MAI-2008-13

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

REPORT OF INVESTIGATION

Surface Metal Mine
(Copper)

Fatal Electrical Accident
August 15, 2008

Ray
Asarco LLC
Ray, Gila County, Arizona
Mine I.D. 02-00150

Investigators

Steven H. Thoring
Mine Safety and Health Inspector

Dean F. Skorski
Supervisory Electrical Engineer

Originating Office
Mine Safety and Health Administration
Rocky Mountain District
P.O. Box 25367, DFC
Denver, CO 80225-0367
Richard Laufenberg, District Manager

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Energized conductor contacted by victim

Ballast

In-line fuse
(the other fuse is inside box and out of view)

OVERVIEW

Peter Eudave, apprentice electrician, age 41, was fatally injured on August 15, 2008, when he contacted a 480-volt electrical conductor. He was replacing the ballast in a floodlight.

The accident occurred because management policies and controls were inadequate and failed to ensure that the electrical circuit was deenergized, locked-out, tagged, and tested before work was performed.

GENERAL INFORMATION

Ray, an open pit copper mine, owned and operated by Asarco LLC, was located in Ray, Gila County, Arizona. The principal operating official was Richard Rhoades, general manager. The mine operated multiple shifts, 24 hours a day, 7 days per week. Total employment was 790 persons.

Copper ore was drilled and blasted in the open pit and transported to the primary crusher. Crushed ore was transported to the mill by conveyor belt. The ore was then milled, concentrated and smelted into copper plates.

The last regular inspection of this operation was completed on April 29, 2008.

DESCRIPTION OF ACCIDENT

On August 15, 2008, Peter Eudave (victim) started work at 7:00 a.m., his normal starting time. Eudave and Timothy Knight, journeyman electrician, met with Jeffrey Hall, supervisor. Hall assigned them to make various electrical repairs.

At approximately 10 a.m., Eudave and Knight traveled to the tailings booster pump station to troubleshoot and repair defective flood lighting. They tested the lighting circuit and discovered a defective lighting ballast. Eudave and Knight traveled to the electrical shop, retrieved a new ballast, and returned to the booster station. They removed the light reflector and two, five ampere in-line fuses supplying the electrical power to the ballast, but did not deenergize the circuit by opening the circuit breaker. The circuit breaker was located a short distance away in the tailings booster pump station. The old ballast was removed and replaced.

Knight turned around to retrieve the light reflector. When Knight turned back, he noticed Eudave was holding one of the energized wires, located on the line (energized) side of the in-line fuse. He unsuccessfully attempted to pull the wire free from Eudave's hand. He then picked up a section of hose and pulled the victim free from the energized conductor.

Knight used a radio to call for emergency medical assistance. He administered cardiopulmonary resuscitation (CPR) until help arrived. Eudave was transported to a local hospital and pronounced dead by the attending physician. Death was attributed to electrocution.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident on August 15, 2008, at 11:20 a.m., by a telephone call from Wes Cruea, senior safety engineer, to Jamie Eubanks, mine safety and health inspector. An investigation began the same day. An order was

issued pursuant to Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, miners' representatives, and the State of Arizona mine inspectors office.

DISCUSSION

Location of the Accident

The accident occurred on the upper deck of the tailings booster pump station. The area was dry.

Electrical Equipment and Analysis

The equipment being worked on at the time of the accident was a Holophane (Predator series) high pressure sodium floodlight. The floodlight was rated at 480 volts and 400 watts. This floodlight was one of four on the upper deck of the booster pump station where the power circuits were being protected by a 20 ampere, 480 volt, Cutler Hammer circuit breaker. The circuit breaker was located in the nearby tailings booster pump station building.

Two in-line fuses (5 amperes each) had been added to the existing circuitry inside the light fixture. During the investigation, power was restored to this light fixture and a phase to ground voltage of 268 volts was measured. The victim was exposed to this voltage level at the time of the accident.

An energized conductor had been cut off on the line side exposing the inner conductive material. A pair of cutting pliers was found at the accident scene. Investigators could not determine why the conductor was cut.

Weather Conditions

The weather at the time of the accident was clear with a temperature of 103 degrees Fahrenheit and calm winds. Weather was not considered to be a factor in the accident.

Training and Experience

Peter Eudave, victim, had 14 years of mining experience that included 1 year and 20 weeks of electrical experience. Eudave had received training in accordance with 30 CFR, Part 48.

Timothy Knight had 4 months of mining experience and 20 years of naval electrical experience with the Department of the Navy. Knight had received training in accordance with 30 CFR, Part 48.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root cause was identified:

Root Cause: Management policies and controls were inadequate and failed to ensure that the electrical circuit was deenergized, locked-out, tagged, and tested before work was performed on the circuit.

Corrective Action: Management should establish policies and controls to ensure that electrical circuits are deenergized, locked-out, and tagged when work is performed on electrical circuits and equipment.

CONCLUSION

The accident occurred because management policies and controls were inadequate and failed to ensure that the electrical circuit was deenergized, locked-out, tagged, and tested before work was performed.

ENFORCEMENT ACTIONS

Order No. 6451806 was issued on August 15, 2008, under provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on August 15, 2008, when a miner was working on the ballast of a 480 volt light system at the tailings booster station. The order was verbally issued at 11:20 a.m., to assure the safety of all persons at this operation. It prohibits all activity at the tailings booster station until MSHA has determined that it is safe to resume normal mining operations in this area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to affected area.

The order was terminated on August 20, 2008. Conditions that contributed to the accident no longer exist.

Citation No. 6423348 was issued on September 3, 2008, under provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.12017:

A fatal accident occurred at this operation on August 15, 2008, when an apprentice electrician received a fatal electrical shock while working on an energized lighting circuit at the tailings booster station. The circuit was not deenergized nor locked out before the work was done.

The citation was terminated on September 12, 2008. All mine electricians received training on lockout and tag procedures.

Approved by, Date: October 14, 2008

Richard Laufenberg
District Manager

APPENDICES

APPENDIX A

Persons Participating in the Investigation

Asarco LLC

Kim Bradshaw……..corporate safety director
James Brown…….. ……..safety engineer
James Coward, Jr…….attorney
Wes Cruea…….senior safety engineer

Patton Boggs LLP

Mark Savit……..attorney

United Steel Workers

Robert Manriquez……..president
Greg Zaragoza……..safety representative

State of Arizona Mine Inspectors Office

William Schifferns……..deputy mine inspector
Jack Speer……..deputy mine inspector

Mine Safety and Health Administration

Steven H. Thoring……..mine safety and health inspector
Dean F. Skorski……..supervisory electrical engineer

APPENDIX B

Accident Investigation Data - Victim Information

Event Number: 1 1 0 1 5 1 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:
Peter Eudave	*M*	*41*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 08/15/2008 b.Time: 12:35	*a. Date: 08/15/2008 b.Time: 7:00*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
102 Electrician Apprentice	*020 Repairing Flood Light*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*1*	*20*	*0*	b. Regular Job Title:	*1*	*20*	*0*	c: This Mine:	*14*	*0*	*0*	d. Total Mining:	*14*	*0*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
042 Electrical shock from conductor	*210 Electrocution*

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

14. Company of Employment: (If different from production operator)
Operator
Independent Contractor ID: (if applicable)

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

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

17. Union Affiliation of Victim: *2605* *United Steel Workers of America*