
Virginia Department of Mines, Minerals & Energy
Division of Mines

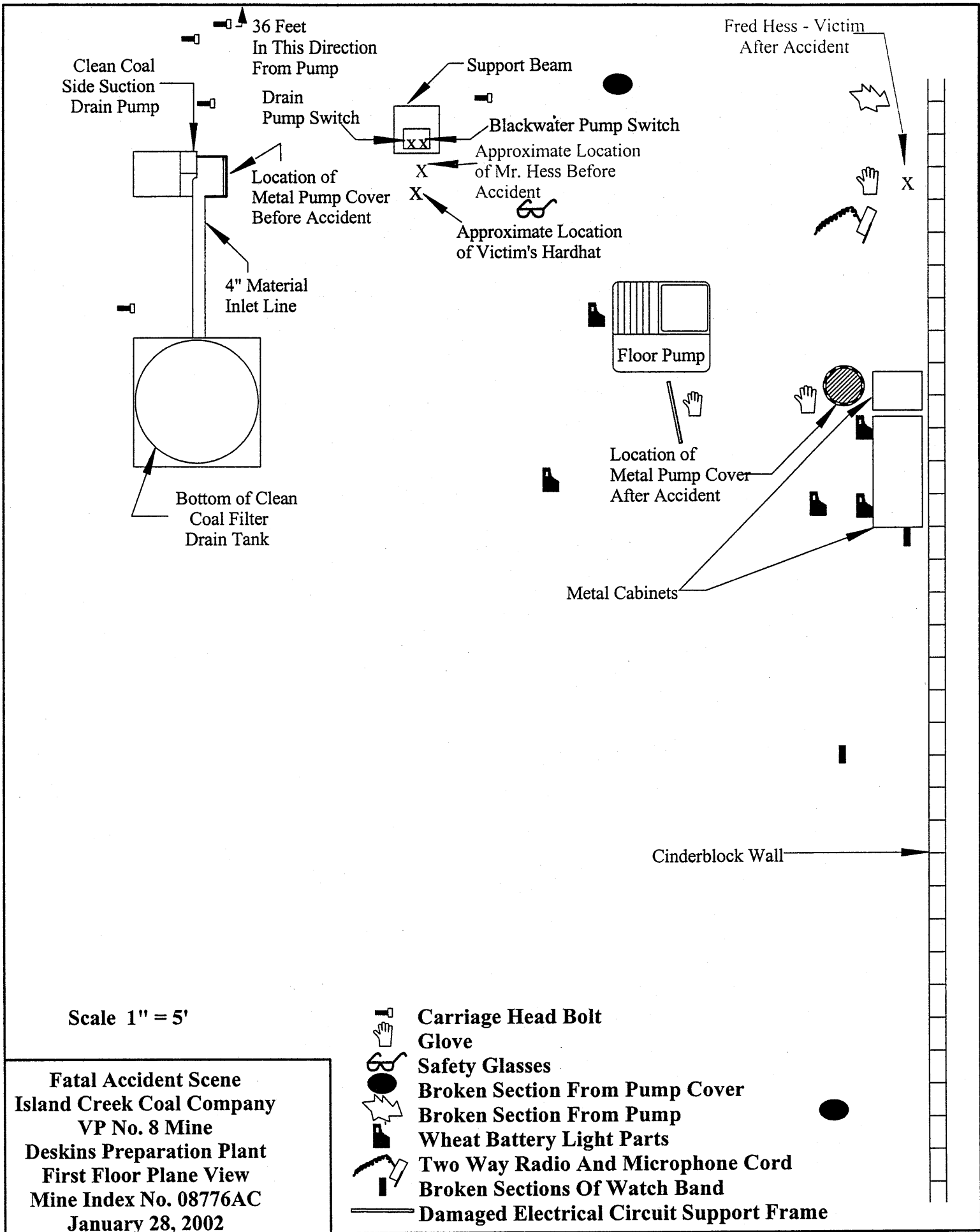
Accident Investigation Report
Preparation Plant

Pump Explosion Fatality
January 28, 2002

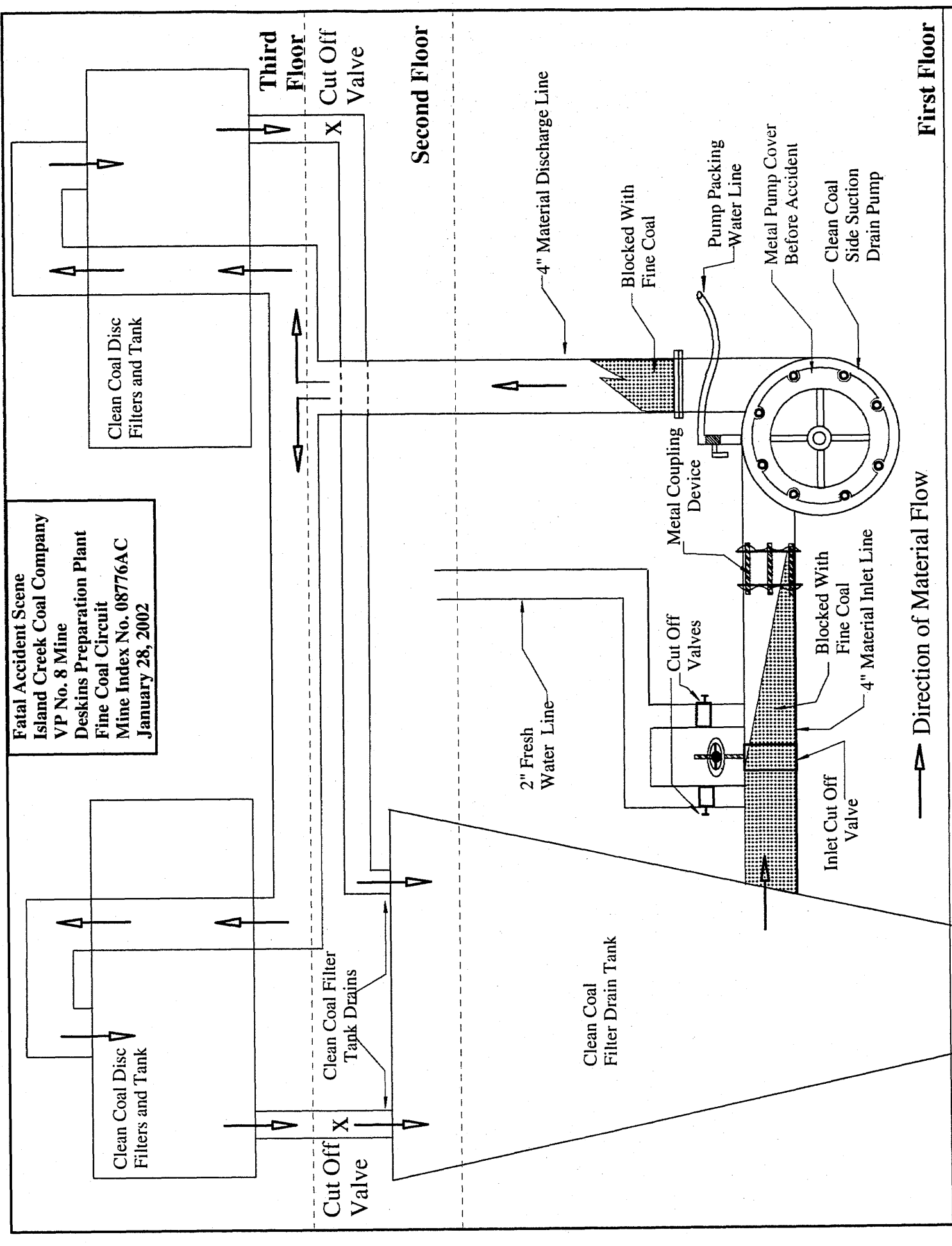
Island Creek Coal Company
VP No. 8
Mine Index No. 08776C
Buchanan County, Virginia

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Fatal Accident Scene
Island Creek Coal Company
VP No. 8 Mine
Deskins Preparation Plant
Fine Coal Circuit
Mine Index No. 08776AC
January 28, 2002

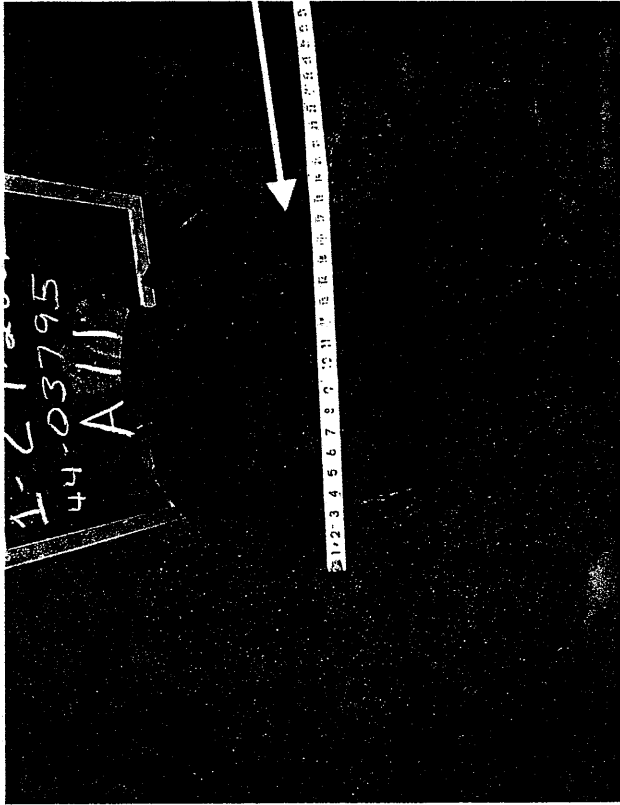
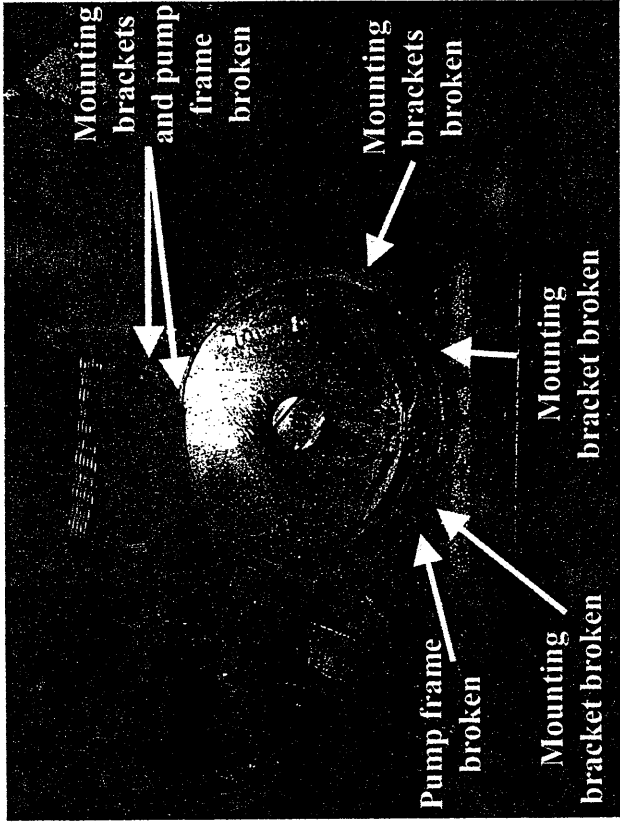
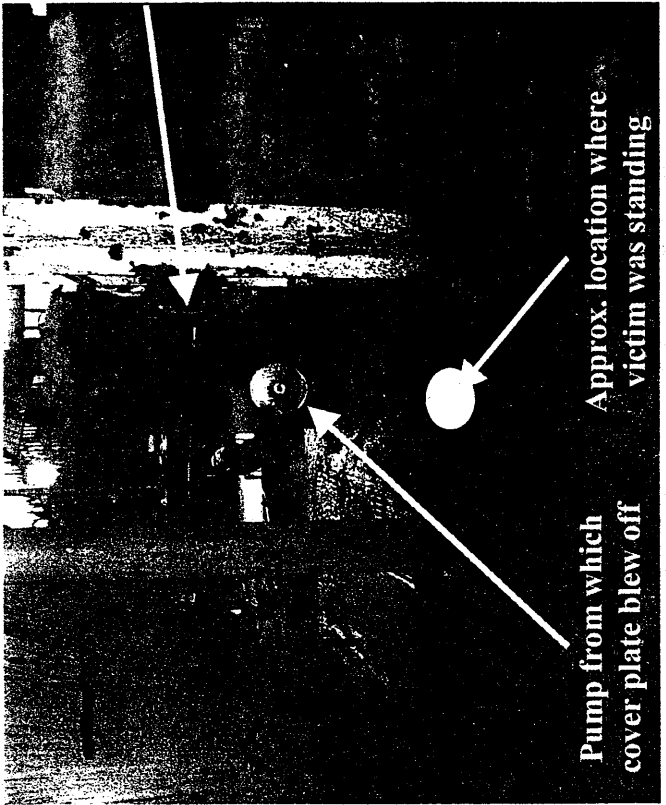
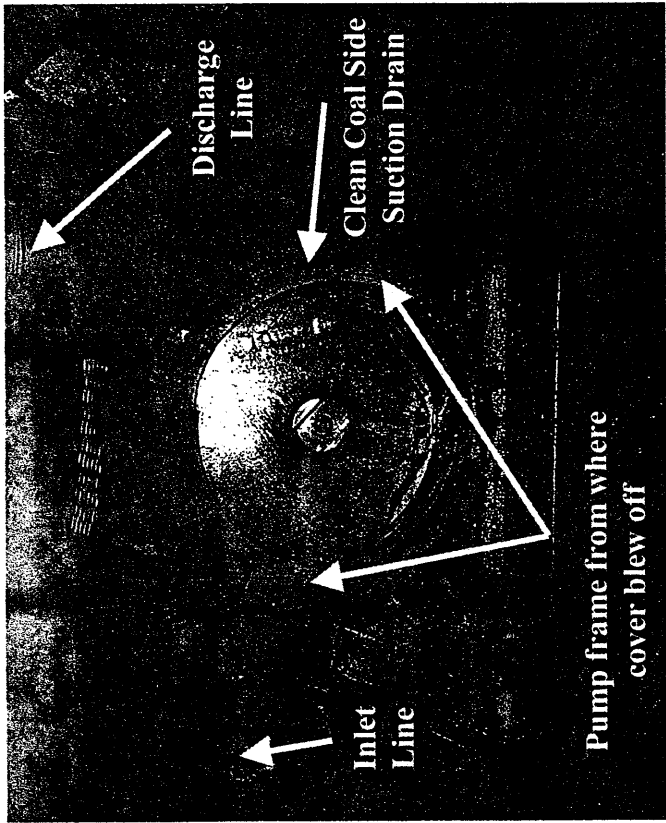


→ Direction of Material Flow

First Floor

Second Floor

Third Floor



Fatal Accident Scene
 Island Creek Coal Company
 VP No. 8 Mine
 Deskins Preparation Plant

PUMP EXPLOSION FATALITY INVESTIGATION REPORT
ISLAND CREEK COAL COMPANY
VP NO. 8
MINE INDEX 08776AC

On Monday, January 28, 2002, at approximately 8:30 p.m., an accident involving the explosion of a clean coal side suction drain pump, occurred at the Island Creek Coal Company, VP No. 8 Mine, Deskins Preparation Plant, Mine Index No. 08776AC. Fred Hess, fine coal operator, was fatally injured when he was struck by the metal pump cover that was ejected from the side of the pump when it exploded. The pump had apparently overheated and Mr. Hess was attempting to de-energize the pump when the explosion occurred. Mr. Hess, age 54, had thirty-two years and seven months total mining experience, twenty-four years and one month with Island Creek Coal Company and eight months experience as a fine coal operator. The Department of Mines, Minerals and Energy's, Division of Mines was notified at approximately 9:23 p.m., on January 28, 2002, and a joint investigation with the Federal Mine Safety and Health Administration was initiated the same day. This mine is scheduled to receive one regular inspection and one spot inspection every six months. A regular inspection was ongoing at the time of the accident.

COMMENTARY

Island Creek Coal Company, VP No. 8 Deskins Preparation Plant is located on State Route 620 in Buchanan County, Virginia. The Deskins Preparation Plant has 24 persons employed on three production shifts per day and operates five or six days per week. The Deskins Preparation Plant is one of two plants that processes coal from the VP No. 8 underground mine. The Deskins plant is operated as needed and does not operate continuously. The Deskins Preparation Plant personnel had not processed coal since January 26, 2002.

On Monday, January 28, 2002, at approximately 3:00 p.m., the second shift began work at the preparation plant facility under the direction of Michael Aldridge, plant foreman. The preparation plant crew performed maintenance work during the first part of the shift and began processing coal at approximately 7:30 p.m.

Mr. Aldridge was conducting a walk-through observation of the plant to ensure proper operation when he observed and talked to Mr. Hess, fine coal operator. Mr. Hess was experiencing problems with the froth cells, which are water-filled tanks used to separate fine coal from fine rock particles. The froth cells are located on the fourth floor of the plant. Mr. Aldridge, after talking to Mr. Hess, traveled to the first floor of the plant where he observed steam coming from the drive shaft area of the clean coal side suction drain pump. The drain pump is used to pump water slurry/fine coal (1/2 mm or less in size) to the clean coal disc filter tanks when the preparation plant is initially started. This pump is normally operated for approximately 15 to 20 minutes and then de-energized. Mr. Aldridge talked to Mr. Hess on a two-way radio and instructed him to check the drain pump located on the first floor where he had observed steam being emitted from the pump drive shaft area. Mr. Hess traveled to the first floor location to evaluate the drain pump. Mr. Aldridge spoke to Mr. Hess about the drain pump and then walked around behind the clean coal filter drain tank, located approximately eleven feet from the pump,

when he heard an explosion. Mr. Aldridge ran to the area and observed that Mr. Hess had been injured. Mr. Aldridge summoned help from other plant personnel using his hand held two-way radio, and moved Mr. Hess approximately 10 feet to get him out of the water that was overflowing from the black water tank located on the first floor. Mr. Aldridge examined Mr. Hess and observed that he was unconscious but breathing. Mr. Christopher Lester, plant electrical repairman, heard Mr. Aldridge call for emergency assistance, and called Mr. Michael Cooper, mine dispatcher, and instructed him to call for an ambulance and to call underground to summons Mr. Dana Gilbert, construction foreman and emergency medical technician-first responder, to the preparation plant. Mr. Aldridge and the plant crew secured Mr. Hess on a long backboard and moved him to the plant lunch-waiting room. Mr. Gilbert was working in A-Shaft and had to travel to B-Shaft to ride the cage out of the mine. Mr. Tommy O'Quinn, tipple utility man, traveled to B-Shaft and transported Mr. Gilbert to the preparation plant. Mr. Gilbert arrived at the plant within approximately 15 minutes after being contacted. Mr. Gilbert examined Mr. Hess, observed that he was unconscious and experiencing breathing problems, and administered oxygen to him. Mr. Hess was treated for shock and continuously monitored by Mr. Gilbert until Dismal River Volunteer Rescue Squad, Inc., personnel arrived. The rescue squad personnel assumed control of Mr. Hess and transported him to the Buchanan General Hospital where he was examined and pronounced dead by Dr. J. Segen, Buchanan County Coroner.

STATEMENTS FROM MINE PERSONNEL AND OTHER FACTORS

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

1. The pump explosion accident occurred on January 28, 2002, at approximately 8:30 p.m. at the VP No. 8 Deskins Preparation Plant.
2. There were no eyewitnesses to the accident.
3. Mine personnel stated that the plant had not processed coal since January 26, 2002.
4. Mine personnel stated that the second shift began work at 3:00 p.m. on January 8, 2002, and Mr. Aldridge directed the preparation plant crew to perform maintenance work until approximately 7:30 p.m. After the maintenance work was completed, Mr. Aldridge directed the crew to begin operation of the plant and start processing coal.
5. Mine personnel stated that Mr. Hess apparently started the clean coal side suction drain pump at approximately 7:45 p.m. from the start/stop switch located adjacent to the pump. The clean coal processing system must be started and completed prior to beginning other plant operational functions. Mr. Hess was also responsible for turning on the drain pump packing water, which is forced around the pump drive shaft entrance gland to maintain a seal and to cool the shaft. After starting the drain pump and turning on the pump packing water, he traveled to the plant second floor and shut off the clean coal disc filter tank drain valves. Mr. Hess then traveled to the third floor to evaluate the material level in the disc filter tanks as pumped from the drain tank by the drain pump. This material can be observed flowing into the disc filter tanks and when the drain tank is empty as observed by the stoppage of material flow into the disc filter

tanks, then the clean coal drain pump can be de-energized from a switch located on the third floor near the disc filter tanks. Adjustments of material level in the disc filter tanks are also made from other sources including the froth cells and the black water circuit. Proper operation of the fine coal processing system is directly dependent upon maintaining the proper level of material in the disc filter tanks.

6. Mr. Fred Reedy, plant operator, stated that he started other plant operational functions when he was informed by Mr. Hess that the fine coal processing system was ready. Mr. Reedy, after starting other plant operational functions, observed from indicators located in the control room that a problem existed with the clean coal disc filters and notified Mr. Hess to check the problem. Mr. Hess apparently began making adjustments to increase material flow to the disc filter tanks to correct the problem.
7. Mr. Aldridge stated that he would routinely begin a walk-through observation as the plant begins processing coal. Mr. Aldridge typically starts at the top floor of the plant and proceeds to the first floor. Mr. Aldridge departed the plant control room, located on the sixth floor and stopped on the fourth floor to talk to Mr. Hess who was having problems with the froth cells.
8. Mr. Aldridge stated that after talking to Mr. Hess, he then traveled to the first floor of the plant and walked outside. At approximately 8:25 p.m. he went back into the first floor of the plant and observed steam coming from the drive shaft area of the clean coal side suction drain pump. Mr. Aldridge contacted Mr. Hess by two-way radio and instructed him to check the pump.
9. This drain pump is used to pump water slurry/fine coal (1/2 mm or less in size) from the clean coal filter drain tank, located on the first floor of the plant, to the clean coal disc filter tanks, which are located on the third floor of the plant. The clean coal disc filter tanks must be drained during each plant shut down and then must be refilled during the next plant start-up.
10. Mine personnel stated that this drain pump is normally operated for approximately 15 to 20 minutes on initial start up and then the fine coal operator de-energizes the pump when all material has been pumped from the clean coal filter drain tank to the clean coal disc filter tanks. On January 28, 2002, the drain pump had been operating for approximately 40 minutes before it exploded.
11. Mr. Reedy, located in the plant control room, stated that immediately before the explosion, he observed on the plant equipment operation readout panel that the black water tank pump and the No. 18 belt had shut down. The black water tank pump and the No. 18 belt are electrically interlocked so that when the pump shuts down, then the belt stops operating. Mr. Reedy restarted the black water pump and No. 18 belt. Apparently, Mr. Hess had traveled to the first floor at the location of the control switches that energize and de-energize both the black water tank pump and the drain pump, and may have de-energized the black water pump switch first by mistake. The control switches for both pumps are located adjacent to each other approximately four inches apart, and both pump switch identification tags had been wiped clean. The pump control switch identification tags may have been obscured with coal dust and this could have been a reason for Mr. Hess inadvertently de-energizing the black water pump switch instead of the drain pump switch. A very short delay occurred between the time that Mr. Reedy restarted

the black water tank pump and the No. 18 belt from the plant control room and the time that he heard the explosion. This short delay supports the theory that Mr. Hess most likely de-energized the black water pump switch first and realizing that he had de-energized the wrong pump, then de-energized the drain pump. This event was followed shortly by the explosion.

12. Mr. Aldridge stated that Mr. Hess, shortly after being notified, went to check the drain pump. Mr. Aldridge, who was located on the first floor, spoke to Mr. Hess about the pump getting hot and then walked behind the clean coal filter drain tank after which he heard an explosion. Mr. Aldridge ran to the explosion area and observed Mr. Hess injured and lying on the concrete floor against a cinderblock wall.
13. Mr. Aldridge moved Mr. Hess away from the cinderblock wall because water was overflowing from the black water tank onto Mr. Hess. Mr. Aldridge called other plant personnel for assistance using his two-way radio and then began administering first aid to Mr. Hess. Mr. Reedy, after hearing the explosion and Mr. Aldridge's call for assistance, began an emergency shut-down of the plant.
14. Mr. Aldridge observed that Mr. Hess was unconscious and experiencing breathing problems. Mine personnel also observed injuries of the victim's left leg and left side abdominal area. Mr. Hess was unresponsive and did not react to any verbal communications.
15. Mr. Aldridge, with assistance from other plant personnel, loaded Mr. Hess on a long backboard and moved him to the plant lunch-waiting room.
16. Mr. Lester stated that he contacted Mr. Cooper requesting an ambulance and an emergency medical technician-first responder. Mr. Cooper contacted the Dismal River Volunteer Rescue Squad, Inc., requesting their assistance.
17. Mr. Cooper also summoned Mr. Gilbert, emergency medical technician-first responder, who was located underground at the Deskins A-Shaft. Mr. Gilbert traveled immediately to the Deskins B-Shaft man trip cage. Mr. Gilbert, after arriving on the surface, was transported to the plant by Mr. O'Quinn and arrived at the preparation plant within approximately 15 minutes.
18. Mr. Gilbert examined Mr. Hess and observed the following: the victim had a pulse; no signs of excessive bleeding were present and; the victim was experiencing breathing problems. Mr. Hess remained unconscious and unresponsive as Mr. Gilbert administered oxygen to him. Mr. Gilbert continued to monitor Mr. Hess until Dismal River Volunteer Rescue Squad, Inc., personnel arrived at approximately 9:00 p.m. and assumed control of Mr. Hess. Rescue squad personnel transported Mr. Hess to the Buchanan General Hospital where he was examined and pronounced dead by Dr. J. Segen, Buchanan County Coroner.
19. The sequence of events and mine personnel statements revealed that the following factors contributed to the pump explosion:
 - On January 28, 2002, the drain pump had been operating for approximately 40 minutes before the explosion occurred. The pump normally operates for approximately 15 to 20

minutes which is ordinarily required to pump all material from the clean coal filter drain tank to the clean coal disc filter tanks. Then the pump is de-energized.

- Both material inlet and discharge lines were blocked with fine coal.
- The pump was running but was not receiving nor discharging any new material due to the blockages in both lines.
- Water was continuously provided to the packing area of the pump.
- The pump overheated.
- The water/coal slurry material inside the pump apparently became hot.
- Due to heat generated inside the pump, the water component of the slurry/fine coal mixture was converted to steam.
- Mr. Aldridge stated that he observed steam being emitted into the atmosphere from around the pump drive shaft area and that he instructed Mr. Hess to check the pump.
- At this time, the pump impeller and the water slurry/fine coal mixture inside the pump were increasing in temperature.
- Apparently when Mr. Hess de-energized the pump, water from the pump packing supply line flowed into the pump and contacted the hot material mixture and the hot pump impeller.
- The sudden introduction of water into the pump and the conversion of water to steam caused a rapid increase of steam pressure inside the pump.
- The sudden increase of steam pressure inside the pump had no means of rapid relief and resulted in blowing off the pump cover.

PHYSICAL FACTORS

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

1. The pump explosion accident occurred on Monday, January 28, 2002, at approximately 8:30 p.m. at the VP No. 8 Deskins Preparation Plant, near the control switch used to energize and de-energize the clean coal side suction drain pump.
2. The drain pump, model No. 5000, was used to pump water slurry/fine coal from the clean coal filter drain tank, located on the first floor of the plant, to the clean coal disc filter tanks located on the third floor. This 14.5-inch centrifugal type pump was equipped with four-inch metal inlet and discharge lines.
3. The control switch used to energize and de-energize the drain pump was located approximately eight feet from the side and directly in line with the pump cover.
4. Investigation observations revealed that four of the eight mounting brackets (lugs) on the drain pump frame designed to secure the cover to the pump with carriage head bolts were broken. The cover was designed to be secured to the pump with eight carriage head bolts installed through mounting brackets on the pump frame. Three of the eight bolt mounting slots on the pump cover were also broken. One of the carriage bolts located near the bottom of the pump may not have been in place due to a damaged mounting bracket.

5. Five carriage head bolts used to secure the pump cover to the drain pump frame were observed on the plant floor at distances of three, four, six, eleven and thirty-six feet from the pump.
6. The drain pump metal inlet and discharge lines were examined during the investigation and found to be blocked with fine coal. It was a common practice to "back flush" such lines when they became blocked. Back flushing can be accomplished by de-energizing the drain pump and allowing the head of fluid above the pump to flow backward through the pump.
7. The drain pump cover measured 19.75 inches in diameter and was observed lying approximately 25 feet from the pump on the plant floor near a cinderblock wall.
8. Sections of metal that had broken from the drain pump cover were observed at the following locations: a section was found approximately forty-five feet and eleven inches from the pump near a side entrance doorway to the plant and a section was found approximately sixteen feet and five inches from the pump.
9. Water and fine coal were observed on the plant floor at the scene of the accident.
10. Equipment that apparently was being worn by Mr. Hess at the time of the accident was observed at the following locations: a Motorola two-way radio and microphone cord were observed approximately eighteen feet from the drain pump control switch; a pair of safety glasses was observed approximately four feet and six inches from the drain pump control switch; two gloves were observed approximately eighteen feet and four inches and one glove was observed approximately fifteen feet from the drain pump control switch; pieces of a watchband were observed approximately seventeen feet and twenty feet from the drain pump control switch and; wheat battery light parts were observed at various locations near the accident scene.
11. The drain pump and cover were sent to the Mine Safety and Health Administration's Approval and Certification center located in Triadelphia, West Virginia, for testing and evaluation.

DISCUSSION

1. The Deskins Preparation Plant is one of two plants that processes coal from the VP No. 8 mine. This plant is operated on an as needed schedule and is not operated continuously. Two-way radios are carried by all plant employees for communications within the plant and are monitored by all employees.
2. Plant shutdown procedures included draining the water slurry/fine coal material from the clean coal disc filter tanks located on the third floor, into the clean coal filter drain tank located on the first floor.
3. The fine coal operator initiates the plant start up process by starting the clean coal drain pump that pumps the water slurry/fine coal from the drain tank into the disc filter tanks. The drain pump packing water is turned on and is an integral part of the

pump starting procedures. This packing water is forced around the pump drive shaft entrance to maintain a seal and to cool the shaft. Then, the fine coal operator closes the cut off valves located on the second floor, for the disc filter tanks, located on the third floor, thus allowing the disc filter tanks to fill and to prevent backflow into the drain tank. The fine coal operator then travels to the third floor to evaluate and adjust the material level in the disc filter tanks. Adjustments of material level in the disc filter tanks are also affected by material from the froth cells and black water circuit. The discharge of material pumped from the drain tank into the disc filter tanks are observed at this third floor location. When the drain pump is started, it usually takes approximately 15 to 20 minutes to pump the material from the drain tank into the disc filter tanks. The fine coal operator must visually verify that material flow from the drain pump into the disc filter tanks has stopped. When this material stops flowing, the drain pump is de-energized with a switch located near the disc filter tanks.

4. Some of the packing water will enter the drain pump housing during normal operations and a surge of water may enter when the pump is de-energized. Investigation observations revealed that packing water was flowing into the pump housing and exiting where the pump cover blew off. The packing water and other water slurry material inside the pump were the sources of water that was converted to steam and blew off the pump cover.
5. The clean coal filter drain tank which is connected to the drain pump inlet line is designed so that after material is pumped, it will leave the tank approximately one-third full of coal fines. If additional material is required to fill the disc filter tanks, then it is normally obtained from other sources. However, additional material may be obtained by introducing fresh water into the drain tank through a two-inch fresh water line connected to the drain pump inlet line. Failure to de-energize the drain pump after all fluids are removed from the drain tank or failure to introduce water into the pump inlet line will result in coal fines drawn into the pump. Then, the drain pump will circulate coal fines that may result in the pump overheating and possibly obstructing the metal inlet and discharge lines.
6. The majority of plant operations, including the operation of pumps, are controlled from the plant control room except the clean coal start up procedures. The clean coal drain pump is controlled by electrical switches located on the first floor adjacent to the pump and on the third floor near the disc filter tanks. Some plant pumps, including the black water pump, have electrical controls located both near the applicable pump and in the plant control room to start and stop operation from either location. Many of the plant operational sequential functions are equipped with electrical interlock devices that are designed to automatically de-energize other interlocked functions to prevent system overloads if any part of the operational functions fail to operate in the proper sequence.

CONCLUSION

On January 28, 2002, at approximately 8:30 p.m., a clean coal side suction drain pump exploded at the Island Creek Coal Company, VP No. 8 Deskins Preparation Plant. Fred Hess, fine coal operator, received fatal injuries when he was struck by the metal pump cover that was ejected from the side of the pump when it exploded. Mr. Hess apparently was in the process of de-energizing the pump when the explosion occurred.

ENFORCEMENT ACTION

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

An order of closure, No. JSA0002357, was issued under Section 45.1-161.91.A. (ii) of the Coal Mine Safety Laws of Virginia on the VP No. 8 Deskins Preparation Plant to preserve the scene of the accident pending an investigation. The order of closure was modified to allow operation of the following: skips; No. seven refuse conveyor belt; No. 12 raw coal belt; No. 43 screen; No. 26 pump, clean-up pump and; plant equipment from the second floor through the eighth floor. The order of closure was also modified to allow implementation of the accident action plan.

RECOMMENDATIONS

1. All plant personnel should be trained to recognize potential hazards and to safely operate or work around pumps.
2. Always follow manufacturer's recommendations for start-up and shutdown of pumps. This is especially critical for solids pumps. Providing a clean water bypass and flushing lines after shut down may prevent problems. Always confirm proper operation of the pump on start-up by checking discharge or by other means.
3. Pumps observed or suspected of overheating should be de-energized at the plant operator's station, breaker room, or other location away from the pump.
4. All personnel should remove themselves from the affected area of the pump prior to restarting or de-energizing pumps from the plant operator station.
5. Pumps of this type and construction should be equipped with the following:
 - A resistance thermal device (RTD) designed to de-energize the pump susceptible to overheating conditions.
 - An automatic shut-off timer.
6. When applicable, pumps should be equipped with automatic float devices and air release valves to improve operation and to maintain prime of the pump.
7. All pumps and pump switches should be provided with labels, tags or other equivalent identification devices.
8. Pump start/stop switches, especially for stationary pumps, should be installed in a safe location away from the pump and in the most protective location for personnel should the pump explode.
9. Regular maintenance inspections of pumps should be conducted to detect signs of structural metal fatigue including cracks in the frame, damaged cover mounting brackets, missing bolts or other components.

SIGNATURE SHEET

This report is hereby submitted by Daniel Perkins and approved by Frank A. Linkous.

Daniel Perkins 04-01-02
DANIEL PERKINS, TECHNICAL SPECIALIST DATE

Frank A. Linkous 04/01/02
FRANK A. LINKOUS, CHIEF DATE

APPENDIX

VICTIM DATA SHEET

PERSONS PRESENT DURING THE INVESTIGATION

MINE LICENSE INFORMATION

VICTIM DATA SHEET

Name:	Fred Hess
Occupation:	Fine Coal Operator
Mailing Address:	421 Ash Street Honaker, Virginia 24260
Date of Birth:	September 8, 1947
Total Mining Experience:	Thirty-two years and seven months
Experience with Present Company:	Twenty-four years and one month
Experience in Present Occupation:	Eight months

PERSONNEL

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

CONSOLIDATION COAL COMPANY

Barry Dangerfield	Vice President of Operations	
Rick Marlowe	Corporate Safety Director	
David Berry	Safety Manager	
Bill Fertall	Manager of Engineering	
Jack Holt	Vice President of Safety and Human Resources	
Bill Tolliver	Corporate Safety Inspector	
Elizabeth Chamberlain	Corporate Safety Director	
Stephen Williams	Superintendent	Dayshift
Franklin Howard	Electrical Repairman	Day Shift
Larry Breeding	Plant Operator	Day Shift
Steven Carter	General Preparation Plant Foreman	Day Shift
Michael Aldridge	Preparation Plant Foreman	Second Shift
Dana Gilbert	Construction Foreman	Second Shift
Christopher Lester	Electrical Repairman	Second Shift
Fred Reedy	Plant Operator	Second Shift
Kenneth Hess	Chief Electrician	Second Shift
Tommy O'Quinn	Tipple Utility	Second Shift

MINE SAFETY AND HEALTH ADMINISTRATION

Ray McKinney	District Manager, District 5
Wayland Jessee	Assistant District Manager, Enforcement
David Woodward	Mining Engineer
Gary Roberts	Coal Mine Inspector
Arnold Doug Carico	Mining Engineer
Terry Marshall	Mechanical Engineer, Technical Support Group
James R. Baker	Educational Field Services Specialist
Jim Poynter	Conference and Litigation Representative
Roy Davidson	Inspection Supervisor

VIRGINIA DIVISION OF MINES

Frank Linkous	Chief, Division of Mines
Opie McKinney	Mine Inspector Supervisor
Carroll Green	Mine Inspector Supervisor
Joseph Altizer	Coal Mine Inspector
Don Keen	Coal Mine Inspector
Terry Ratliff	Coal Mine Inspector
Sammy Fleming	Coal Mine Inspector
Dwight Miller	Coal Mine Technical Specialist
Daniel Perkins	Coal Mine Technical Specialist
David Elswick	Coal Mine Technical Specialist

UNITED MINE WORKERS OF AMERICA

Max Kennedy	International Representative
Bill Shelton	Safety Committeeman
Lonnie Alsbrook	Safety Committeeman
Ralph Looney	Safety Committeeman
Danny Sparks	President of Local Union 2232

MINE LICENSE INFORMATION

Official Corporation	Island Creek Coal Company
Official Business Name of Operator	Island Creek Coal Company
Person with Overall Responsibility	Stephen D. Williams
Person in Charge of Health and Safety	Stephen D. Williams

LIST OF PERSONS INTERVIEWED

Steven Carter	General Preparation Plant Foreman
Franklin Howard	Electrical Repairman
Michael Aldridge	Preparation Plant Foreman
Dana Gilbert	Construction Foreman
Fred Reedy	Plant Operator
Kenneth Hess	Chief Electrician
Christopher Lester	Electrical Repairman
Tommy O'Quinn	Tipple Utility