

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

REPORT OF INVESTIGATION

**Underground Nonmetal Mine
(Marble)**

**Fatal Fall of Roof Accident
October 17, 2008**

**Marble Hill Mine
O-N Minerals (Filler Products) Company
Ellijay, Gilmer County, Georgia
Mine I.D. No. 09-01038**

Investigators

**Donald L. Ratliff
Supervisory Mine Safety and Health Inspector**

**Roger W. Rowe
Mine Safety and Health Inspector**

**Sandin E. Phillipson, Ph.D.
Geologist**

**Wayne L. Maxwell
Mine Safety and Health Specialist**

**Originating Office
Mine Safety and Health Administration
Southeastern District
135 Gemini Circle, Suite 212 Birmingham, Alabama 35209
Wyatt S. Andrews, Acting District Manager**



OVERVIEW

Tony A. Cruse, scaler operator, age 45, was fatally injured on October 17, 2008, when a large rock fell from the roof crushing the cab of the track mounted excavator he was operating. Cruse was scaling a rib and roof in a heading of the mine when the rock fell from the roof.

The accident occurred because management failed to follow established procedures to ensure that persons could safely scale the roof. The height of the heading exceeded the mining height established in the mine's ground support plan. This additional height required scaling to be performed from a location that exposed the scaler operator to the hazard of being positioned under loose material.

Management was aware that ground conditions were adverse in the area of the accident. In August 2008, management had investigated a roof fall that occurred in an adjacent heading. This fall destroyed a scaler and injured one person. No additional controls, as recommended by a consulting firm, were implemented.

GENERAL INFORMATION

Marble Hill Mine, an underground multi-level marble mine, was owned and operated by O-N Minerals (Filler Products) Company. The mine was located approximately four miles south of Ellijay, Gilmer County, Georgia. The principal operating official was Thomas Buck, president and CEO. The mine normally operated two ten hour shifts per day, five days per week. Total employment was 24 persons.

Marble was drilled and blasted from multiple drifts. Material was removed from the faces with a front-end loader and transported in haul trucks to the surface where it was crushed and sized in the mill and sold as a filler product for various industries.

The last regular inspection was completed on August 28, 2008.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Tony A. Cruse (victim) reported to work at 6:00 a.m., his normal starting time. Robert Coleman, mine foreman, assigned Cruse to go underground, fuel the scaler, and scale Level 9 - North 8 Heading. Cruse began scaling in North 8 Heading. He scaled the roof and ribs advancing north toward the face. Cruse advanced to within 30 feet of the face and was scaling the east rib when the fall occurred.

Cruse was last observed scaling at 9:00 a.m. by Jeremy Hedden, truck driver, as he drove by the area on the way from the surface to an active mining area on Level 10. On his way out of the mine, Hedden passed by the area at 10:00 a.m. and saw the rock on top of the scaler Cruse was operating.

Hedden radioed for help but the call would not transmit at that location. He left the accident area and drove toward the surface to radio Coleman. Coleman answered the call and reported the accident to Scott Chancey, production manager. Emergency medical personnel were called. Chancey, Coleman, and Hedden met and then traveled to the accident site. When they arrived, Chancey and Coleman saw rock on the scaler. They walked around both sides of the scaler and observed that Cruse was nonresponsive.

Coleman and Chancey returned to the surface and waited for additional management personnel, Mine Safety and Health Administration (MSHA) investigators, and mine rescue teams to arrive. Management evaluated the accident scene and devised a recovery plan. Miners, tools, and equipment were transported to the site. The Gilmer County Extrication Team went underground to assist.

The scaler was eventually connected to a haul truck and pulled to a safe location approximately 170 feet from the face. The Gilmer County Extrication Team recovered Cruse from the cab of the scaler at 5:11 p.m. The victim was transported to the surface where he was pronounced dead by the Gilmer County Coroner at 5:50 p.m. The cause of death was blunt force trauma.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 10:10 a.m., on October 17, 2008, by a telephone call from David Tant, area loss prevention manager, to Gerald Smith, mine safety and health inspector. An order was issued under provisions of 103(k) of the Mine Act to ensure the safety of the miners. An investigation was started the same day.

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 management and employees, the Gilmer County Sheriff's Office, Emergency Medical Services, Emergency Management Agency, Fire and Rescue, and the Coroner's office. The Cobb County Emergency Management Agency also assisted in the investigation.

DISCUSSION

Geology

The Marble Hill Mine was developed in the Murphy Marble formation. Marble was extracted using the room and pillar mining method. The formation trended N 10° E and dipped 45° toward the east. The mine was developed on multiple, horizontal levels, each of which followed the trend of the marble bed. The levels were stacked vertically above each other but spaced nominally 50 feet apart.

The mine was accessed by a drift from the surface. Ten successive levels stepped down toward the east along the dip of the marble bed. The deepest level planned was Level 11. Limited development work had been performed on each level which was temporarily abandoned when the next successive level was reached. Full development to the property boundaries was intended for each level in succession once the bottom level had been reached. Mining along strike and with dip was constrained by vertical projections of property boundaries. Each level was driven nominally with five parallel drifts, utilizing planned dimensions of 40-foot x 40-foot pillars and 40-foot widths for drifts and crosscuts. Planned mining height was 25-27 feet.

Due to variations in development and assuming an average 30-foot mining height, the thickness of sill pillars between subjacent levels ranged from 31 to 76 feet. The top two levels provided access and the first production level was Level 4.

Actual mining widths were measured on Level 9 with a laser range finder. The headings were 35-43 feet wide, with an average width of 40 feet. Mining heights on Level 9 ranged from 25-34 feet but were more commonly 30-31 feet. Level 9 North 8 Heading was approximately 600 feet below the surface at the accident site.

The thickness of the sill pillar between Level 9 and the overlying Level 8 was 45 feet assuming an average 30-foot mining height on Level 9. The measured height in Level 9 North 8 Heading was as much as 34 feet resulting in a sill pillar thickness of 41 feet.

Location of the Accident

The accident occurred on Level 9 North 8 Heading approximately 30 feet from the face. The face was located approximately 200 feet north of the last open crosscut. The fall of roof was a single, triangular block that measured approximately 26 feet long, 4 feet high (at the triangle apex), and 10 feet wide (at the base of the triangle), corresponding to the triangular shaped cavity in the roof.

The fallen rock broke into four large pieces and several small pieces on impact. The combined weight of the rocks was approximately 42 tons. The fallen block was defined by the intersection of bedding planes that strike N 15° E and dip 45° E, and joints that strike N 20° W and dip 20° W, creating a diamond-shaped cross section of rock. The roof of the drift was characterized by a saw-toothed profile formed by diamond-shaped blocks that had fallen from the roof either during scaling or as a result of blasting.

Ground Support Policy

Scaling was performed with a mechanical scaler and no roof bolting was performed. Typically the roof was scaled starting outby the mined area with the scaler located in or near the center of the heading. The roof and ribs were scaled as the scaler advanced toward the face until scaling was complete. The scaler was turned around and any loose rock not removed initially was scaled on the way out of the heading. The same ground control procedure was used since the mine was developed in 1990.

In August 2008, a similar roof fall occurred on Level 9 North 7 Heading, an adjacent heading, that injured the operator of the scaler and destroyed the machine. An investigation was conducted and a consulting firm was contracted to review the roof conditions in the mine. The firm recommended additional controls if mining was to continue north on Level 9 but these recommendations were not implemented by management. Neither the mine's ground support policy nor the consultant's roof control recommendations were followed in the North 8 Heading where the accident occurred.

Scaler

The scaler involved in the fatal accident was a 324D L Caterpillar track mounted excavator. The excavator was equipped with a 19 feet 4 inch reach boom and an optional 9 feet 8 inch stick. The loader bucket had been removed from the stick and a rock pick attachment was installed. The rock pick was approximately 8 feet 6 inches long and was used to pry loose material from the roof and ribs. The maximum reach of the boom, stick, and pick was approximately 36 feet as measured on a similar equipped excavator.

The excavator was equipped with a standard lighting system consisting of three 24-volt lights each with 65 Watt bulbs. Two lights were attached to the boom and the other light was attached to the front chassis.

Training and Experience

Tony A. Cruse, victim, had eight years, six weeks of mining experience and had four years and 33 weeks of experience as a scaler. 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: Management did not ensure that scaling was performed from a location that did not expose persons to injury from falling material.

Corrective Action: Management should establish and implement procedures to ensure that persons can safely scale the roof. All persons should be trained in these procedures and monitored to ensure the procedures are followed.

Root Cause: Management failed to ensure that established ground control policies were being followed. Specifically, the height of the headings were not being maintained 25' to 27' high as established by management's ground control policy.

Corrective Action: Management should ensure that established policies and procedures to control the ground are followed. All persons should be trained regarding the mining plans. Mining heights should be monitored to ensure the plans are being adhered to.

CONCLUSION

The accident occurred because management failed to follow established procedures to ensure that persons could safely scale the roof. The height of the heading exceeded the mining height established in the mine's ground support plan.

The accident occurred because management failed to follow established procedures to ensure that persons could safely scale the roof. The height of the heading exceeded the mining height established in the mine's ground support plan. This additional height required scaling to be performed from a location that exposed the scaler operator to the hazard of being positioned under loose material.

Management was aware that ground conditions were poor in the area of the accident. Management had investigated a fall of the roof that occurred in August, 2008, in an adjacent heading. This fall destroyed a scaler and injured one person. No additional controls, as recommended by a consulting firm, were implemented.

ENFORCEMENT ACTIONS

Order No. 6054408 was issued on October 17, 2008, under the provisions of Section 103(k) of the Mine Act:

A verbal 103(k) order was issued on October 17, 2008, at 10:35 a.m. by Gerald Smith, Mine Safety and Health Inspector. A fatal accident occurred at the Marble Hill Mine on 10/17/2008 when the scaler operator was scaling on Level 9 North 8 with a Caterpillar 324 Excavator. This

order is issued to assure the safety of all persons at this operation. It prohibits all activity at the Level 9 North 8 area of the mine, also prohibits the use of the Caterpillar 324 Excavator 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 the affected area.

The order was terminated on January 6, 2009. All mining on Level 9 was discontinued.

Citation No. 6086741 was issued on January 6, 2009, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR, 57.3201:

A fatal accident occurred at this operation on October 17, 2008, when a scaler operator was crushed by a large rock while scaling in Level 9 North 8 Heading. Scaling was being performed from a location that exposed the scaler operator to falling material. The roof at the accident site was 34 feet high requiring the scaler operator to be positioned under the loose material. Management engaged in aggravated conduct constituting more than ordinary negligence. The height of the entry exceeded the safe working height of the scaling machine, exposing the scaler operator to the hazard of falling material.

This citation was terminated on January 22, 2009, after the operator established and trained miners on safe scaling procedures. The operator developed and submitted a mining plan that detailed a maximum mining height of 25 feet.

Order No. 6086742 was issued on January 6, 2009, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR, 57.3360:

A fatal accident occurred at this operation on October 17, 2008, when a scaler operator was crushed by a large rock while scaling in Level 9 North 8 Heading. Ground support was not being used to control the roof of North 8 Heading although ground conditions and experience indicated that it was necessary. In August, 2008, a similar roof fall had occurred in North 7 Heading (an adjacent heading) injuring one person and destroying a scaling machine.

An investigation was conducted and a consulting firm recommended additional controls, but no ground support controls were implemented. Additionally, management engaged in aggravated conduct constituting more than ordinary negligence by not implementing the recommendations necessary or taking other actions to prevent a second roof fall.

This citation was terminated on January 22, 2009, after the operator established and trained miners on safe scaling procedures and the company's mining plan that detailed a maximum mining height of 25 feet. The area of the mine where adverse ground conditions existed which contributed to the fatal accident has been barricaded and abandoned.

Approved: Date:
Wyatt S. Andrews
Acting District Manager

APPENDICES

- A. Persons Participating in the Investigation
- B. Schematic of the Accident Area
- C. Schematic of the Roof at Accident Site/Photo of the Rock
- D. Victim Data Sheet

APPENDIX A

Persons Participating in the Investigation

O-N Minerals (Filler Products) Company

Charles H. Richards, Jr.	general manager
Scott E. Chancey	operations manager
Edward L. Stiles	mine manager
Robert W. Coleman	mine foreman
David P. Tant	EHS manager
Jeremy P. Hedden	haul truck driver

Yancy Bros. Co.

Goff Owen III	machine sales & rental representative
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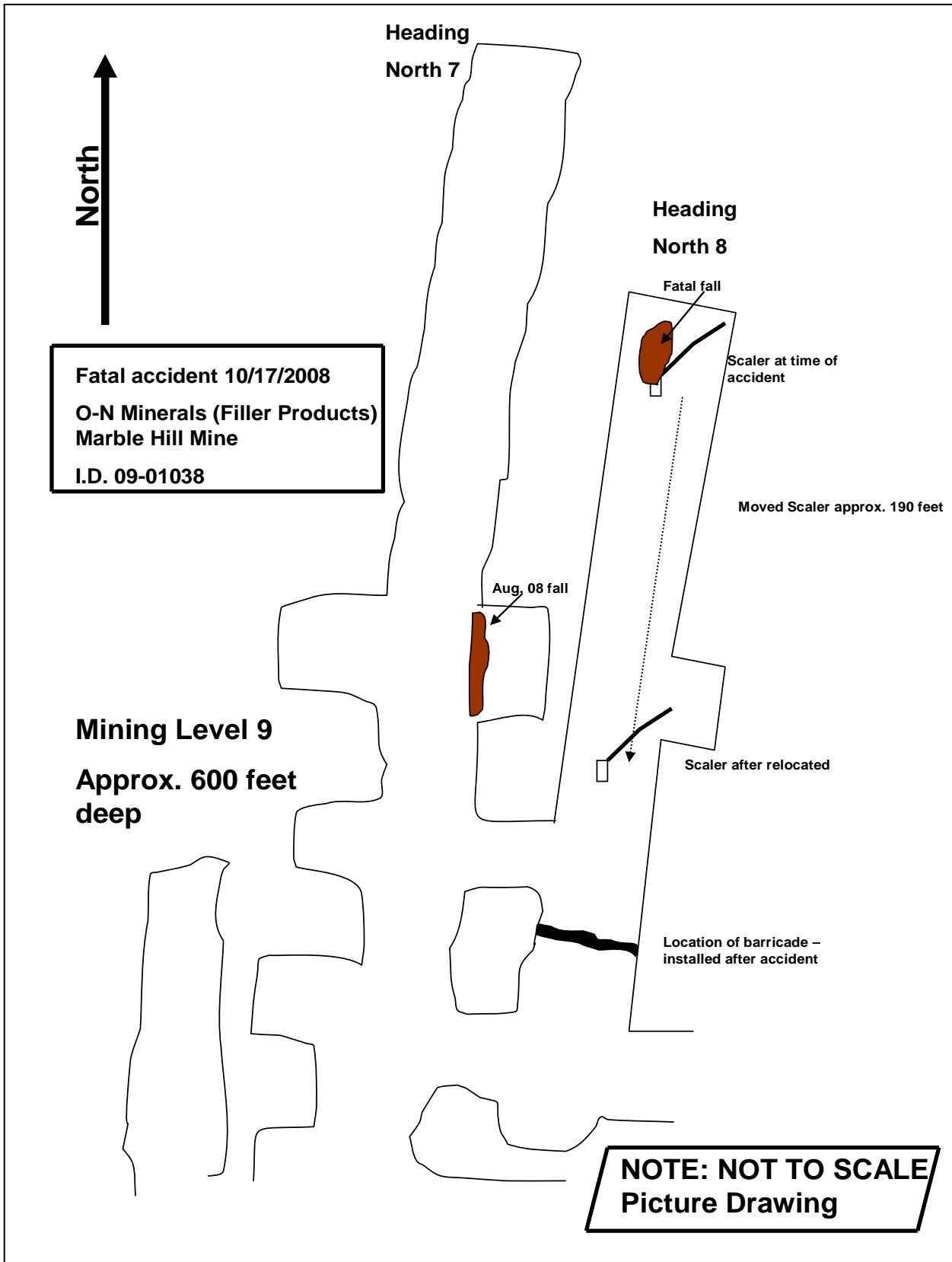
Gilmer County Commissioner's Office

Robert Webber	emergency services director
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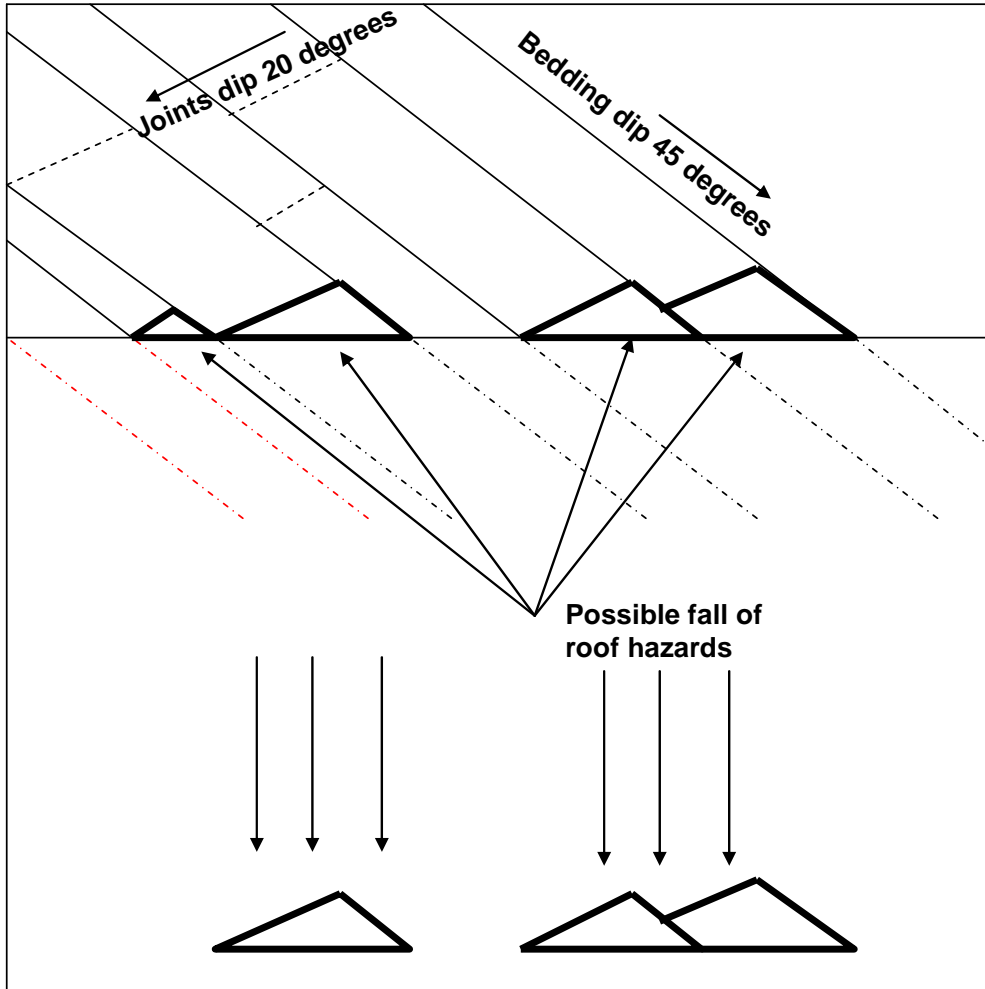
Mine Safety and Health Administration

Donald L. Ratliff	supervisory mine safety and health inspector
Roger W. Rowe	mine safety and health inspector
Sandin E. Phillipson, Ph.D	geologist
Wayne L. Maxwell	mine safety and health specialist

APPENDIX B



APPENDIX C



APPENDIX D

Accident Investigation Data - Victim Information

U.S. Department of Labor
Mine Safety and Health Administration



Event Number: 0 9 4 6 8 1 1

Victim Information: 1

1. Name of Injured/Ill Employee: <i>Tony A. Cruse</i>		2. Sex: <i>M</i>	3. Victim's Age: <i>45</i>	4. Degree of Injury: <i>01 Fatal</i>	
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 10/17/2008 b. Time: 10:00</i>			6. Date and Time Started: <i>a. Date: 10/17/2008 b. Time: 7:00</i>		
7. Regular Job Title: <i>078 Scaler</i>		8. Work Activity when Injured: <i>098 Mechanical Scaling</i>		9. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
10. Experience a. This Work Activity: <i>4</i> <i>33</i> <i>0</i>		b. Regular Job Title: <i>4</i> <i>33</i> <i>0</i>		c. This Mine: <i>8</i> <i>6</i> <i>6</i>	
11. What Directly Inflicted Injury or Illness? <i>121 Rock from the roof</i>		12. Nature of Injury or Illness: <i>170 Crushing Trauma</i>			
13. Training Deficiencies: Hazard: <i>New/Newly-Employed Experienced Miner:</i> 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: <input checked="" type="checkbox"/> First-Aid: CPR: EMT: Medical Professional: None:					
16. Part 50 Document Control Number: (form 7000-1)			17. Union Affiliation of Victim: <i>9999</i> <i>None (No Union Affiliation)</i>		