*0*	*8*	*6*	c: This Mine:	*0*	*8*	*6*	d. Total Mining:	*0*	*8*	*6*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
076 Front-end loader tire	*170 Ran over by the loader tire*

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

14. Company of Employment: (If different from production operator)
Innovative Enviromental Construction
Independent Contractor ID: (if applicable) *V401*

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

16. Part 50 Document Control Number: (form 7000-1)
17. Union Affiliation of Victim: *9999* *None (No Union Affiliation)*