

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine  
(Limestone)

Fatal Electrical Accident  
March 28, 2005

Capitol Aggregates, LTD  
Fairland Quarry  
Marble Falls, Burnet County, Texas  
Mine ID No. 41-02810

Investigators

Mark J. Albrecht  
Supervisory Mine Safety and Health Inspector

Terry L. Worley  
Mine Safety and Health Inspector

Dean F. Skorski  
Supervisory Electrical Engineer

Originating Office  
Mine Safety and Health Administration  
South Central District  
1100 Commerce Street, Room 462  
Dallas, Texas 75242-0499  
Edward E. Lopez, District Manager

## **OVERVIEW**

On March 28, 2005, Robert M. Taylor, self-employed electrician, age 49, was fatally injured when he contacted an energized electrical circuit. Taylor was troubleshooting an electrical problem at the secondary plant.

The accident occurred because there were no safe operating procedures in place to ensure that the circuit breakers were de-energized, locked out, tagged, and the 480-volt circuit tested prior to performing any electrical work on individual circuits.

## **GENERAL INFORMATION**

Fairland Quarry, a crushed limestone operation, owned and operated by Capitol Aggregates, LTD, was located near Marble Falls, Burnet County, Texas. The principal operating official was Bart Ballard, plant manager. The mine operated one shift per day, five days per week. Total employment was 17 persons.

Limestone was drilled, blasted, and hauled by truck to the primary crusher located in the pit. Crushed rock was conveyed to the secondary plant, where it was crushed, screened, and washed. Finished products were sold to customers for construction aggregate.

Robert M. Taylor was a self-employed electrician who had performed electrical work at this mine on previous occasions.

The last regular inspection at this operation was completed on November 10, 2004.

## **DESCRIPTION OF THE ACCIDENT**

On the day of the accident, employees of Fairland Quarry began work at 6:30 a.m. and started the secondary plant but experienced problems starting the overland conveyor. Bart Ballard, plant manager, called Robert Taylor, electrician, at 8:00 a.m. to discuss the problem. Taylor suggested replacing the control transformer for the conveyor. A replacement transformer was located at a nearby mine. Lance Basancon, foreman, removed the old transformer and replaced it with the assistance of Jerome Martin, primary plant operator. Because the conveyor still would not start after the secondary plant was restarted, Taylor was called again at 10:30 a.m.

Taylor arrived at the mine at 11:00 a.m. and checked the installation of the new control transformer and found that the ground was not properly installed. He corrected the installation of the ground and checked it with a meter. The overland conveyor was turned on but appeared to be single-phasing and would not start.

Taylor went under the secondary plant control building and removed the covers from two junction boxes through which power came to the secondary plant (main circuit and Spokane 2 circuit). Taylor concluded that one of the phase conductors to the main circuit was damaged because he measured a voltage drop when the overland conveyor was turned on.

Taylor asked Basancon to assist him in identifying the damaged conductor at the main circuit breaker. Taylor did not have the necessary equipment to test the circuit without energizing it. Basancon turned off the main circuit breaker and the Spokane 2 circuit breaker and disconnected one phase conductor on the output side of the main breaker. He then turned on both circuit breakers while Taylor checked at the main junction box to determine that the damaged conductor was still connected at the main breaker.

Basancon turned both circuit breakers off, reconnected the conductor, and disconnected a second phase conductor from the output side of the main breaker. Taylor checked and determined that they had found the damaged conductor. Basancon then turned both breakers off and directed mine employees to dig a hole next to the main circuit breaker to expose the conduit that contained the damaged conductor. He intended to pull the damaged conductor from the conduit and replace it with a new conductor.

Ballard came to the main breaker about that time and instructed Martin to make sure the power was off. Martin checked and found both breakers were off. Soon thereafter, Ballard and Taylor decided to install a new conductor in an existing cable tray rather than pull it through the buried conduit. Mine employees were then directed to measure the distance from the main circuit breaker to the junction box.

At 1:50 p.m., Taylor returned to the open junction boxes under the control building. He apparently contacted an energized electrical circuit inside the Spokane 2 junction box. (MSHA investigators could not establish when or by whom the power was turned on.)

Ballard returned from the scale house at 2:00 p.m. and found Taylor lying on the ground near the open junction boxes under the secondary plant control building. Ballard approached Taylor, determined that he had been injured, and radioed the scale house for help. Ballard instructed Martin to check the secondary plant power. Martin stated he found the main circuit breaker off but did not check the Spokane 2 circuit breaker.

Ballard and Basancon removed Taylor from beneath the secondary plant control building. Mine employees performed cardio-pulmonary resuscitation on Taylor until emergency medical personnel arrived. Taylor was taken to a local hospital and was pronounced dead. Death was attributed to electrocution.

Terry Worley, mine safety and health inspector, arrived at the mine about 4:00 p.m. He checked both the main junction box and the Spokane 2 junction box and determined that both were de-energized prior to his arrival. Investigators were unable to determine who had turned off the Spokane 2 circuit breaker.

## **INVESTIGATION OF THE ACCIDENT**

MSHA was notified of the accident at 3:00 p.m., March 28, 2005, by a telephone call from Benjamin (Don) Patrick, corporate safety director to Ralph Rodriguez, supervisory mine safety and health inspector. An investigation was started that day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, made 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 county officials.

## DISCUSSION

### **Location of the Accident**

The accident occurred at the Spokane 2 circuit junction box beneath the secondary plant control building. Although weather conditions were sunny and warm, the ground in this area was damp from recent rainfall.

### **Secondary Plant**

The secondary plant consisted of several crushers, screens, conveyor belts, and screw conveyors. There were a total of 68 pieces of equipment in 9 different processing circuits. The Spokane 2 crusher was installed after the secondary plant was constructed and had operated for several years. The plant control building was built on vertical steel I-beams to place it about six feet above the ground. The area beneath the control building was bare ground and was open to the weather.

### **Electrical Service**

Electrical service to the secondary plant was purchased from a local electric cooperative at 7,200 volts to a utility-owned transformer that reduced the voltage to 480 volts. Two electrical feeder circuits for the secondary plant were connected to the transformer and were referred to as the main circuit and the Spokane 2 circuit.

### **Circuit Breakers**

The main circuit of the secondary plant was protected by a 2000-amp circuit breaker located in a box about 170 feet from the control building. This breaker protected all of the secondary plant equipment with the exception of the Spokane 2 crusher and was labeled "main". The Spokane 2 circuit was protected by an 800-amp circuit breaker located on a service pole about 10 feet from the main breaker. This breaker protected only the Spokane 2 crusher and was labeled "Spokane 2". Neither circuit breaker location was visible from the area beneath the secondary plant control building.

### **Junction Boxes**

Electrical conductors from the two circuit breakers ran in buried conduit to two junction boxes beneath one corner of the secondary plant control building. Each junction box was upright with the lower edge about 21 inches above ground level and the upper edge about 38 inches above ground level. The boxes were about two feet apart but were turned ninety degrees to each other. The front cover of each box was lying on the ground at the time of the accident.

### **Training**

Taylor was a master electrician with more than 26 years of experience. He had received site specific hazardous awareness training as required in 30 CFR, Part 46.

## ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified:

**Causal Factor:** Management policies, standards, and controls were inadequate. The mine operator did not provide Taylor with training on the electrical configuration of the secondary plant. Supervisors were unaware of which circuit was controlled by the Spokane 2 breaker.

**Corrective Action:** Management should provide in-depth training regarding the electrical configuration of the secondary plant to ensure that an electrician can safely troubleshoot and make necessary electrical repairs.

**Causal Factor:** The Spokane 2 circuit breaker was not de-energized, locked out, tagged, and tested before repairs were attempted. No procedures were in place to ensure that the task could be safely completed.

**Corrective Action:** Management should establish procedures to ensure power circuits are de-energized, locked out, tagged, and tested prior to performing work. Management should review the lockout procedures and conduct a risk assessment before electrical work is performed.

## CONCLUSION

The accident occurred because there were no safe operating procedures in place to ensure that the circuit breakers were de-energized, locked out, tagged, and the 480-volt circuit tested prior to performing any electrical work on individual circuits.

## ENFORCEMENT ACTIONS

**Order No. 6256164** was issued on March 28, 2005, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on March 28, 2005, while an electrician was conducting electrical tests at the secondary plant. This order is issued to assure the safety of all persons at this operation and prohibits all activity under the lower end of the secondary plant, including the control building and the incoming circuit breakers, until MSHA has determined that it is safe to resume normal operations. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area.

This citation was terminated on April 28, 2005, after the conditions that contributed to the accident no longer existed.

**Citation No. 6236813** was issued on April 27, 2005, under provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.12017:

A fatal accident occurred at this operation on March 28, 2005, when a circuit breaker was not locked out nor were other means taken to prevent the electrical circuit from being energized without the knowledge of the individuals working on it. The operator engaged in aggravated conduct constituting more than ordinary negligence in that management was aware that the circuit breaker was not locked out while an electrician worked on the electrical circuit. This violation was an unwarrantable failure to comply with a mandatory standard.

This citation was terminated on May 2, 2005, after the mine operator established lockout procedures and trained miners regarding the requirements of the procedures.

Approved: \_\_\_\_\_  
Edward E. Lopez  
District Manager

Date: \_\_\_\_\_

## APPENDIX A

### PERSONS PARTICIPATING IN THE INVESTIGATION

#### Capitol Aggregates Ltd.

Bart H. Ballard	plant manager
Lance M. Basancon	foreman
Andrew P. Cotten	safety director
Benjamin D. Patrick	corporate safety director

#### Mine Safety and Health Administration

Mark J. Albrecht	supervisory mine safety and health inspector
James R. Fitch	mine safety and health inspector
Dean F. Skorski	supervisory electrical engineer
Terry L. Worley	mine safety and health inspector

#### Burnet County

James P. McElroy	Justice of the Peace, precinct 2
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