

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

**REPORT OF INVESTIGATION**

**Underground Nonmetal Mine  
(Potash)**

**Fatal Electrical Accident  
August 6, 2008**

**Intrepid Potash East Mine  
Intrepid Potash NM, LLC  
Carlsbad, Eddy County, New Mexico  
Mine ID No. 29-00170**

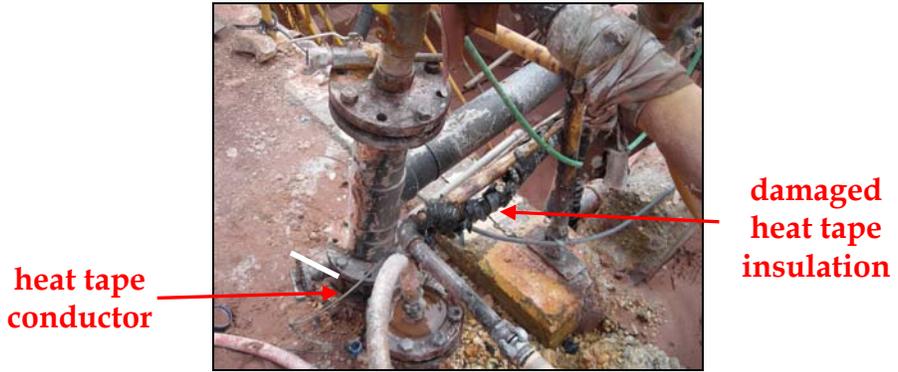
**Investigators**

**Laurence M. Dunlap  
Supervisory Mine Safety and Health Inspector**

**Daniel J. Haupt  
Supervisory Special Investigator**

**Thomas D. Barkand  
Electrical Engineer**

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



## OVERVIEW

Jeffrey R. Franklin, shift supervisor, age 38, was fatally injured on August 6, 2008, when he contacted conductors for a heat tape that had been installed in a shared conduit body with the conductors of a 480-volt circuit. Both the heat tape and circuit had been abandoned but neither of them had been removed. The 480-volt circuit was energized and short-circuited to the heat tape causing it to be energized to 277 volts to ground. The heat tape overheated and portions of the heat tape insulation melted away, leaving bare conductors. Franklin contacted the bare heat tape conductors or adjacent energized parts while checking water valves in the area around the heat tape.

The accident occurred because management policies and procedures failed to ensure that all potential electrical hazards in the plant were identified and corrected. The conduit body was not effectively grounded, the 480-volt circuit was not protected from overloads with a properly sized circuit breaker, the conductors inside the conduit body were not protected from mechanical damage, and the two abandoned circuits were not removed.

## **GENERAL INFORMATION**

Intrepid Potash East, an underground potash mine and surface processing plant, owned by Intrepid Potash NM LLC, was located about 26 miles east of Carlsbad, New Mexico. The principal operating official was Leonard Kaskiw, general manager. The mine operated 24 hours per day, 7 days per week using multiple shifts. Total employment was 306 persons.

Potash was mined from underground bedded deposits using continuous mining machines with shuttle car haulage from the face. Material was conveyed to a shaft where it was skip-hoisted to the surface. The ore was crushed, ground, and screened. Finished products were shipped to customers by railcar or truck and sold for agricultural use.

The last regular inspection at this operation was completed on May 28, 2008.

## **DESCRIPTION OF THE ACCIDENT**

On the day of the accident, Jeffrey R. Franklin (victim) reported for work at the control room at 5:45 p.m., his usual arrival time while working evenings. He reviewed several reports and met with Joseph Flores, mill operator. Franklin and Flores both left the control room about 7:00 p.m. to check a feed pump at the tailings pond.

Franklin called Carlos Buendia, control room operator, about 7:15 p.m. then left Flores to check other surface areas of the mine. Adan Gonzales, loader operator, saw Franklin's truck traveling on the tailings pond road about 7:30 p.m.

Buendia attempted to contact Franklin by radio and company sound system about 7:45 p.m. When Franklin did not respond, Richard Cahill, lead man, and Andrew Franco, mechanic, began a search. About 8:10 p.m., they found Franklin at the hydro-separator sump near the flocculent building. He was lying unconscious on the ground and was unresponsive.

Cahill called over the radio for help. Several employees responded to the area and attempted to resuscitate Franklin. He was transported to a local hospital where he was pronounced dead by the attending physician at 9:26 p.m. Death was attributed to electrocution.

## **INVESTIGATION OF THE ACCIDENT**

On the day of the accident, the Mine Safety and Health Administration (MSHA), was notified at 8:28 p.m. by a telephone call from Randy Logsdon, safety manager, to MSHA's emergency hotline. Daniel Haupt, supervisory special investigator, was notified and an investigation was started the same day. An order was issued pursuant to section 103(k) of the Mine Act to ensure the safety of miners.

MSHA's accident investigation team traveled to the mine, made 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 management and employees.

## **DISCUSSION**

### **Location of the Accident**

The accident occurred outside the flocculent building at the hydro-separator sump. The area was well illuminated. Brine and fresh water leaks from the valves and hose connections resulted in the area being wet. The weather was warm and partly cloudy and not considered to be a factor in the accident.

### **Electrical Circuits**

Four abandoned heat tape circuits originated on two terminal blocks in a distribution box located on the north side of the hydro-separator tank. The abandoned heat tape involved in the accident was a parallel self-regulating heater with a 2-wire circuit rated for 120 volts at 5 watts per foot at a maximum of 85 degrees Celsius and 32 amps. It had been installed on an abandoned 1-inch metal water pipe in the area of the hydro-separator sump. The heat tape had been wrapped around the metal pipe and covered with a layer of insulation.

Electrical power to the heat tape distribution box had been removed leaving only one white size #10 American Wire Gauge (AWG) conductor attached to the right terminal block. The white conductor extended through approximately 100 feet of 1-inch rigid conduit, including several rigid conduit bodies, back to a lighting transformer circuit breaker panel in the flocculent building. At the breaker panel, the end of the white conductor was taped and was not bonded to the system ground.

Two energized size #10 AWG 480-volt conductors for an abandoned 277-volt lighting fixtures circuit also originated at the lighting transformer breaker panel. The conductors were connected to the line (hot) side of the lighting transformer feed breaker. These conductors were in the same conduit as the white conductor until reaching the conduit body involved in the accident. The lighting fixtures had been removed, along with the conduit between them and the conduit body, leaving two openings in the conduit body.

The lighting transformer circuit received power from a distribution circuit located in the #4 motor control center (MCC) building, located approximately 406 feet away. The distribution circuit was protected by a 50-amp molded-case circuit breaker with a thermal magnetic trip. Two #8 AWG conductors connected the lighting circuit to the 50-amp breaker in the MCC building through buried conduit. Investigators determined that the 50-amp circuit breaker did not provide adequate protection.

A short circuit from the 480/277 volt circuit to the abandoned heat tape circuit occurred in a type Lr rigid conduit body installed on the end of the 1-inch conduit run located near the heat tape distribution box. The white conductor attached to the heat tape had been energized by one of the 480-volt phase conductors, resulting in the abandoned heat tape

being energized to 277 volts to ground. The white conductor and the inside surfaces of the conduit body showed signs of electrical arcing.

Once energized, the heat tape short-circuited (arc fault) to the metal pipe where a 4-inch polypropylene pipe was pressing the heat tape against the pipe. Brine and fresh water leaks from the valves and hose connections in the area of the accident had saturated the ground and heat tape. The heat tape jacket and conductor insulation were burned and charred for a length of about one foot and the heat tape conductor was observed arcing to the 1-inch metal pipe following the accident.

### **Test readings**

The equipment ground resistance between the type Lr conduit body, where the short circuit occurred, and the #4 MCC building was measured at 5.5 ohms. The resistance of the phase conductors (#8 and #10) between the conduit body and the 50-amp distribution breaker was measured at 0.4 ohms.

### **Training and Experience**

Jeffrey R. Franklin (victim) had 15 years and 24 weeks of mining experience, all at this mine. He had been a foreman for 1 year and 40 weeks and had received all 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 procedures failed to ensure that all potential electrical hazards were identified and corrected.

**Corrective Action:** Management should establish policies and procedures to ensure that all potential electrical hazards in the plant are identified and corrected.

## **CONCLUSION**

The accident occurred because management policies and procedures failed to ensure that all potential electrical hazards in the plant were identified and corrected. The conduit body was not effectively grounded, the 480-volt circuit was not protected from overloads with a properly sized circuit breaker, the conductors inside the conduit body were not protected from mechanical damage, and the two abandoned circuits were not removed.

## **ENFORCEMENT ACTIONS**

**ORDER No. 6460274** was issued on August 6, 2008, under the provisions of Section 103 (k) of the Mine Act:

A fatal accident occurred at this operation on August 6, 2008, when a miner was electrocuted. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the accident site until MSHA has determined that it is safe to

resume normal mining operations in the area. 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 order was terminated on August 12, 2008, after conditions that contributed to the accident no longer existed.

**Citation No. 6314986** was issued on August 21, 2008, under the provisions of Section 104(a) of the mine Act for a violation of 57. 12001:

A foreman was electrocuted at this operation on August 6, 2008 when an abandoned heat tape circuit became energized to 277 volts to ground due to 480/277-volt short circuits in a conduit body. The circuit breaker protecting the 480-volt circuit was not the proper capacity.

This citation was terminated on September 23, 2008, after the heat tape circuit and 480-volt circuit were removed.

**Citation No. 6314987** was issued on August 21, 2008, under the provisions of Section 104(a) of the mine Act for a violation of 57. 12004:

A foreman was electrocuted at this operation on August 6, 2008 when an abandoned heat tape circuit became energized to 277 volts to ground due to 480/277-volt short circuits in a conduit body. Two adjacent conduits had been removed creating openings to the atmosphere, which exposed 480-volt circuit conductors to mechanical damage.

This citation was terminated on September 23, 2008, after the heat tape circuit and 480-volt circuit were removed.

**Citation No. 6314988** was issued on August 21, 2008, under the provisions of Section 104(a) of the mine Act for a violation of 57. 12025:

A foreman was electrocuted at this operation on August 6, 2008 when an abandoned heat tape circuit became energized to 277 volts to ground due to 480/277-volt short circuits in a conduit body. The metal conduit body where the short circuits occurred was not effectively grounded.

This citation was terminated on September 23, 2008, after the conduit and conduit body were removed.

Approved: \_\_\_\_\_

Edward E. Lopez  
District Manager

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

## APPENDIX A

### PERSONS PARTICIPATING IN THE INVESTIGATION

#### **Intrepid Potash NM LLC**

Randy K. Logsdon.....safety manager  
Gerald W. Goad.....surface superintendent  
Keith D. Williams.....surface electrical engineer  
Wilson R. Vanloon.....lead electrician

#### **Jackson Kelly PLLC**

Karen L. Johnston.....attorney

#### **Western Engineering & Research Corporation**

Jeffrey L. Sellon.....electrical engineer

#### **Mine Safety and Health Administration**

Thomas D. Barkand.....electrical engineer  
Laurence M. Dunlap.....supervisory mine safety and health inspector  
Daniel J. Haupt.....supervisory special investigator

## APPENDIX B

Accident Investigation Data - Victim Information												U.S. Department of Labor																																			
Event Number: 1 0 5 4 1 5 0												Mine Safety and Health Administration																																			
<b>Victim Information: 1</b>																																															
1. Name of Injured/Ill Employee: <i>Jeffrey R. Franklin</i>			2. Sex: <i>M</i>		3. Victim's Age: <i>38</i>		4. Degree of Injury: <i>01 Fatal</i>																																								
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 08/06/2008 b. Time: 19:50</i>						6. Date and Time Started: <i>a. Date: 08/06/2008 b. Time: 18:00</i>																																									
7. Regular Job Title: <i>149 shift supervisor</i>				8. Work Activity when Injured: <i>036 checking water valves</i>				9. Was this work activity part of regular job?																																							
			Yes			<input checked="" type="checkbox"/>			No																																						
10. Experience			Years			Weeks			Days			b. Regular			Years			Weeks			Days			c. This			Years			Week			Days			d. Total			Years			Weeks			Days		
a. This												b. Regular												c. This									d. Total														
Work Activity:			<i>1</i>			<i>40</i>			<i>0</i>			Job Title:			<i>1</i>			<i>40</i>			<i>0</i>			Mine:			<i>15</i>			<i>24</i>			<i>0</i>			Mining:			<i>15</i>			<i>24</i>			<i>0</i>		
11. What Directly Inflicted Injury or Illness? <i>042 electrical conductors</i>												12. Nature of Injury or Illness: <i>210 electroction</i>																																			
13. Training Deficiencies:																																															
Hazard:												New/Newly-Employed Experienced Miner:						Annual:						Task:																							
14. Company of Employment: (If different from production operator) <i>Operator</i>												Independent Contractor ID: (if applicable)																																			
15. On-site Emergency Medical Treatment:																																															
Not Applicable:												First-Aid:						CPR:						EMT:						Medical Professional:						None:											
												<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>																													
16. Part 50 Document Control Number: (form 7000-1) <i>220082250016</i>												17. Union Affiliation of Victim: <i>9999</i>						None (No Union Affiliation)																													
<b>Victim Information:</b>																																															
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:																																									
7. Regular Job Title:				8. Work Activity when Injured:				9. Was this work activity part of regular job?																																							
			Yes			<input type="checkbox"/>			No																																						
10. Experience:			Years			Weeks			Days			b. Regular			Years			Week			Days			c. This			Years			Week			Days			d. Total			Years			Weeks			Days		
a. This												b. Regular												c. This									d. Total														
Work Activity:												Job Title:												Mine:									Mining:														
11. What Directly Inflicted Injury or Illness?												12. Nature of Injury or Illness:																																			
13. Training Deficiencies:																																															
Hazard:												New/Newly-Employed Experienced Miner:						Annual:						Task:																							
14. Company of Employment: (If different from production operator)												Independent Contractor ID: (if applicable)																																			
15. On-site Emergency Medical Treatment:																																															
Not Applicable:												First-Aid:						CPR:						EMT:						Medical Professional:						None:											
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			Yes			<input type="checkbox"/>			No																																						
10. Experience:			Years			Weeks			Days			b. Regular			Years			Week			Days			c. This			Years			Week			Days			d. Total			Years			Weeks			Days		
a. This												b. Regular												c. This									d. Total														
Work Activity:												Job Title:												Mine:									Mining:														
11. What Directly Inflicted Injury or Illness?												12. Nature of Injury or Illness:																																			
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Hazard:												New/Newly-Employed Experienced Miner:						Annual:						Task:																							
14. Company of Employment: (If different from production operator)												Independent Contractor ID: (if applicable)																																			
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16. Part 50 Document Control Number: (form 7000-1)												17. Union Affiliation of Victim:																																			