MAI-2011-02

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Phosphate Rock)

Fatal Sliding Material Accident
March 2, 2011

Trader Construction Co.
Contractor ID No. IQ6

at

Lee Creek Mine
PCS Phosphate Company Inc.
Aurora, Beaufort County, North Carolina
Mine ID No. 31-00212

Investigators

Billy J. Ratliff
Mine Safety and Health Inspector

Timothy N. Riffe
Mine Safety and Health Inspector

Ricky W. Boggs
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Southeastern District
135 Gemini Circle, Suite 212, Birmingham, Alabama 35209
Michael A. Davis, District Manager


DEERE
McELROY

OVERVIEW

David E. Clark Jr., contract superintendent, age 51, was fatally injured on March 2, 2011, when he was struck by a section of pipe. Clark was supervising the operation of attempting to join two ends of 22-inch diameter pipe into a pipe fusion machine (machine). Two excavators were being used to position the pipe in the cradle of the machine when the pipe slipped out and struck him.

The accident occurred because contractor management policies, procedures, and controls were inadequate and did not protect persons performing the task of fusing pipe. Four pipe jaws, two inner jaws and two outer jaws, were located on the machine. These jaws would remain open while pipe was positioned in the cradle. The jaws were designed to close and hold the pipe in place while it was being fused. A positioning cylinder for one of the outer jaws was defective and removed from the machine eight days prior to the accident. Contractor management was aware of the defect but did not correct it. Since the defect was not corrected, the pipe jaw could not hold the pipe in place and it slipped out of the cradle. A competent person did not examine each working place and promptly initiate appropriate action to correct known conditions that adversely affect safety.

Additionally, the machine had been in service for three weeks but the victim had not been task trained regarding the task he was performing. He was standing four feet from the machine and was not clear of the pipe being placed in the machine.

GENERAL INFORMATION

Lee Creek Mine, a surface operation, owned and operated by PCS Phosphate Company, Inc., (PCS Phosphate) is located in Aurora, Beaufort County, North Carolina. The principal operating official is Brent Heimann, president. The mine operates two 12 hour shifts, 7 days per week. Total employment is 385 persons.

Excavators are used to strip varying depths of overburden above the ore body. Draglines are used to remove and stockpile the ore. The stockpiled material is mixed into slurry and pumped to the plant. The ore is separated by floatation, dried, and further processed chemically for fertilizer products. Reject material is pumped through slurry pipes, dried, and used for reclamation.

Trader Construction Co. (Trader) is located in New Bern, Craven County, North Carolina. The principal operating official is Carl Huddle, president. PCS Phosphate contracts with Trader to perform general labor tasks on a daily basis. Trader employs 152 persons at the mine. David Clark Jr. (victim), contract superintendent, worked for Trader.

Two persons working on the crew with the victim were employed by temporary employment agencies. One person worked for Holden Temporaries, Inc. of Tarboro, North Carolina and the other person was employed by Labor Quick of Greenville, North Carolina.

The last regular inspection at this operation was completed on February 9, 2011.

DESCRIPTION OF ACCIDENT

On the day of the accident, David Clark Jr. reported to the mine at 5:50 a.m., his normal starting time. At 6:00 a.m., Clark and Christopher Joyner, excavator operator, Holden Temporaries, Inc., Elbert Strickland, fusion machine operator, and Jose Lugo, excavator operator, Labor Quick, met near the dyke builder machine across the road from their work area. Ernest Grant II, superintendent, reviewed the tasks for the shift.

About 7:00 a.m., the crew traveled to the area where a culvert had been placed under State Route 306 and railroad tracks. They were to uncover the culvert and place pipe under the road and railroad tracks. The crew also had to dig a ditch under the R9 roadway to bury the pipe. At approximately 12:00 p.m., the ditch

had been excavated, the pipe was placed under the road and railroad tracks, and the ditch was covered.

After lunch, the crew prepared equipment to begin fusing pipe on the south side of R9 roadway. The first fusion (connection) was made on the west end of the pipe where it surfaced under R9 roadway (see Appendix C). The crew moved east, made the second fusion without incident, and moved further east to make another fusion.

The crew skipped the next fusion because one end of the pipe was buried, limiting its movement. They made another fusion and moved back to make the final fusion for the entire pipe in this area.

Two excavators and the machine were set in place. A cable was wrapped around the east side of the pipe, the cable ends were attached, and a clevis was used to secure the pipe to the bucket of one of the excavators. Lugo used the excavator to lift the pipe into the machine. Both the outer and inter jaws of the machine were closed over the pipe to secure the east end in place.

Joyner operated the excavator on the west side of the machine to move the pipe. A cable choker was used to attach the pipe to the bucket of the excavator. Strickland directed Joyner to move the excavator away from the machine and pull the pipe north. Joyner pulled the pipe and Strickland signaled that it was aligned. As Strickland directed, Joyner moved the pipe back toward the machine, lifted it, and held the pipe in position.

Clark had been on the operator's side of the machine. He traveled west along the pipe, crossed over it, and walked behind the excavator that Joyner was operating to the other side of the machine. Clark helped align the pipe in the cradle while Strickland had Joyner pull up the pipe. As they were attempting to align the west end of the pipe, it slipped from the cradle and sprung towards Clark, striking him.

Joyner immediately placed the pipe on the ground. Strickland and Joyner ran to assist Clark. At 4:51 p.m., Joyner called for Emergency Medical Services (EMS). EMS began transporting Clark to a helicopter landing zone but diverted to ambulance to the Buford County Hospital where he was pronounced dead at 5:50 p.m. The cause of death was attributed to blunt force trauma.

INVESTIGATION OF ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified of the accident at 5:14 p.m. on March 2, 2011, by a telephone call from Greg Rowe, safety director, PCS Phosphate, to Doniece Schlick, safety specialist. An investigation was started the same day. An order was issued under Section 103(j) of the Mine Act to ensure the safety of the miners. This order was later modified to Section 103(k) of the Mine Act when the first Authorized Representative arrived at the mine.

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 employees, Beaufort County Sheriff's Office, Aurora Rescue, and Beaufort County Medical Center.

DISCUSSION

Location

The accident occurred on the south side of R9 roadway, between R9 roadway and a long narrow incised pond, 652 feet inside the gate along State Route 306. The area is level and comprised of sandy soil. Since roadways are located on both sides, mine management had the pipe placed at this location to protect it from mobile equipment.

Weather

The weather at the time of the accident was sunny with a temperature of 59 degrees Fahrenheit and a wind speed of 3.7 mph. Weather was not considered to be a factor in this accident.

Pipe

The pipe, a high-density polyethylene (HDPE) standard dimension ratio 11 (SDR11) pipe was being placed to carry slurry. The pipe's specifications are 22-inch diameter, 2-inch wall thickness, and 54.8 pounds per linear foot. The pipe had been used previously and was bowed making it difficult to align in the machine. Damage was found on one end of the pipe showing it was forced into the machine.

Pipe Fusion Machine

The pipe fusion machine involved in the accident, McElroy model No. A3640101, has a 240 volt motor that is powered by a portable 480 VAC generator. The machine has two sets of jaws (inner and outer) on each cradle seat, totaling four jaws. These jaws are designed to hold pipe in the cradle while each separate end of the pipes are shaved, allowing them to squarely align. A heating plate is placed between the two shaved pipe ends and they are pressed against the heating plate to heat/melt the pipe. After the pipe is heated, the heating plate is removed and the ends of the pipe are pushed together.

The amount of pressure and heating time required is determined by the size and side wall diameter of the pipe being fused. Pressure on the pipe is needed in all phases of the operation. The pressure is monitored and preset in the machine. A selector control allows for the proper pressures to be pre-set. The pipe remains in the machine until it is cooled and the fusion is complete.

Investigators inspected the machine, with the assistance of an engineer from McElroy, and found that one of the outer fixed jaw positioning cylinders was missing. This allowed the outer fixed jaw to stay in the open position. If the open outer jaw had been operating as designed by the manufacturer, the end of the pipe would have remained in the cradle.

Investigators also found a crack on the piston shaft where it mounts into a clevis on an inner fixed positioning cylinder. This condition could eventually lead to the malfunctioning of the positioning cylinder; however, the cylinder was functioning properly when inspected.

Excavator/Rigging

The excavator involved in the accident, a John Deere Model 270C-LC, is self-propelled, hydraulic driven, and crawler mounted. The excavator was being used to suspend the pipe for alignment into the machine. An eye was fabricated and welded to the back of the excavator bucket. A clevis was attached through the eye and a heavy duty safety hook was attached to the clevis. A manufactured cable choker was attached around the HDPE pipe and into the safety hook that was manufactured to swivel. The cable choker was located around the pipe approximately 37 feet from the end that was being positioned/loaded into the machine. With this arrangement, the excavator could move the pipe in any direction to change the pipe's angle. No defects were found on the excavator or rigging.

Training and Experience

David E. Clark Jr., victim, had worked for Trader for 24 years, including 20 years at this operation. He had not received task training for the task he was performing, in accordance with 30 CFR Part 48, when the accident occurred.

Elbert Strickland had worked for Trader for 19 years. He had received training in accordance with 30 CFR Part 48.

Christopher Joyner had been employed with Holden Temporaries, Inc. for 16 months. He had received training in accordance with 30 CFR Part 48.

Jose Lugo had been employed with Labor Quick for 3 years. He had received training in accordance with 30 CFR Part 48.

ROOT CAUSE ANALYSIS

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

Root Cause: Contractor management policies, procedures, and controls were inadequate and failed to ensure that proper training was provided to persons to stay clear of the pipe in the machine.

Corrective Action: Contractor policies, procedures, and controls were implemented for moving, fusing, and guiding pipe. The new procedures require all persons to stay 10 feet away from the swing radius of the machine or be protected by substantial barriers. All persons were instructed regarding these procedures.

Root Cause: Contractor policies, procedures, and controls were inadequate and failed to ensure that any defects on machinery that affect safety to be corrected in a timely manner.

Corrective Action: Contractor management established and implemented policies, procedures, and controls that require any defects on machinery that affect safety to be corrected in a timely manner. All persons were instructed regarding these procedures.

CONCLUSION

The accident occurred because contractor management policies, procedures, and controls were inadequate and did not protect persons performing the task of fusing pipe. Four pipe jaws, two inner jaws and two outer jaws, were located on the machine. These jaws would remain open while pipe was positioned in the cradle. The jaws were designed to close and hold the pipe in place while it was being fused. A positioning cylinder for one of the outer jaws was defective and removed from the machine eight days prior to the accident. Contractor management was aware of the defect but did not correct it. Since the defect was not corrected, the pipe jaw could not hold the pipe in place and it slipped out of the cradle. A competent person did not examine each working place and promptly initiate appropriate action to correct known conditions that adversely affect safety.

Additionally, the machine had been in service for three weeks but the victim had not been task trained regarding the task he was performing. He was standing four feet from the machine and was not clear of the pipe being placed in the machine.

ENFORCEMENT ACTIONS

Issued to PCS Phosphate Company Inc.

Order No. 8546465 was issued on March 3, 2011, under the provisions of Section 103(j) of the Mine Act:

An accident occurred at this operation on March 2, 2011, at approximately 4:51 p.m. As rescue and or recovery work is necessary, this order is being issued, under section 103j of the Mine Act, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the accident scene, which is in the south side of the R9 area across from the dyke builder, except an imminent danger until MSHA has determined that it is safe to resume normal mining operations in the area. This order applies to all persons engaged in the rescue and recovery operation and any other persons onsite. This order was initially issued orally to the mine operator at approximately 4:51 p.m. and has now been reduced to writing.

The order was terminated on June 9, 2011. Conditions that contributed to the accident no longer exist.

Issued to Trader Construction Co.

Citation No. 8578891 was issued on May 25, 2011, under provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.14100(b):

A fatal accident occurred at this operation on March 2, 2011, when a 22- inch diameter pipe that was being suspended by an excavator slipped from the cradle of a fusing machine and struck a contract superintendent. He was positioned near a suspended load on the off side of the fusing machine when the pipe struck him. One of the jaw positioning cylinders was defective and had been removed eight days prior to the accident. This situation caused the outer fixed jaw to be placed back further than designed by the equipment manufacturer. With this configuration, the pipe would not stay in the cradle, and required a person to be positioned on the off side fusing machine to manually close the jaw. Management engaged in aggravated conduct constituting more than ordinary negligence in that defects affecting safety on the machine were not corrected in a timely manner to prevent the creation of a hazard to persons. The jaw positioning cylinder was removed from the fusing machine eight days prior to the accident and the fusing machine was not removed from service, exposing persons to a hazard. This violation is an unwarrantable failure to comply with a mandatory standard.

This citation was terminated on June 9, 2011. Repairs were made to the pipe fusion machine.

Order No. 8578892 was issued on May 25, 2011, under provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.16009:

A fatal accident occurred at this operation on March 2, 2011, when a 22- inch diameter pipe that was being suspended by an excavator slipped from the cradle of a fusing machine and struck a superintendent for a contractor. The victim was positioned near a suspended load on the off side of the fusing machine when the pipe struck him. Working near the suspended load has been a common practice in the past. Management engaged in aggravated conduct constituting more than ordinary negligence by allowing persons to work in areas that were not clear of suspended loads, exposing them to the hazard. This violation is an unwarrantable failure to comply with a mandatory standard.

This order is a "Rules to Live By" priority standard and was terminated on June 20, 2011, after contractor management established safe operating procedures and trained all persons regarding these procedures.

Order No. 8578893 was issued on May 25, 2011, under provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.18002(a):

A fatal accident occurred at this operation on March 2, 2011, when a 22- inch diameter pipe that was being suspended by an excavator slipped from the cradle of a fusing machine and struck a contract superintendent. He was positioned near a suspended load on the off side of the fusing machine when the pipe struck him. An examination of working places had not been conducted on any of the fusing set-ups on the day of the accident. Management engaged in aggravated conduct constituting more than ordinary negligence in that a competent person designated by the mine operator did not examine working places for conditions which may adversely affect safety or health. The operator failed to promptly initiate appropriate action to correct known conditions. Each fusion setup exposed persons to hazards that were not present before the start of the shift. This violation is an unwarrantable failure to comply with a mandatory standard.

This order was terminated on June 20, 2011, after contractor management established policies and procedures for conducting examinations and for correcting conditions found which may adversely affect safety or health. Persons conducting examinations were trained regarding these new procedures.

Citation No. 8578894 was issued on May 25, 2011, under provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 48.27(c):

A fatal accident occurred at this operation on March 2, 2011, when a 22- inch diameter pipe that was being suspended by an excavator slipped from the cradle of a fusing machine and struck a contract superintendent. He was positioned near a suspended load on the off side of the fusing machine when the pipe struck him. The victim had not received the required new task training to fuse pipe with this machine. He was not instructed in the safety and health aspects and safe work procedures of using this fusing machine.

This citation was terminated on May 25, 2011, after contractor management established safe operating procedures and task trained all persons regarding these procedures.

Approved:_____ Date:_____

Michael A. Davis
District Manager

APPENDICES

A. Persons Participating in the Investigation
B. Sketch of Accident Scene
C. Aerial View of the Location of Accident
D. Victim Data Sheet

APPENDIX A

Persons Participating in the Investigation

PCS Phosphate Company Inc.

Greg Rowe	Safety Director
Jerry Water	Mine Manager

Trader Construction Co.

Joey Breeden	Safety Director
Carl Huddle	President
Matt Rose	Project Manager
Bruce Pollock	Safety Coordinator
Ernest Grant II	Superintendent
Elbert Strickland	Fusion Machine Operator
Chris Joyner	Equipment Operator

Holden Temporaries, Inc.

Christopher Joyner	Excavator Operator

Labor Quick

Jose Lugo	Excavator Operator

McElroy

Jason Lawrence	Project Engineer
Chris Greggs	National Sales Manager

Pitt County Hospital

Dr. William Oliver	Director of Autopsy and Forensic Services

Aurora Rescue

Sam Williams	First Responder

Beaufort County Sheriff's Office

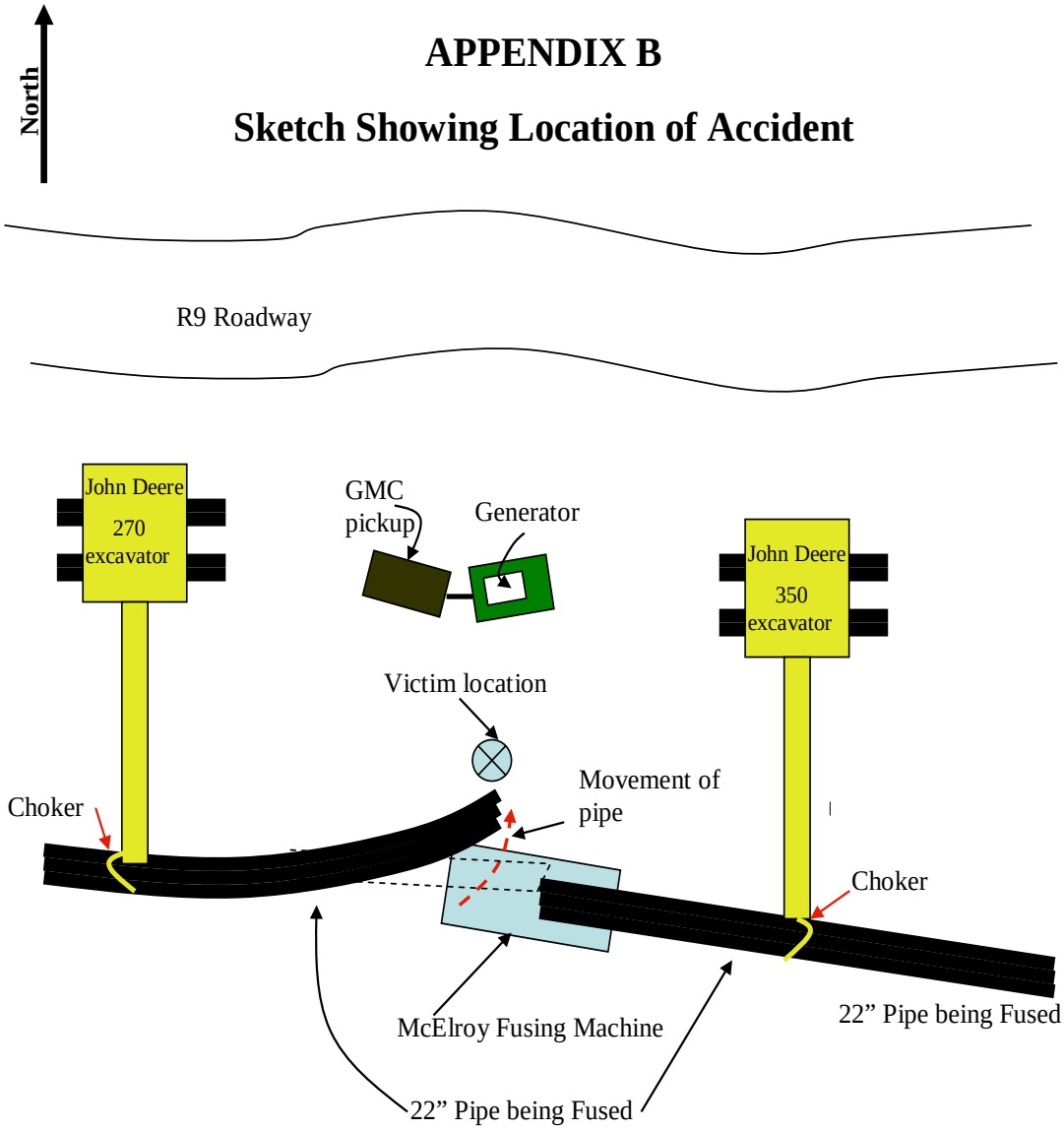
Kenny Watson	Captain

Mine Safety and Health Administration

Billy J. Ratliff	Mine Safety and Health Inspector
Timothy N. Riffe	Mine Safety and Health Inspector
Ricky W. Boggs	Mine Safety and Health Specialist

APPENDIX B

Sketch Showing Location of Accident



NOT TO SCALE

APPENDIX C

Aerial view of accident scene

Accident scene

Buried pipe

Pipe above ground

APPENDIX D

Accident Investigation Data - Victim Information

Event Number: 6 5 2 8 0 3 4

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:
David E. Clark	*M*	*51*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:
a. Date: 03/02/2011 b.Time: 16:51

6. Date and Time Started:
a. Date: 03/02/2011 b.Time: 16:51

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
149 Superintendent	*042 supervise pipe fusing*	Yes | X | No |

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*24*	*0*	*0*	b. Regular Job Title:	*10*	*0*	*0*	c: This Mine:	*20*	*0*	*0*	d. Total Mining:	*24*	*0*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
127 22 inch HDPE pipe	*140 Blunt force trama to head*

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

14. Company of Employment: (If different from production operator)
Trader construction
Independent Contractor ID: (if applicable) *IQ6*

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

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

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

Victim Information: