MAI-2013-12

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Crushed and Broken Limestone)

Fatal Falling/Sliding Material Accident
September 18, 2013

Gaddie-Shamrock LLC
Caldwell Quarry
Albany, Clinton County, Kentucky
ID No. 15-00091

Investigators

Leroy Lockett
Supervisory Mine Safety and Health Inspector

Michael LaRue
Mine Safety and Health Inspector

Alan Coburn
Supervisory Mine Health and Safety Specialist (Training)

Originating Office
Mine Safety and Health Administration
Southeastern District
135 Gemini Circle, Suite 212
Birmingham, Al 35209
Samuel K. Pierce, District Manager


09/20/2013 11:16

OVERVIEW

On September 18, 2013, Lonnie Ferrell, Front- end Loader Operator, age 56, was killed when he was engulfed by material in a pug mill hopper (hopper). Ferrell used a front-end loader to place material into the hopper. He then entered the top of the hopper to remove a lump of stone that would not feed onto the belt conveyor below. The unconsolidated material that Ferrell was standing on collapsed, engulfing him. The hopper was operating at the time of the accident.

The accident occurred due to management's failure to establish policies and procedures for safely clearing a hopper. The hopper's discharge operating controls were not deenergized and locked out before Ferrell worked on or near equipment and he did not wear a safety harness and lanyard, which was securely anchored and tended by another person, prior to entering the hopper.

The hopper did not have a heavy screen (grizzly) installed to control the size of material and prevent clogging. Additionally, the hopper was not equipped with any mechanical devices or other effective means of handling material so persons can work where they are not exposed to entrapment by sliding material.

Ferrell was not task trained to recognize all potential hazardous conditions and to understand safe job procedures to eliminate all of the hazards before he began work on the hopper.

GENERAL INFORMATION

The Caldwell Quarry, owned and operated by Gaddie-Shamrock LLC, is located on HWY 1590, 2 miles northwest of Albany, Clinton County, Kentucky. The principal operating officials are Roy Beard, President, and Doug Beard, Vice-President.

The mine operates, one ten hour shift, four days a week. One maintenance shift operates on Friday. Total employment is 12 persons.

The mine is a surface limestone operation using multiple pits and a multi-bench mining method. The limestone is drilled and blasted. The material is loaded into haul trucks with a front-end loader and transported to the on-site processing plant. Finished materials are sold for various uses in the construction industry.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this operation on April 10, 2013.

DESCRIPTION OF ACCIDENT

On the day of the accident, September 18, 2013, Lonnie Ferrell (victim) began his shift about 5:15 a.m. Ferrell started all the mobile equipment planned to be operated for the shift. After that, he went to the office break room and talked with Danny Abston, Foreman.

At 6:00 a.m., Ferrell began loading crushed rock, from a stockpile, into the hopper using a front-end loader. Ferrell continued to load material into the hopper until about 1:00 p.m., when he got off the front-end loader and entered the hopper.

Lyle Jones, Excavator Operator, then heard someone yelling for help. Jones turned, looked toward the hopper, and saw Ferrell buried up to his waist inside the hopper. Jones ran to the hopper but when he got to there, Ferrell had been fully engulfed.

Jones ran approximately 100 yards along the stockpile to an area about 75 yards from the control tower where he could signal Abston to shut down the #1 discharge conveyor and the #2 pug mill feed conveyor. Abston noticed Jones signaling and shut down both conveyors. Jones signaled Abston to come to the hopper and also flagged down Junior Albertson, Driller, who was passing in a truck, to help get Ferrell out of the hopper.

Albertson and Jones entered the hopper and began digging the material by hand trying to locate Ferrell. After a few minutes, Albertson, Jones, and Abston realized they could not remove the tons of material, by hand, to find Ferrell.

Steve Brown, Greaser/Oiler, arrived and told them to call 911. Abston called Tammy Huddleston, Office Clerk, and told her to call 911. She called for Emergency Medical Services (EMS) at 1:02 p.m.

Jones used an excavator to remove some of the material, but the excavator's bucket was too wide to remove enough material to locate Ferrell. Abston and Jones began to jog the #1 discharge belt, in an attempt to empty the hopper and continued until Clinton County EMS arrived at 1:07 p.m. EMS personnel immediately decided to cut a hole into the side of the hopper using a fire and rescue saw. The rescue saw was ineffective so Stanley Stockton, Mechanic, used an acetylene cutting torch to cut a large hole in the side of the hopper and the material was then drained from the hopper. Ferrell was located near the bottom of the chute and was pronounced dead at 2:03 p.m. by L. Scott, Deputy Coroner.

INVESTIGATION OF ACCIDENT

MSHA was notified of the accident on September 18, 2013, at 1:24 p.m. by a telephone call to the National Call Center from Wesley Spearman, Mine Manager. The National Call Center notified Derek Broadhead, Data Clerk. Broadhead notified Doniece Schlick, Assistant District Manager, and an investigation was started the same day.

MSHA issued an order pursuant to Section 103(j) of the Mine Act, and an investigation began that same day. This order was later modified to Section 103(k) of the Mine Act after the arrival of an Authorized Representative at the mine site.

MSHA's accident investigation team traveled to the mine and conducted a physical inspection of the accident scene, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and rescue agencies.

DISCUSSION

Location of the Accident

The accident occurred at the pug mill hopper. The pug mill is located approximately 1/8 mile east of the mine's plant and had been operating for two years; however, the

pug mill is only used during the summer and rarely operates during the winter due to ice and freezing of the material.

Pug Mill Hopper

The pug mill hopper is a square bin, approximately 12 feet high , designed to allow material to be dumped into the top via a 14-foot x 14-foot square opening. The material is then gravity fed into a 12-inch x 12-inch discharge chute open at the bottom of the bin. The bin is equipped with a vibrator attached to the outside of the bin structure to prevent material from sticking to the inside of the bin. The material from the discharge chute is loaded on the first of two belt conveyors.

The #1 conveyor is approximately 20 feet long and about 6 inches below the bin discharge chute. The #1 conveyor is horizontal and feeds the bottom of the #2 conveyor. The #2 conveyor is approximately 300 feet long and carries material approximately 20 feet up to the pug mill control platform.

The control platform receives the material and mixes the base material with water via a screw auger. This mixed material is then referred to as pug. The control platform is located over a set of scales. Over the road dump trucks can drive underneath the control platform and the pug drops into the trucks.

The pug mill operator's control station is located on the control platform. The control station is equipped with electrical control panels and all the controls for: the dumping of pug into the dump truck, on/off switch for the hopper vibrator, the on/ off controls for the #1 conveyor and #2 conveyor, and the screw auger. The pug mill operator has a view of the scale weight indicator (read out) allowing him to determine how much pug is loaded into the dump trucks. The control platform is approximately the same elevation as the top of the pug mill bin hopper. About two weeks prior to the accident, the mine started loading material from a stockpile instead of from the quarry. The stockpile contained lumps of crushed rock that caused the hopper chute to clog several times.

Typically, when the hopper chute clogged, Ferrell would travel about 100 yards along the stockpile to an area about 25 yards from the control station where he used hand signals to get Abston's attention and Abston would shut off the #1 and #2 conveyor. When the conveyors were shut off, Ferrell and Abston would go to the bottom of the hopper chute and use a steel bar to break the lump of crushed rock to unclog the chute.

Through interviews, investigators determined that Ferrell had actually entered the hopper several times when he saw a lump of material in the hopper. Ferrell would signal Abston to shut down the #1 and #2 conveyors. Ferrell waited until Abston

signaled him that the conveyors were shut down. Then he entered the hopper to break the lump into a manageable size or roll the lump out of the hopper. After that, Ferrell walked to the back of the front-end loader and would signal Abston, who was watching, to restart the conveyors.

Training and Experience

Lonnie Ferrell, victim, worked at this mine for 16 years. He had previously worked for an excavation company operating a dozer.

A representative of MSHA's Educational Field Services staff conducted an in-depth review of the mine operator's training records. The investigator determined the mine operator failed to provide all training required. Ferrell was not task trained to recognize all potential hazardous conditions and to understand safe job procedures to eliminate all of the hazards before beginning work on the pug mill hopper. Specifically, he was not trained in policies and procedures for safely clearing a pug mill hopper.

Weather

The weather on the day of the accident was clear with a temperature of approximately 73 degrees Fahrenheit, 80 percent humidity, and light winds. Weather was not considered to be a contributing factor to the accident.

ROOT CAUSE ANALYSIS

The investigators conducted a root cause analysis and the following root causes were identified:

Root Cause: Management failed to establish policies and procedures for safely clearing a pug mill hopper. The hopper's discharge operating controls were not deenergized and locked out before Ferrell worked on or near equipment and he did not wear a safety harness and lanyard, which was securely anchored and tended by another person, prior to entering the hopper.

Corrective Action: Management installed a grating designed to cover the top of the chute. It has been welded to the top of the hopper to prevent persons from accessing the hopper. This grating also prevents lumps from clogging the discharge chute.

Root Cause: Management failed to ensure that Ferrell was task trained to recognize all potential hazardous conditions and to understand safe job procedures to eliminate all of the hazards before he began work on the hopper.

Corrective Action: Management established written policies and safe work procedures to ensure that miners are task trained when working near bins, hoppers, silos, tanks and surge piles. All miners received training regarding working near bins, hoppers, silos, tanks and surge piles. The task training included revised lockout procedures, lockout responsibility, and procedures to restore equipment and/or circuits to service. Requirements for wearing a safety belt or harness equipped with a lifeline when entering such facilities were also discussed.

CONCLUSION

The accident occurred due to management's failure to establish policies and procedures for safely clearing a hopper. The hopper's discharge operating controls were not deenergized and locked out before Ferrell worked on or near equipment and he did not wear a safety harness and lanyard, which was securely anchored and tended by another person, prior to entering the hopper.

The hopper did not have a heavy screen (grizzly) installed to control the size of material and prevent clogging. Additionally, the hopper was not equipped with any mechanical devices or other effective means of handling material so persons can work where they are not exposed to entrapment by sliding material.

Ferrell was not task trained to recognize all potential hazardous conditions and to understand safe job procedures to eliminate all of the hazards before he began work on the hopper.

ENFORCEMENT ACTIONS

Issued to Gaddie-Shamrock LLC

Order Number 8726199 –issued on September 18, 2013, under the provisions of Section 103 (j) of the Mine Act:

> *A fatal accident occurred at this operation on September 18, 2013 at approximately 1308 hours. This order is being issued under section 103(j) of the Federal Mine safety and Health Act of 1977, to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibit all activity of the pug mill*

area of the mine, including the CAT 988H loader S/N 233817, Cat 345 excavator # 8525 and including the back gat to the point of road leading to the main plant.

The initial 103(j) order was modified to reflect that MSHA is now proceeding under the authority of section 103(k) of the Federal Mine Safety and Health Act of 1977. This section 103(k) Order is intended to protect the safety of all persons on-site, including those involved in rescue and recovery operations or investigation of the accident. The mine operator shall obtain prior approval from an Authorized Representative of the Secretary for all actions to recover and/or restore operations in the affect area. Additionally, the mine operator is reminded of its existing obligations to prevent the destruction of evidence that would aid in investigating the cause or causes of the accident.

Citation Number 8545469 – issued under the provisions of Section of 104(d)(1) of the Mine Act for violation of 56.16002 a (c):

On September18, 2013, a fatal accident occurred at this operation when a miner was engulfed by loose unconsolidated material while he was inside the pug mill hopper. The victim climbed over the bumper block and entered the hopper, walking onto unconsolidated material in an attempt to remove a lump of material that would clog the feed chute. Mine management engaged in aggravated conduct constituting more than ordinary negligence by allowing the miner to enter the hopper without wearing a safety belt or harness equipped with a lifeline suitably fastened and did not station a second person near the hopper. Additionally, the pug mill hopper was not locked out while the victim was attempting to remove the lump of material. This violation is an unwarrantable failure to comply with a mandatory standard.

Order Number 8545470– issued under the provisions of Section of 104(d)(1) of the Mine Act for violation of 46.7(b):

On September 18, 2013, a fatal accident occurred at this operation when a miner was engulfed by loose unconsolidated material while he was inside the pug mill hopper. Mine management engaged in aggravated conduct constituting more than ordinary negligence by not providing task training with safe work procedures for persons entering the pug mill feed hopper to remove material that could clog the feed chute. This is an unwarrantable failure to comply with a mandatory standard.

Approved: Samuel K Pierce Date: 1/13/14
Samuel K. Pierce
District Manager

APPENDIX A

Persons Participating in the Investigation

Gaddie-Shamrock LLC

Wesley Spearman……..Mine Manager

Danny Abston……Quarry Foreman

Kenny Harris……..Safety Director

Mine Safety and Health Administration

Leroy Lockett……..Supervisory Mine Safety and Health Inspector

Michael LaRue……Mine Safety and Health Inspector

Alan Coburn ……..Supervisory Mine Health and Safety Specialist (Training)

APPENDIX B

Accident Investigation Data - Victim Information

Event Number: 6 6 4 8 1 0 8

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:
Lonnie Ferrell	*M*	*56*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 09/18/2013 b.Time: 14:03	*a. Date: 09/18/2013 b.Time: 13:00*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
182 front-end loader operator	*014 climbed on pile/ material inside hoppe*	Yes | No X

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*13*	*24*	*1*	b. Regular Job Title:	*13*	*24*	*1*	c: This Mine:	*14*	*24*	*1*	d. Total Mining:	*16*	*24*	*1*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
034 victim was engulfed by hopper material	*110 suffocation*

13. Training Deficiencies

Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task: X

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

Independent Contractor ID: (if applicable)

15. On-site Emergency Medical Treatment

Not Applicable: X | First-Aid: | CPR: | EMT: | Medical Professional: | None:

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

17. Union Affiliation of Victim: *9999* *None (No Union Affiliation)*

Victim Information:

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:

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