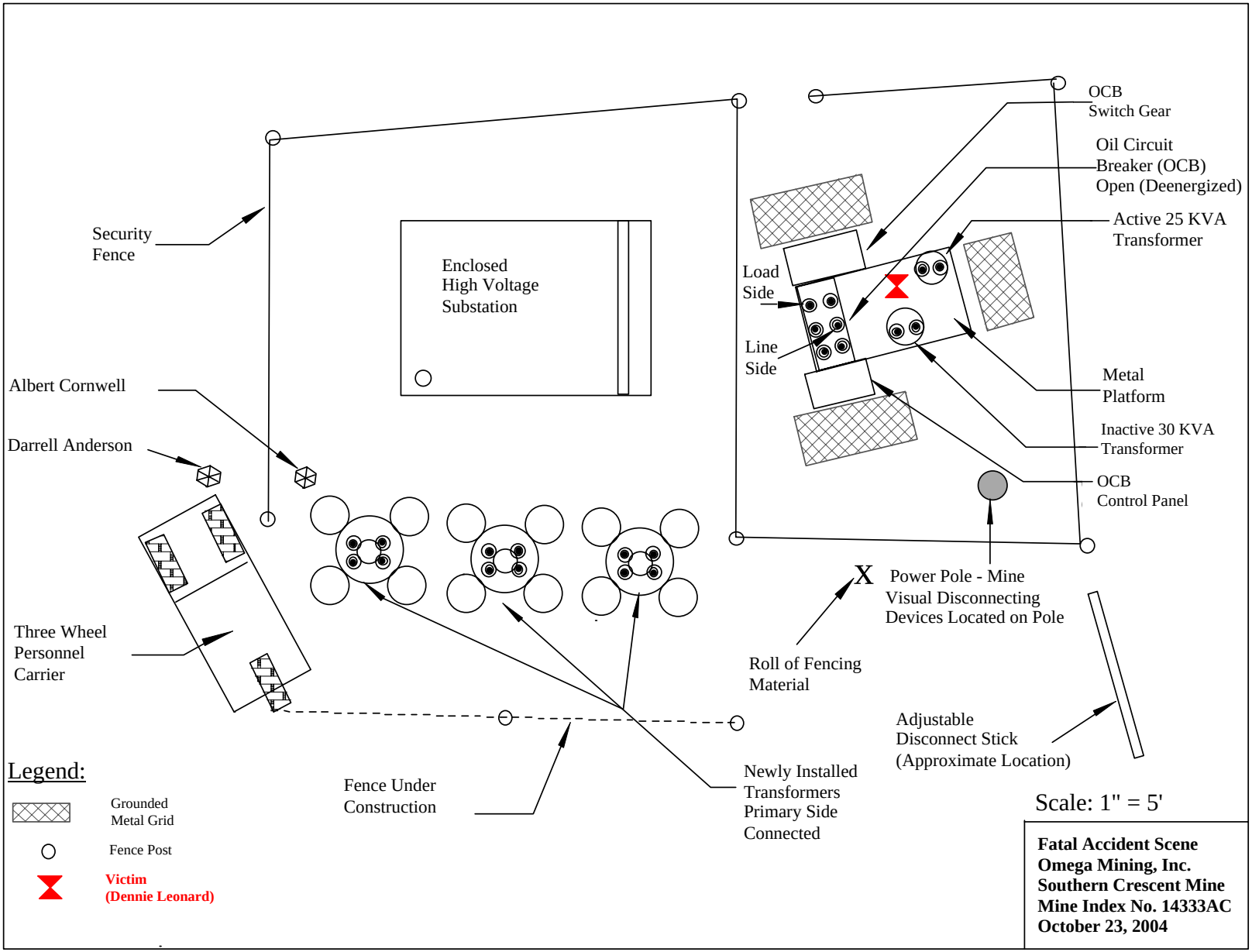
Virginia Department of Mines, Minerals & Energy
Division of Mines

Accident Investigation Report
Surface of Underground Coal Mine

Fatal Electrical Accident
October 23, 2004

Omega Mining, Inc.
Southern Crescent Mine
Mine Index No. 14333AC
Russell County, Virginia

CONTENTS


Security Fence
Enclosed High Voltage Substation
OCB Switch Gear
Oil Circuit Breaker (OCB) Open (Deenergized)
Active 25 KVA Transformer
Load Side
Line Side
Metal Platform
Inactive 30 KVA Transformer
OCB Control Panel
Albert Cornwell
Darrell Anderson
Three Wheel Personnel Carrier
X
Power Pole - Mine Visual Disconnecting Devices Located on Pole
Roll of Fencing Material
Adjustable Disconnect Stick (Approximate Location)
Fence Under Construction
Newly Installed Transformers Primary Side Connected
Legend:
Grounded Metal Grid
Fence Post
Victim (Dennie Leonard)
Scale: 1" = 5'
Fatal Accident Scene
Omega Mining, Inc.
Southern Crescent Mine
Mine Index No. 14333AC
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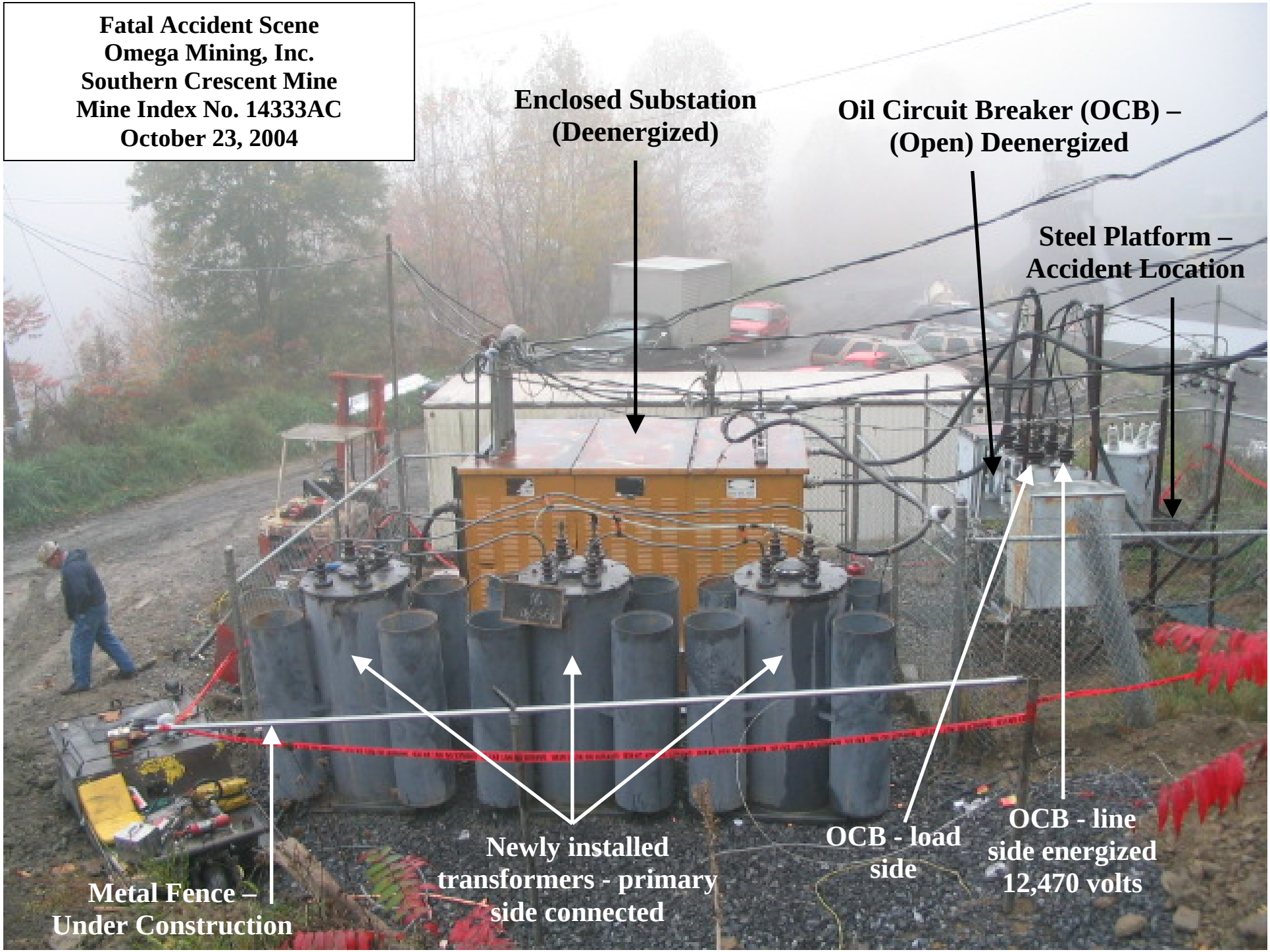
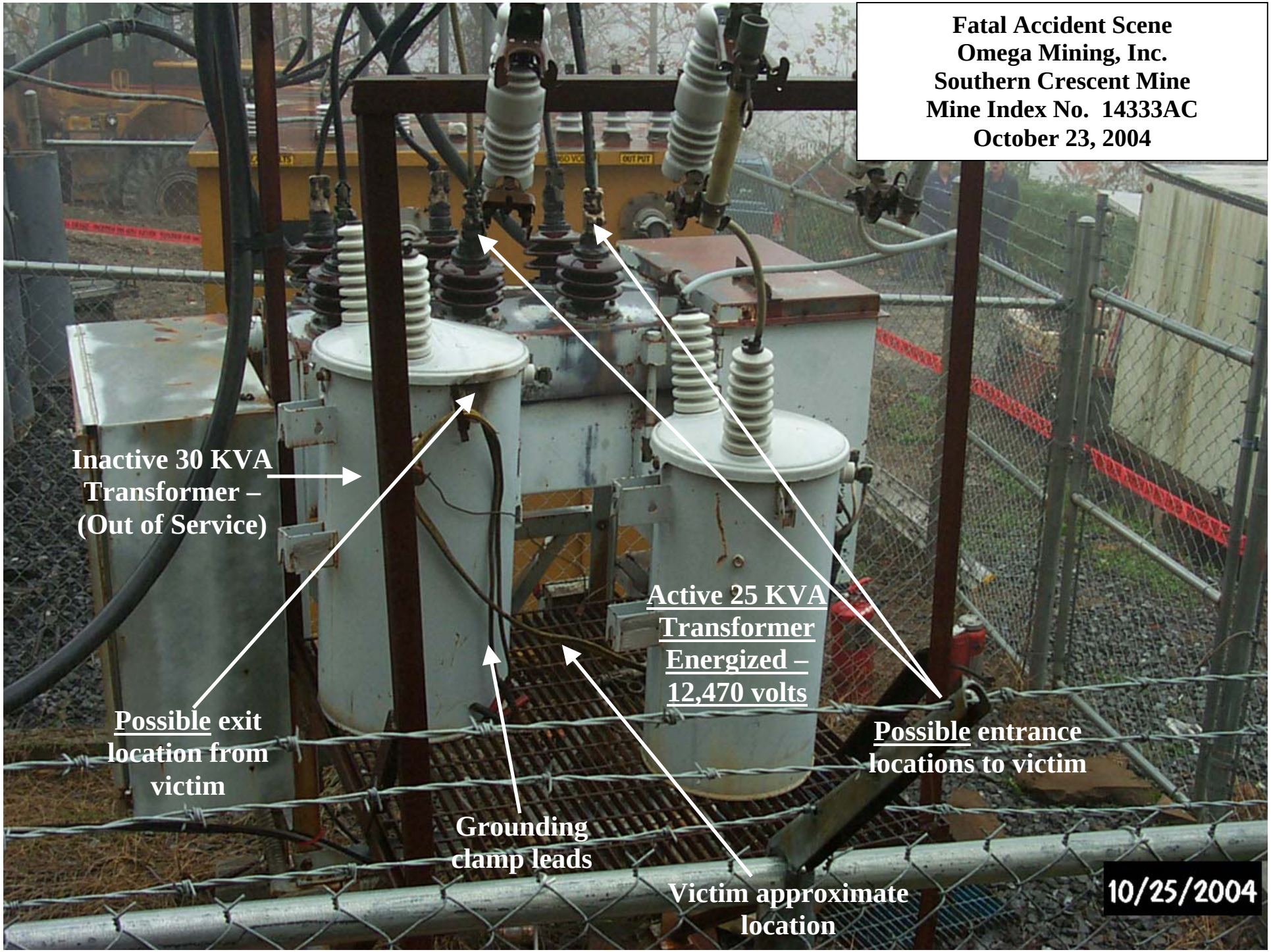
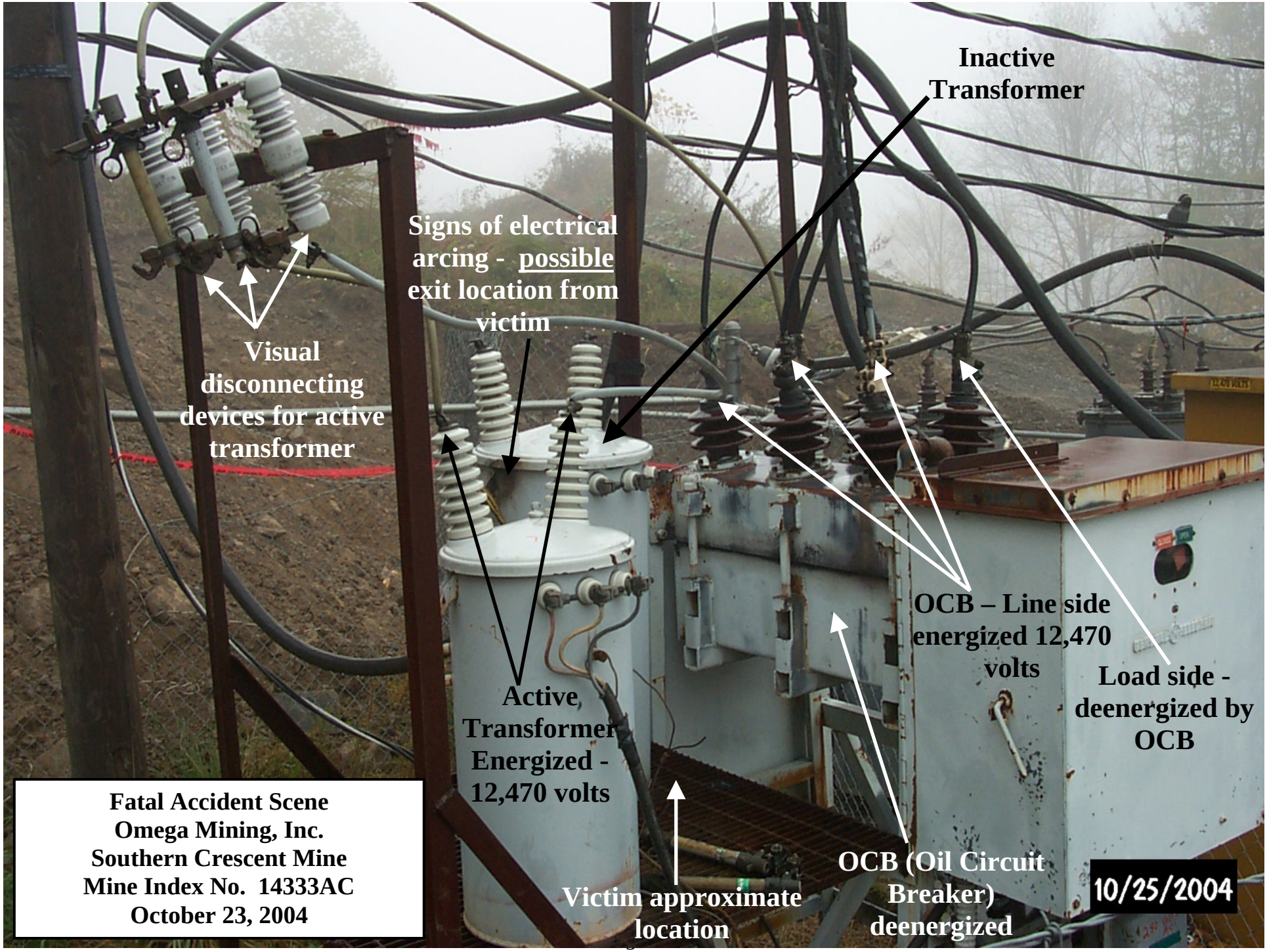
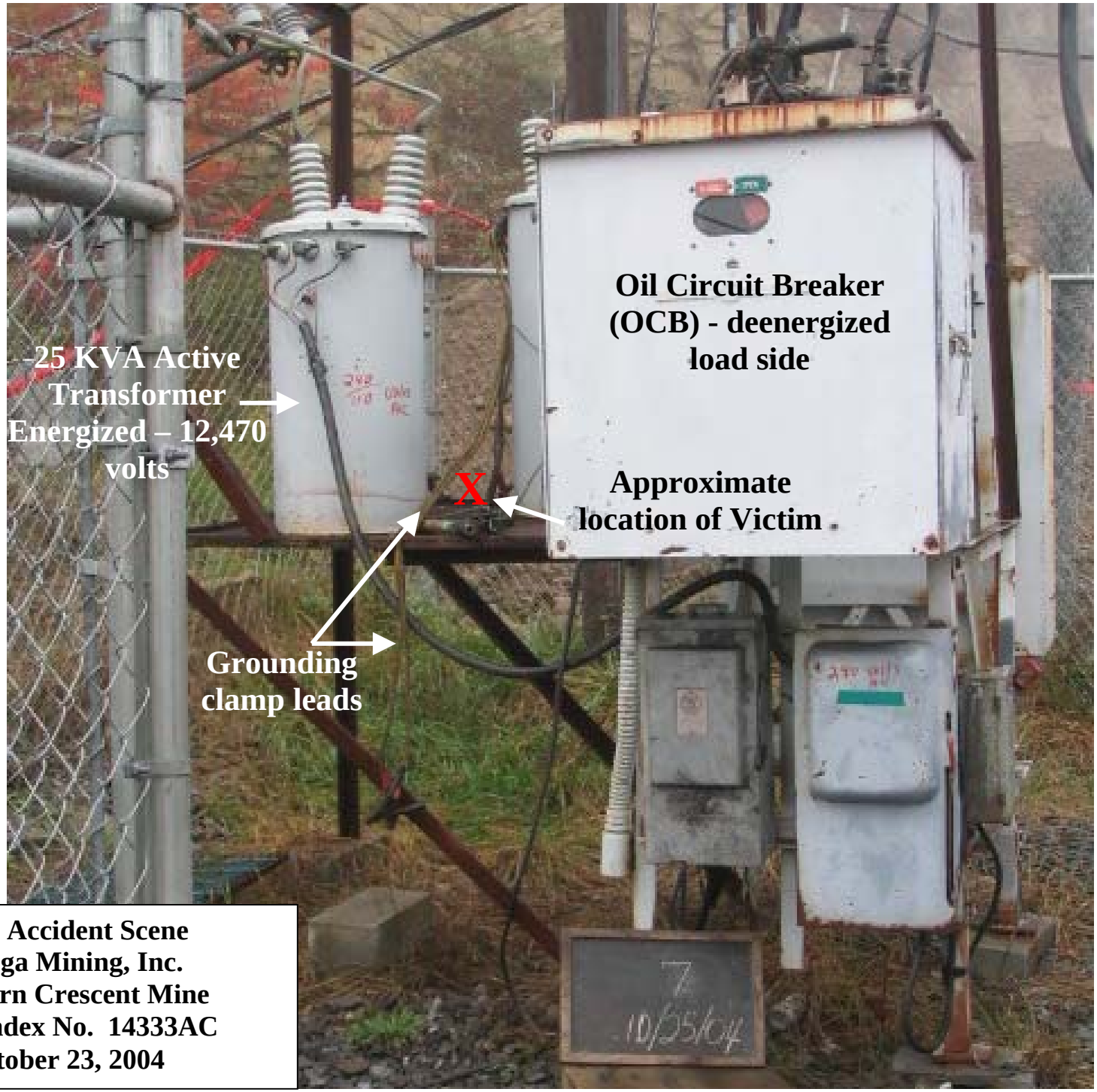



Fatal Accident Scene
Omega Mining, Inc.
Southern Crescent Mine
Mine Index No. 14333AC
October 23, 2004
Inactive 30 KVA Transformer – (Out of Service)
Active 25 KVA Transformer Energized – 12,470 volts
Possible exit location from victim
Possible entrance locations to victim
Grounding clamp leads
Victim approximate location
10/25/2004


Inactive Transformer
Signs of electrical arcing - possible exit location from victim
Visual disconnecting devices for active transformer
Active Transformer Energized - 12,470 volts
OCB – Line side energized 12,470 volts
Load side - deenergized by OCB
Victim approximate location
OCB (Oil Circuit Breaker) deenergized
10/25/2004
Fatal Accident Scene
Omega Mining, Inc.
Southern Crescent Mine
Mine Index No. 14333AC
October 23, 2004



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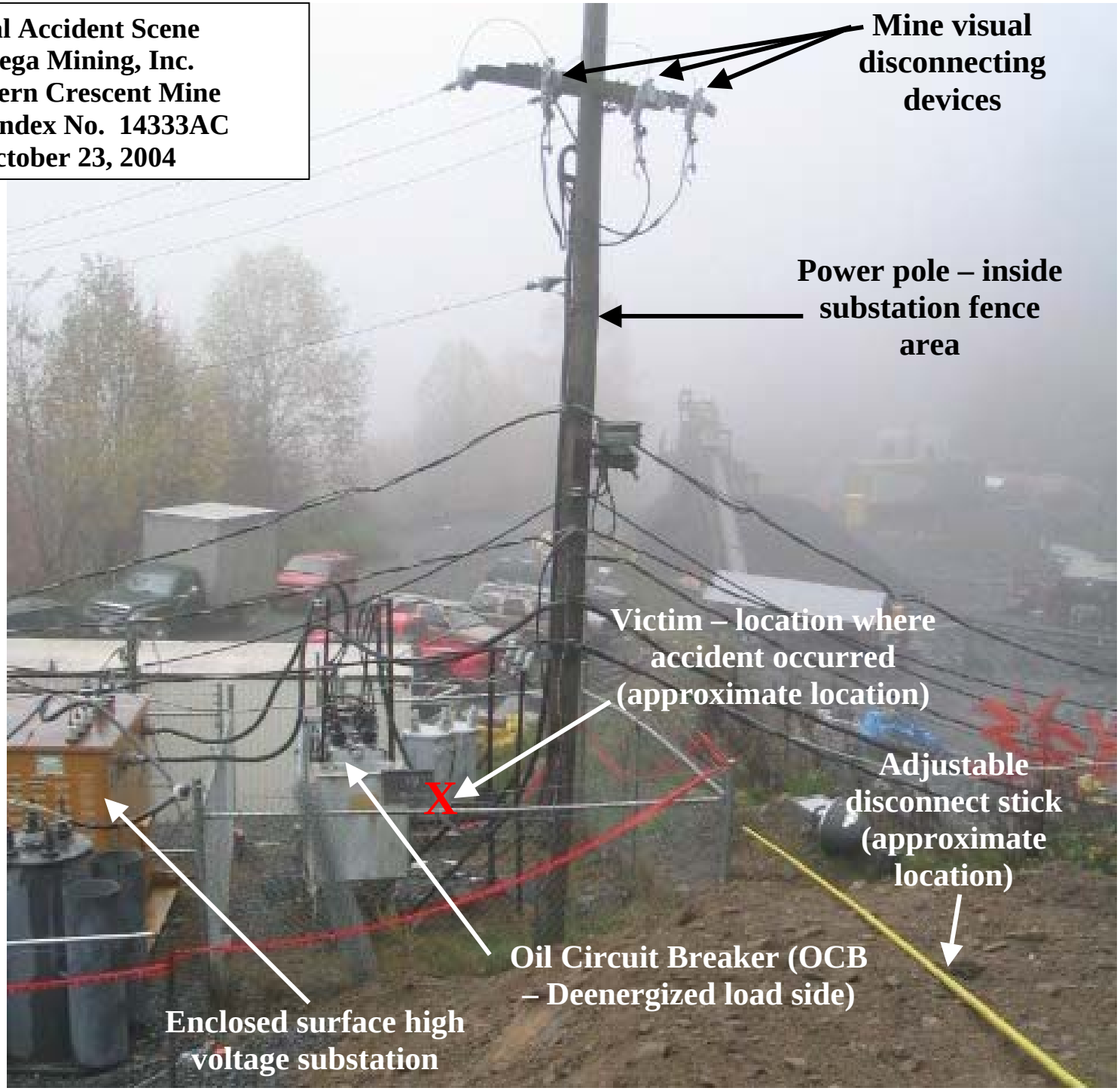

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Southern Crescent Mine
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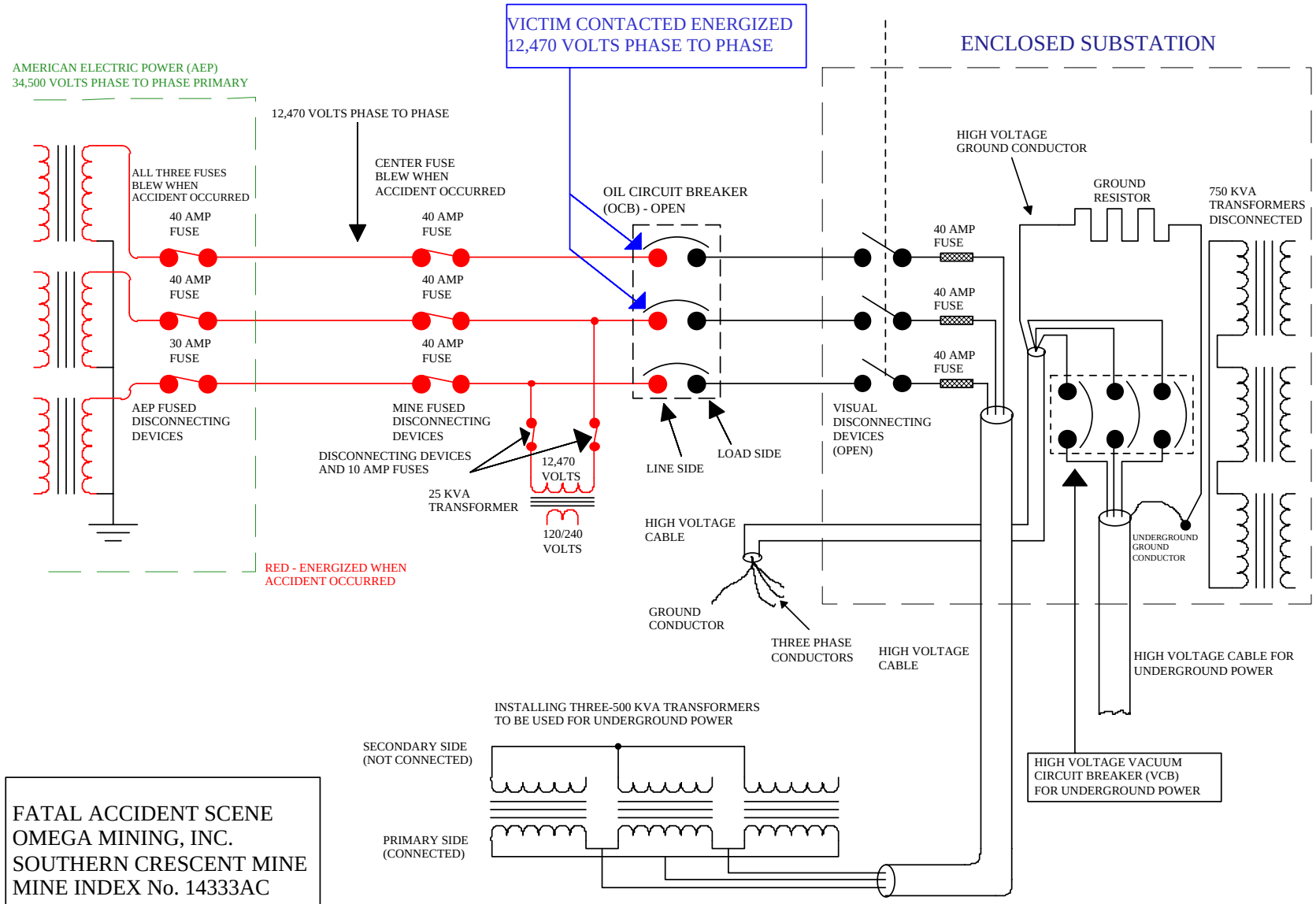

FATAL ACCIDENT SCENE
OMEGA MINING, INC.
SOUTHERN CRESCENT MINE
MINE INDEX No. 14333AC
OCTOBER 23, 2004

ELECTRICAL ACCIDENT FATALITY INVESTIGATION REPORT
OMEGA MINING, INC.
SOUTHERN CRESCENT MINE
MINE INDEX NO. 14333AC

On October 23, 2004, at approximately 4:40 p.m., a surface high voltage electrical power accident occurred at the Omega Mining, Inc., Southern Crescent Mine, Mine Index No. 14333AC. Mr. Dennie Ray Leonard, Chief Electrician, received serious electrical burn injuries when he came in contact with an energized 12,470 volt, phase to phase, alternating current (AC) high voltage power circuit located inside an open-type surface high voltage substation. On October 29, 2004, Mr. Leonard died as a result of these serious burn injuries. Mr. Leonard was making preparations to ground an energized 12,470 volt, phase to phase, circuit that he apparently thought was deenergized. Mr. Leonard, age 56, had approximately 39 years total mining experience, and four months experience with the present company at the Southern Crescent Mine. The Department of Mines, Minerals and Energy's (DMME) Division of Mines was notified of the accident at approximately 5:50 p.m. on October 23, 2004, and a joint investigation with the Federal Mine Safety and Health Administration was initiated the same day. The mine is scheduled to receive four regular inspections per year. The last regular inspection was completed on August 27, 2004.

COMMENTARY

Omega Mining, Inc., Southern Crescent Mine is located off State Route 624 in the Drill area of Russell County, Virginia. This underground mine is a one-section drift mine developed approximately 1,200 feet in the Lower Banner coal seam. Approximately 650 tons of raw coal are produced daily using two continuous mining machines and shuttle cars. Mining personnel produce coal on the day and evening shifts with maintenance work being performed on the third shift. The mine employs twenty-three miners underground, and four miners on the surface.

On Saturday, October 23, 2004, the dayshift production crew arrived at the mine between 6:30 a.m. and 7:00 a.m. Work activities planned for the day included underground maintenance and clean-up work, and completion of an electrical up-grade at the surface high voltage substation. The electrical up-grade work consisted of installing three open-type 500 kilovoltamp (KVA) oil-filled transformers to replace the three 250 KVA transformers located inside the enclosed high voltage substation. The underground crew entered the mine at approximately 7:00 a. m., under the supervision of Mr. Ralph Campbell, section mine foreman, to perform their assigned tasks. Three workmen remained on the surface to complete wiring of the newly installed transformers, and to complete erecting a security fence around the transformer area. The surface crew consisted of Mr. Leonard, Mr. Darrell Anderson, electrical repairman, and Mr. Albert Cornwell, outside person. Mr. Leonard was directing the work being conducted on the surface. As part of this surface work, Mr. Cornwell operated a bulldozer to push up a mound of earth to provide better access in reaching the fused, mine visual disconnecting devices, located inside the surface substation fenced area.

Before connecting the new transformers into the mine electrical high voltage circuit, Mr. Leonard decided the transformers needed to be turned around to better facilitate the necessary wiring connections. Upon completion of turning the transformers around, wiring of the newly installed transformers continued until the surface crew stopped for lunch. After lunch, Mr.

Leonard, while using an adjustable disconnect stick ("hot stick"), opened the mine visual disconnecting devices for the incoming electrical power system. These visual disconnecting devices were mounted near the top of a power pole located inside the fenced portion of the substation area. Mr. Leonard then applied grounding clamp leads to the incoming line side of the oil circuit breaker in preparation to complete the connections to the primary side of the newly installed transformers.

At approximately 4:15 p.m., wiring to the primary side of the newly installed transformers was completed. Wiring to the secondary side of the transformers was completed except for connections to the mine high voltage power circuit. At this time, Mr. Anderson removed the grounding clamps and Mr. Leonard, using the adjustable disconnect stick, closed the fused, visual disconnecting devices for the mine incoming high voltage electrical power. The surface crew planned to energize the newly installed transformers and allow 15 to 20 minutes of operation to ensure they were operating properly. During this time, Mr. Leonard, Mr. Anderson, and Mr. Cornwell met in the mine office and discussed the necessary work to complete the job. These discussions included completion of erecting the fence, wiring the underground power into the system, and traveling underground to ensure correct phase rotation of the three phase electrical system.

After the newly installed transformers had operated for 15 to 20 minutes, the surface crew returned to the substation area to connect the underground power circuit to the secondary side of the transformers, and to complete erecting the security fence. Mr. Anderson and Mr. Cornwell traveled to the area where the fence was being constructed near the newly installed transformers. Mr. Leonard asked Mr. Anderson where the grounding clamp leads were located and Mr. Anderson informed him that they were located at the substation entrance gate. Shortly thereafter, Mr. Anderson and Mr. Cornwell saw a flash of light and heard a blast. Simultaneous to this event, the center visual disconnecting device fuse provided for the mine's incoming power blew, and the three fuses provided for the American Electrical Power (power company) disconnecting devices also blew. All electrical power to the mine was deenergized when the power company fuses provided for the three phase conductors blew. The American Electric Power disconnect fuses were located on a pole approximately 50 feet from the mine substation.

Mr. Anderson and Mr. Cornwell rushed to the area where Mr. Leonard was working and observed him lying on his side on a metal platform between the incoming line side of the high voltage oil circuit breaker and where an active (energized) 25 KVA transformer and an inactive (out-of-service) 30 KVA transformer were located. Mr. Anderson observed Mr. Leonard entangled in the grounding clamp leads. Mr. Leonard had apparently climbed onto this metal platform, located 48 inches above ground level, to apply the grounding clamp leads to the incoming line side of the high voltage oil circuit breaker. This oil circuit breaker provides overcurrent, short circuit and single-phase protection for the mine high voltage electrical power system. With the mine incoming power visual disconnecting devices not opened (deenergized), the line side of the incoming high voltage power circuit was still energized with 12,470 volts, phase to phase.

Mr. Anderson observed that Mr. Leonard was not in direct contact with any electrical circuit and immediately began conducting a physical examination of Mr. Leonard. During the examination, Mr. Anderson observed that Mr. Leonard was unconscious, and he could not detect the presence of a pulse or any signs of breathing. Mr. Anderson immediately began attempting to try to get a response from Mr. Leonard. Shortly thereafter, Mr. Leonard regained consciousness and began moving his left arm and was asking Mr. Anderson to "pull his right arm". Mr. Cornwell used the adjustable disconnect stick to open the visual disconnecting

devices for the mine incoming high voltage electrical power. Mr. Cornwell then traveled to the mine office and called 911 for emergency assistance.

Mr. Anderson and Mr. Cornwell removed Mr. Leonard from the metal platform. Mr. Anderson observed that Mr. Leonard sustained a laceration over his right eye, had burns on his right arm, and his pants were smoking. Mr. Anderson restrained and comforted Mr. Leonard until rescue squad personnel arrived. Mr. Leonard was transported from the mine by the New Garden Rescue Squad to a location near Honaker, Virginia where he was transferred to a Med Flight helicopter and transported to the Bristol Regional Medical Center. Later that night, Mr. Leonard was transferred to the Vanderbilt Burn Center located in Nashville, Tennessee.

Mr. Daniel Smith, mine superintendent, was notified by Mr. Cornwell of the accident by telephone and arrived at the mine at approximately 5:15 p.m. At 5:50 p.m., Mr. Smith contacted Division of Mines personnel, who immediately traveled to the mine. Representatives of the Federal Mine Safety and Health Administration also arrived, and participated in obtaining preliminary information from Mr. Anderson, Mr. Cornwell, and Mr. Smith on October 23, 2004.

A joint investigation with personnel from the Mine Safety and Health Administration, the Division of Mines, and company employees continued on October 25, 2004, with an examination of the scene. Employees from the American Electric Power Company were also present when the scene was examined and replaced the blown fuses in their fused disconnecting devices.

On October 29, 2004, Mr. Leonard died as a result of serious electrical burn injuries at the Vanderbilt Burn Center.

STATEMENTS FROM MINE PERSONNEL AND OTHER FACTORS

Statements from mine personnel and other factors determined during the investigation revealed the following:

Allen Whited – Company President, stated:

1. That he was at the surface area of the mine from 9:00 a.m. until approximately 11:30 a.m. on the day of the accident;
2. That he had provided supplies and other materials needed for the work being performed;
3. That Mr. Leonard was in charge of the work being conducted on the surface of the mine on October 23, 2004;
4. That he had assisted the surface crew while repositioning the “newly” installed transformers and had assisted in erecting the security fence;
5. That the surface substation was energized when he departed the mine;
6. That Mr. Leonard was wearing regular, leather work gloves at the time of the accident, and that the right-hand glove revealed evidence of being burned;
7. That electrically rated, high voltage gloves were available in the mine office;
8. That he had observed Mr. Leonard pulling the fused visual disconnecting devices in the past while wearing electrically rated, high voltage gloves;
9. That he had called the mine at approximately 3:30 p.m. but did not get an answer and he assumed the surface crew had departed the mine;
10. That he received a telephone call from Mr. Albert Cornwell at 5:19 p.m. informing him of the accident;
11. That he had observed Mr. Leonard locking out and tagging electrical circuits in the past;

Daniel Smith – Mine Superintendent, stated:

1. That he was not at the mine on October 23, 2004;
2. That he was notified of the accident in a telephone call at 4:45 p.m.;
3. That he arrived at the mine at approximately 5:15 p.m.;
4. That after being told what had happened, and looking at the scene, he began notifying the Federal Mine Safety and Health Administration and DMME's Division of Mines officials to report the accident;
5. That he secured the scene and ordered that nothing be changed;
6. That Mr. Leonard had directed the work being conducted on the surface of the mine on October 23, 2004;
7. That electrically rated, high voltage gloves were available in the mine office;
8. That in the past, he had observed Mr. Leonard using high voltage gloves to pull visual disconnecting devices;
9. That in the past, he had observed Mr. Leonard locking out and tagging electrical power sources when repairing equipment.

Ralph Campbell – Section Mine Foreman, stated:

1. That he arrived at the mine at 6:30 a.m. on the day of the accident, and had departed the mine at approximately 2:00 p.m.;
2. That Mr. Leonard was in charge of directing the work on the surface on the day of the accident;
3. That he directed the underground work on the day of the accident;
4. That he heard Mr. Leonard and coworkers discussing their work assignments but did not hear any specific details;
5. That he observed the visual disconnecting devices were pulled when he came to the surface from underground, and that Mr. Leonard and the two coworkers were working on the newly installed transformers located outside the fence;
6. That he had observed Mr. Leonard perform electrical repair work in the past with the equipment electrical power source disconnected, locked out, and tagged before making repairs.

Albert Cornwell – Outside person, stated:

1. That he arrived at the mine at approximately 6:45 a.m. on the day of the accident;
2. That he assisted the surface crew perform work relative to the electrical up-grade;
3. That he had operated a bulldozer to push up a mound of dirt to provide better access to reach the mine visual disconnecting devices with the adjustable disconnect stick ("hot stick");
4. That Mr. Anderson had removed the grounding clamp leads and that Mr. Leonard had closed the visual disconnecting devices to provide power to the newly installed transformers;
5. That Mr. Leonard asked where the grounding clamp leads were located just prior to the accident;
6. That he heard an electrical arc and saw a flash;
7. That the accident occurred at approximately 4:45 p.m. to 4:50 p.m.;
8. That he opened the mine visual disconnecting devices after the accident and called 911 for emergency assistance;
9. That after the accident, he assisted Mr. Anderson remove Mr. Leonard from the metal platform;

10. That he called Mr. Whited and Mr. Smith to inform them of the accident;
11. That he had observed Mr. Leonard pull the high voltage visual disconnecting devices in the past.

Darrell Anderson –Electrical Repairman, stated:

1. That he arrived at the mine at 6:30 a.m. on the day of the accident;
2. That Mr. Leonard directed the work on the surface on the day of the accident;
3. That he was located on the opposite end of the transformer area when the accident occurred;
4. That he had removed the grounding clamp leads and that Mr. Leonard had closed the visual disconnecting devices after wiring of the primary side of the newly installed transformers was completed;
5. That the newly installed transformers were allowed to operate for 15 to 20 minutes;
6. That during that time he, Mr. Leonard, and Mr. Cornwell discussed the remaining tasks to be completed, and that opening the mine visual disconnecting devices was not discussed;
7. That he did not see Mr. Leonard when the accident occurred;
8. That he heard a boom and saw a flash of light when the accident occurred;
9. That Mr. Leonard was entangled in the grounding clamp leads when he was observed immediately after the accident;
10. That in the past, he had observed Mr. Leonard perform electrical repair work with electric power sources to the equipment locked out and tagged.

PHYSICAL FACTORS

The physical factors at the scene of the accident revealed the following:

1. An up-grade of the mine electrical system was in progress at the mine when the accident occurred.
2. The mine had previously been operating with high voltage power being received and distributed from an enclosed surface substation.
3. The electrical accident occurred on a metal platform, 48 inches above ground level, near the oil circuit breaker (OCB) located inside an open-type surface substation.
4. The victim came in contact with a 12,470 volt, phase-to-phase, energized high voltage circuit while preparing to apply grounding clamp leads.
5. An insulated, adjustable disconnect stick ("hot stick"), used to pull the incoming high voltage power fused visual disconnecting devices, was located in close proximity to the scene of the accident.
6. Grounding clamp leads were observed on the metal platform where the victim was located immediately after the accident. Mine personnel stated that the victim was entangled in the grounding clamp leads when they arrived at his location immediately after the accident.
7. High voltage power is supplied to the mine by the American Electric Power Company. The supplied 34,500 volts, three-phase power, is stepped down to 12,470 volts at an American Electric Power Company substation located adjacent to the mine. The power being supplied to the mine is wye connected, and solid grounded. The power is stepped down at the mine high voltage surface substation to 4,160 volts.
8. The investigation revealed that the American Electric Power Company's fused disconnecting devices were blown as a result of the accident. These disconnecting devices were fused with one-30 amp and two-40 amp fuses.
9. At the time of the accident, the mine fused visual disconnecting devices used to deenergize the surface substation, contained in-line 40 amp fuses for each phase conductor. The center phase disconnecting device fuse was found to have blown when the accident occurred.
10. High voltage power from the fused visual disconnecting device to the primary side of the oil circuit breaker was delivered by a 2/0 AWG, 3 conductor, type MP-GC high voltage cable.
11. A Compton Electric Equipment control panel was used to control the high voltage oil circuit breaker (OCB). The control panel, serial number 80-6635, is rated at 14,400 volts and has a current rating of 600 amps.
12. During the investigation conducted on October 23, 2004, the high voltage oil circuit breaker (OCB) was observed in the "open" (deenergized) position and none of the relay indicator flags had been activated. The fact that none of the relay flags had been activated verified that the OCB was "open" (deenergized) before Mr. Leonard attempted to ground the line (energized) side of the circuit breaker. Overcurrent and short circuit protection are provided by 50/51 induction type relays. Two of the three phases are monitored for shortcircuit and overcurrent using a separate relay for each phase. Each relay has a built-in time-overcurrent unit and an instantaneous unit. Each relay also has two red indicator flags that are designed to activate and display when the circuit breaker opens (deenergizes) due to either an overcurrent or short circuit condition.

13. The General Electric Oil Blast high voltage circuit breaker, serial number K6566223AZ201 is rated at 15,500 volts with a current rating of 600 amps and has a current interrupting rating of 4,000 amps. This high voltage oil circuit breaker provides overcurrent, short circuit and single-phase protection for the incoming high voltage power.
14. The high voltage oil circuit breaker provided protection for the primary side of the transformer. This transformer stepped the voltage down from 12,470 volts to 4,160 volts that was used underground.
15. The field-bed ground measured 6.25 ohms resistance. The ground resistors measured 96 ohms.

CONCLUSION

On October 23, 2004, at approximately 4:40 p.m., an electrical accident occurred at the surface area of Omega Mining, Inc., Southern Crescent Mine. Mr. Dennie Ray Leonard, Chief Electrician, received serious electrical burn injuries when he came in contact with an energized 12,470 volt, phase to phase, alternating current (AC) high voltage power circuit located inside an open-type surface-high voltage substation. Mr. Leonard died on October 29, 2004, as a result of these serious burn injuries. Mr. Leonard was making preparations to ground an energized 12,470-volt circuit that he apparently thought was deenergized.

ENFORCEMENT ACTION

The following enforcement action was taken as a result of the investigation:

1. An order of closure, No. BHM0005072, was issued under section 45.1-161.91 A (ii) of the Coal Mine Safety Laws of Virginia to control and preserve the scene of the accident pending an investigation. The order of closure was modified to allow mine personnel to restore the surface high voltage electrical substation to its original condition. The order of closure was modified to allow the mine to return to normal mining activities but remained in place pending completion of the accident investigation.
2. An order of closure, No. BHM0005133, was issued under section 45.1-161.91 A (i), referencing 45.1-161.196 of the Coal Mine Safety Laws of Virginia. An imminent danger was present in that work was being performed on an energized high voltage circuit that had not been deenergized, tagged, locked out and grounded. The Coal Mine Safety Laws of Virginia, Section 45.1-161.196 requires that all high voltage circuits shall be deenergized, suitably tagged, locked out and grounded before repair work is performed.
3. A Notice of Violation, No. BHM0005134, was issued under section 45.1-161.199 of the Coal Mine Safety Laws of Virginia. At the time of the accident, one person who is a working coal miner and who has been certified by the State Board of Health as possessing the qualifications of an Emergency Medical Technician (EMT) or EMT-First Responder or a sufficient number of first-aid trainees was not located so as to be available for duty at the mine when three persons were working on the surface area of the mine on the day shift on October 23, 2004. The Coal Mine Safety Laws of Virginia, Section 45.1-161.199 requires that an Emergency Medical Technician (EMT) or EMT First Responder, or a sufficient number of first-aid trainees be available for duty when mining personnel are working at the mine.

RECOMMENDATIONS

1. No electrical work shall be performed on low, medium, or high voltage circuits or equipment, except by a certified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a certified person. Nor shall such work be performed until it is established that disconnecting device(s) are opened, locked out and suitably tagged by the persons who perform electrical or mechanical work on such circuits or equipment connected to the circuits.
2. All high voltage circuits must be grounded before repair work is performed. The certified electrical repairman shall effectively ground the high voltage circuit prior to performing any work on the deenergized circuit.
3. Protective high voltage gloves should be worn when grounding high voltage circuits.
4. When performing multiple tasks involving energized high voltage power electrical circuits, certified electrical persons should double check to ensure that the proper disconnecting devices have been opened, locked-out and suitably tagged and that grounding the circuit can be safely performed.

SIGNATURE SHEET

This report is hereby submitted by Bill Messick and approved by Frank A.Linkous.

BILL MESSICK, COAL MINE INSPECTOR	DATE
FRANK A. LINKOUS, CHIEF DIVISION OF MINES	DATE

APPENDIX

VICTIM DATA SHEET

PERSONS PRESENT DURING THE INVESTIGATION

MINE LICENSE INFORMATION

VICTIM DATA SHEET

Name:	Dennie Ray Leonard
Occupation:	Chief Electrician
Mailing Address:	H.C. 67 Box 438 Patterson, VA 24631
Date of Birth:	November 25, 1947
Total Mining Experience:	Thirty-nine years
Experience with Present Company:	Four months
Experience in Present Occupation:	Thirty-five years

PERSONNEL

The following personnel provided information and/or were present during the investigation.

Those persons who were interviewed are identified with an asterisk (*):

OMEGA MINING, INC. SOUTHERN CRESCENT MINE

Allen Whited*	Company President	Day Shift
Daniel Smith*	Mine Superintendent	Day Shift
Ralph Campbell*	Section Mine Foreman	Day Shift
Darrell Anderson*	Repairman	Day Shift
Albert Cornwell*	Outside Person	Day Shift

MINE SAFETY AND HEALTH ADMINISTRATION

Ed Morgan	District Manager
Norman Paige	Assistant District Manager
Russell Dresch	Electrical Engineer
Jason Lane	Electrical Engineer
Larry Worrell	Coal Mine Inspector Supervisor
Jim Poynter	Coal Mine Inspector Supervisor
Fred Martin	Coal Mine Inspector
Carl E. Duty	Coal Mine Inspector
Tony Arena	Coal Mine Inspector, Electrical
Bob Baker	Educational Field Services Specialist

VIRGINIA DIVISION OF MINES

Frank A. Linkous	Chief, Division of Mines
Opie McKinney	Mine Inspector Supervisor
Joe Altizer	Coal Mine Inspector
Bill Messick	Coal Mine Inspector
Dwight Miller	Coal Mine Technical Specialist
Bobby Garrett	Coal Mine Technical Specialist

MINE LICENSE INFORMATION

Official Corporation:	Omega Mining, Inc.
Official Business Name of Operator:	Omega Mining, Inc.
Person with Overall Responsibility:	Allen Whited
Person in Charge of Health and Safety:	Allen Whited