UNITED STATES

DEPARTMENT OF LABOR

MINE SAFETY AND HEALTH ADMINISTRATION

OFFICE OF THE ADMINISTRATOR

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

UNDERGROUND COAL MINE INUNDATION (BLACKDAMP)

Moss No. 3 Portal A Mine (I. D. 44-01642)
Clinchfield Coal Company
Duty, Dickenson County, Virginia

April 4, 1978

Originating Office - Mine Safety and Health Administration
4015 Wilson Blvd., Arlington, Virginia 22203

UNITED STATES

DEPARTMENT OF LABOR

MINE SAFETY AND HEALTH ADMINISTRATION

OFFICE OF THE ADMINISTRATOR

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

UNDERGROUND COAL MINE INUNDATION (BLACKDAMP)

Moss No. 3 Portal A Mine (I. D. 44-01642)
Clinchfield Coal Company
Duty, Dickenson County, Virginia

April 4, 1978

By

James D. Micheal
Coal Mine Specialist

Robert A. Elam
Mining Engineer

Paul J. Componation
Coal Mine Safety Specialist

Originating Office - Mine Safety and Health Administration
4015 Wilson Blvd., Arlington, Virginia 22203
Joseph O. Cook - Administrator for Coal Mine Safety and Health

Abstract

This report is based on an investigation made pursuant to the Federal Mine Safety and Health Amendments Act of 1977 (83 Stat. 742 as amended by 91 Stat. 1290).

At approximately 12:30 p.m., on Tuesday, April 4, 1978, the single entry Drainway on Fryingpan Creek of the Moss No. 3 Portal A Mine, Clinchfield Coal Company, Duty, Dickenson County, Virginia, was inundated by an inrush of blackdamp (oxygen deficient air). The Drainway that was being advanced by a continuous mining machine cut into a mined out inaccessible abandoned area of the same mine. Two of the four men that were in the face area when the Drainway entry cut through were killed by the blackdamp; the other two men (one dragged the other) retreated to the surface and survived. Three other men were killed by the blackdamp while attempting to rescue the two missing men. Two other men were overcome by the blackdamp while attempting rescue efforts and had to be assisted to the surface; and another man involved in rescue attempts reportedly came out of the Drainway unassisted at approximately 1:30 p.m., after having been underground for about 40 minutes.

The names of the victims, their ages, occupations, and mining experience are listed in Appendix A.

TABLE OF CONTENTS

PART I

INUNDATION (BLACKDAMP) AND RECOVERY

OPERATIONS

The Moss No. 3 Mine, Clinchfield Coal Company, located near Duty, Dickenson County, Virginia, was opened into the Thick Tiller Coalbed on October 11, 1957. Clinchfield Coal Company, a subsidiary of The Pittston Company Coal Group, is the operating company of the Moss No. 3 Mine. At the time of this investigation, corporate and supervisory officials were as follows:

The Pittston Company Coal Group

G. R. Swanson	President
J. E. Nypaver	Vice-President, Operations
J. W. Crawford	Director of Health and Safety

Clinchfield Coal Company

C. M. Bailes	Vice-President
Henry Kiser	General Manager
W. B. Couch	Division Manager
M. L. West	Manager, Safety Division
Strickler Mullins	Superintendent, Moss No. 3 Mine
Robert Yokum	Mine Foreman, Moss No. 3 mine

The Moss No. 3 mine consists of Portal A, Portal B, Portal C, Portal D and the most recent opening, Portal A-2. The mine area associated with this accident was developed from the Moss No. 3 Portal A mine. See Appendix B for the general information for the Moss No. 3 Mine.

Mining Conditions Prior to Inundation

The main entries of the Moss No. 3 Portal A mine were developed in a southwesterly direction for a distance of approximately 12,300 feet. The coalbed dips northwest about 1.5 percent for approximately 8,600 feet from an elevation of about 1,600 feet at the portal entry to an elevation of 1,465 feet. The coalbed then rises about 0.7 percent for a distance of approximately 7,300 feet to the northwest property line. According to company estimates, 23,000,000 gallons of water enter the mine each 24 hours and 6,000,000 gallons per day were pumped from the mine. During development mining, the water was removed with pumps. However, as

areas were second mined, the pumps had to be removed which resulted in water accumulations at the lower elevations. At the time of the accident, mining in the areas of the mine below the 1,510 foot elevation had been completed and water had accumulated to the 1,495 foot elevation. See mine map in Appendix J. Parts of the 1 Right off 1 Right off 11 Right section along the northwest mine boundary and the 5 Right off 1 Right off the A Mains section, along the northeast boundary, were above the 1,495 foot elevation. These areas were not flooded but the rising water sealed the 1 Right abandoned area from the rest of the mine and this abandoned area became pressurized by the encroachment of the water.

The new Moss No. 3 Portal A-2 mine (see mine map, Appendix J) intersected the abandoned 5 Right section of the Moss No. 3 Portal A mine at the 1,504 foot elevation. The rising water in the abandoned areas of the Moss No. 3 Portal A mine presented a problem of eventual flooding of some of the active areas of the new Moss No. 3 Portal A-2 mine.

Near the first of March 1978, M. L. West, Manager, Safety Division, Clinchfield Coal Company, met with MSHA officials, Ray G. Ross, Frank C. Mann, Willis D. Ison, and James V. Bowman at Norton, Virginia, and discussed plans that would prevent flooding of the new Moss No. 3 Portal A-2 mine. The plan discussed at this meeting was to drill an 8-inch diameter horizontal hole from the surface into the abandoned 1 Right area, a distance of approximately 265 feet. This 8-inch borehole would permit monitoring of the atmosphere in the abandoned area and would serve as a centerline for an entry which would be driven with a continuous mining machine. According to the testimony of W. B. Couch, Division Manager, mine management considered enlarging the 8-inch diameter borehole to 24 or 30 inches; however, this part of the plan was not discussed at this meeting.

Shortly after the meeting with MSHA officials, the company employed a contractor to drill the 8-inch borehole. The borehole was drilled a distance of approximately 5 feet and the plan was abandoned due to the inability of the contractor to control the direction of the drill. West informed MSHA by telephone of the inability of the contractor to drill the 8-inch borehole, and received permission from MSHA to proceed with the plan to develop the Drainway entry with a continuous mining machine.

On March 17, 1978, West submitted a plan to MSHA for developing the Drainway entry. The plan stipulated that the entry would be developed by a continuous mining machine from the surface into an abandoned area a distance of about 225 feet; that adequate ventilation will be provided by a fan and venti-

lation tubing; that the roof will be supported with either conventional roof bolts or resin grouted rods and supplemented with timbers and/or crossbars where needed. The plan stated that, according to surveys, the abandoned area near the connection point did not contain water. Although the plan made no reference to the possibilities that the abandoned area might contain methane and/or blackdamp, it did provide that test drill holes will be kept 20 feet in advance of the face. The plan was received in the MSHA district office on March 21, 1978, and approved by the District Manager on March 24, 1978. See Appendix G Plan No. 1.

The development of the Drainway entry with a continuous mining machine was begun on Tuesday, March 28, 1978. Mining was done on three shifts each day. During the afternoon shift, (4:00 p.m. to midnight) on Friday, March 31, the continuous mining machine developed a mechanical problem and had to be brought to the surface for repair. The Drainway entry had been driven approximately 191 feet. At this time the first test boreholes were drilled.

On Monday morning, April 3, 1978, a second continuous mining machine was brought from the mine yard to the Drainway site to replace the malfunctioning machine. Glen Beverly, Ambrose Conley and Lawrence Shelby (victim), representatives from the National Mine Service Company, arrived at the Drainway site to repair the continuous mining machine.

At approximately 1:30 p.m., the same day, Ronald W. Franks and Vearle Hileman, MSHA District 5 personnel, arrived at the Drainway site. They had completed inspection duties at another mine and were enroute to their office in Norton, Virginia, via a mountain road (shortcut) which took them by the Drainway site. Although the Drainway entry was not part of their area of assignment, they decided to stop and investigate what appeared to them to be a new mine opening. According to Franks and Hileman there were two continuous mining machines on the surface. One machine was being repaired and the other was being serviced. No work was being done underground and the ventilation fan was not operating.

Franks and Hileman discussed the Drainway project with Henry Kiser, Manager of Mines, and Pete Capelli, Assistant to the General Manager. They were advised by Capelli that the company was concerned about encountering methane when the Drainway entry holed through into the abandoned area and that test boreholes were being drilled. The subject of blackdamp was not discussed by MSHA and company officials. The ventilation fan was started and Franks and Hileman checked the air movement in the drift opening and shortly afterwards left the mine site.

At the end of the midnight to 8:00 a.m. shift on Tuesday, April 4, 1978, the Drainway entry had been developed to within approximately 13 feet of the abandoned workings. The time remaining on the third shift did not permit the last advance of the Drainway to be roof bolted before the dayshift crew reported for work. See Appendix F, Photo 2. According to the preshift examination record book for the 8:00 a.m. shift at the Drainway entry, no unsafe conditions were found and 5,400 cubic feet a minute of air was measured at the inby end of the line curtain.

The Inundation

The Drainway crew consisting of Charles Breeding, continuous mining machine operator, Earl Castle Jr., shuttle car operator, William Arden, roof-bolting machine operator, Jack Nowlin, roof-bolting machine operator helper, and Marion Johnson, maintenance foreman, supervised by Richard Carson, Superintendent, began their work duties at 8:00 a.m., Tuesday, April 4, 1978.

Also Glen Beverly, Ambrose Conley and Lawrence Shelby, representatives from the National Mine Service Company, arrived at the Drainway site and began making repairs to the continuous mining machine that was located on the surface about 150 feet from the drift mouth.

At the start of the shift the crew trammed the continuous mining machine from the face of the Drainway entry to the surface. The roof-bolting machine was trammed from the surface to the face and the place was bolted. Strickler Mullins, Superintendent, arrived at the Drainway site about 9:30 a.m. He had been at the company shop having some shorter sections of drill steel augers made which would eliminate the whipping action that was occurring when test boreholes were drilled with the 10-foot auger sections. Mullins met Carson in the Drainway entry where they examined the face area for test boreholes that were drilled on the previous shift. They found a test borehole in the center of the entry, about 2 feet above the floor, and 8 1/2 feet deep. Breeding and Earl Castle Jr. extended the 8 1/2 foot borehole to a depth of approximately 13 feet where it penetrated the abandoned 1 Right area of the Moss No. 3, Portal A mine. The borehole was cleaned by allowing the drill auger to rotate freely as the drill augers were removed from the borehole. Air was flowing from the gob area into the Drainway. Breeding and Castle stated it blew dust 3 or 4 feet into the Drainway entry.

Immediately after the drill auger was removed from the hole, Mullins made tests for methane with an approved methane detector and found 0.15 percent. Carson's detector was inoperative and he obtained another from Mullins' vehicle. Mullins and Carson continued testing for methane and when very little could be detected, Mullins became concerned. He told Carson "that bleeder is three or four miles in there and there ought to be some methane coming out of the hole." Mullins instructed Breeding to go to the surface and get a flame safety lamp that was hanging on the canopy near the entry portal. Breeding and Castle were removing an air line from the face area to the compressor on the surface. The drills used to drill the test boreholes were operated by compressed air. Carson told Breeding to continue removing the air line and he would get the flame safety lamp. Carson returned with the flame safety lamp and started making tests for methane across the face of the Drainway entry. According to Mullins, the flame on the flame safety lamp "had a little red on it" and was extinguished as the safety lamp was passed across the front of the hole. Mullins, dissatisfied with Carson's method of testing, got the flame safety lamp from him, and either requested one of the workmen to take the flame safety lamp back from the face area and relight it or he took the flame safety lamp back from the face and relit it himself. Mullins adjusted the flame of the flame safety lamp to the first ring on the safety lamp glass chimney and made tests across the face of the Drainway entry but did not approach closer than 4 feet to the test borehole. The flame of the flame safety lamp was not extinguished and methane was not detected. Mullins stated that he gave the flame safety lamp back to "my boy" (person unidentified) and told him to take the safety lamp and to "put it back on the miner; set it up on a little square box on the miner (methane monitor) which they use for methane." However, as near as could be ascertained, the continuous mining machine had not been brought to the face at this time. After removing the air line from the Drainway entry to the surface, Breeding and Castle started tramming the continuous mining machine into the Drainway.

After completing the testing, Mullins returned to the surface, got into his vehicle, and traveled to the Bucu fan house located approximately 1,500 feet from the Drainway site. He telephoned Clarence Adkins (base operator) at the company office and told him to contact Henry Kiser, General Manager of Mines, or W. B. Couch, Division Manager, and advise them that a borehole had penetrated the abandoned area and that methane or water was not encountered. Mullins then returned to the Drainway entry. According to Mullins" testimony no

further tests were made with the flame safety lamp. Breeding stated that he did not know where the flame safety lamp was, and that someone told him it was on the machine somewhere but he did not remember seeing the flame safety lamp sitting on the "little box" located in front of the operator's station of the continuous mining machine. Breeding stated that the only thing he knew was that Mullins was the only one who had the flame safety lamp. However, Mullins stated that he saw the lighted flame safety lamp sitting on the continuous mining machine after the third shuttle car of coal had been loaded from the face.

The machine was trammed into position at the face of the Drainway entry about 11:45 a.m. and mining of coal was started. Mullins and Carson, thinking there should be methane in the abandoned area, positioned themselves on either side of the continuous mining machine inby the operator, and continuously tested for methane with approved detectors during mining operations. Marion Johnson, maintenance foreman, was standing behind the operator's position observing mining. See sketch, Appendix I, Figure 1.

About 12:30 p.m. the fourth shuttle car of coal was loaded and the shuttle car left for the surface. Breeding was operating the continuous mining machine cutting coal from the face for the next shuttle car when the cutting head mined through into the abandoned 1 Right area on the left side of the entry. Mullins stated that he felt a blast of air and immediately called to Breeding "hold it, I believe the thing is through." See Appendix F., Photo Nos. 3 and 4. Breeding stopped the machine immediately. At that time Mullins heard someone hollering and struggling on the opposite side of the continuous mining machine. He crossed under the boom of the machine to investigate. Breeding stated, "When we cut through Dick Carson hollered and said, Boys I am feeling dizzy. I'm going to get out of here and then it seems like just a matter of seconds that everything seemed like it blacked out." Mullins, after crossing under the miner boom, attempted to drag Marion Johnson but was unable to do so because of Johnson's size. Mullins then dragged Breeding toward the surface for a distance of approximately 150 feet. At this point Mullins became too weak to drag Breeding any further and continued to the surface without him. While hanging on to the canopy support at the portal, Mullins waved his arms to get attention of workmen on the surface.

Recovery Operations

The following description of the recovery operation and the account and time of the activities that took place following the accident are not considered absolute. Considering the extreme emergency that existed immediately following the inundation, and the physical effect the oxygen deficient atmosphere had on the persons involved in the rescue attempts it is understandable that areas of conflict could exist concerning their activities.

Earl Castle Jr. had just unloaded a shuttle car of coal onto the surface storage pile and was returning toward the portal when he saw Mullins waving his arms. He recognized Mullins was excited and heard him say "We got some boys down; come on let's help them." Castle stopped the shuttle car and went into the Drainway entry. He found Breeding lying on the floor near the water hole, approximately 80 feet inby the Drainway portal. He turned him over and wiped the mud from his face, loosened his clothing and saw he was breathing.

William Arden and Jack Nowlin had just finished their lunch and were walking toward the Drainway portal when they also saw Mullins waving his arms and heard him holler. Mullins, Arden and Nowlin followed Castle into the Drainway to where Breeding was lying. Apparently Mullins and Nowlin assisted Breeding a short distance toward the portal and Mullins returned the remainder of the way to the surface alone. Nowlin went back to the water hole where he was overcome. In the meantime, Arden and Castle continued toward the face. Castle later stated that he went to within 10 or 12 feet of the boom of the continuous mining machine and found Carson lying near the line brattice and another man near him. He also saw Arden, who had been overcome, lying on his face and turned him over. Realizing he could not help the overcome men, Castle started to run. He ran two or three steps toward the surface and was overcome.

Lawrence Shelby, Glen Beverly, and Grayson Conley, the National Mine Service Company representatives, who were repairing the continuous mining machine about 150 feet from the Drainway portal had just finished their lunch. Shelby and Beverly were seated on some crib blocks near the machine when they saw Mullins waving his arms; Conley had gone to his automobile for a drink of water. Beverly went to the Drainway portal to ascertain the problem and Mullins informed him of the situation. Beverly returned to his automobile for a cap lamp. Enroute he met Ray G. Ross, District Manager, District 5, MSHA, Frank C. Mann, Supervisory Mining Engineer, Willis D. Ison, Subdistrict Manager, and M. L. West, Manager Safety Division, Clinchfield Coal Company, who had stopped at the Drainway site while enroute to Dante from duties

at the nearby McClure No. 2 mine. Ross, Mann, Ison, and West saw someone at the Drainway portal, later identified as Mullins, waving his arms, but thought he was only trying to get the attention of workmen in the area. As they neared the portal they became aware that something was wrong. West started running toward the portal followed by Ross, Mann, and Ison. Mullins told them he had men down on bad air. At this time there were six men underground: Richard Carson, Superintendent; Marion Johnson, Maintenance Foreman; Charles Breeding, continuous mining machine operator; Earl Castle Jr., shuttle car operator; William Arden, roof-bolting machine operator; and Jack Nowlin, roof-bolting machine operator helper.

West, Ross, Ison, Shelby, and Mullins entered the Drainway with Mann following closely behind. They found Breeding approximately 50 feet inby the portal. After determining he was in no immediate danger, West, Ross, Ison, and Shelby continued inby toward the waterhole. Mann and Mullins assisted Breeding to the surface. At this time Mullins told Mann they had cut into an abandoned area and that men were down on bad air.

West and Ross, after traveling just inby the waterhole, became dizzy and disoriented. Realizing they were in trouble, they decided to retreat and struggled to the surface. Ison and Shelby continued on toward the face area where they too were overcome by the blackdamp. Beverly who had returned to his vehicle for a cap lamp entered the mine last. He stated that as he started underground he met two men coming out toward the surface. He did not recognize them, but later they were identified to be West and Ross. On reaching the waterhole Beverly found someone with a red T-shirt lying on the floor. It was later ascertained that Nowlin was wearing a red T-shirt. Beverly was overcome at this point. At this time there were eight men underground.

On arriving back on the surface, West informed Ross that they didn't have communications at the Drainway site and that he was going back to the McClure No. 2 mine site to get Henry Kiser, who had a vehicle equipped with a two-way radio and he would call the office for assistance. According to statements from Ross and Mann, after gaining composure, they reentered the Drainway entry to the waterhole where they found Nowlin, in a semi-conscious condition, lying partially in the water. They assisted him to the surface. Ross and Mann reentered the Drainway entry a third time and traveled to the waterhole where they found Glen Beverly and assisted him to the surface. At approximately 1:00 p.m. rescue efforts temporarily ceased with Carson, Johnson, Ison, Arden, Shelby and Castle still underground.

statements from Mullins differ from the statements from Ross, Mann and Beverly regarding their activities during recovery efforts. Mullins stated that he helped rescue Beverly who had entered the Drainway before the arrival of Ross, Mann, Ison and West to help rescue Breeding. Beverly stated, that before he went underground and while he was enroute from the Drainway portal to his automobile to secure a cap lamp, he met four men walking toward the Drainway portal who were later identified as Ross, Mann, Ison and West. According to statements from Ross and Mann, Breeding was found in a semi-conscious condition about 50 feet inby the Drainway portal and Mann and Mullins assisted Breeding to the surface. Ross and Mann reentered the Drainway entry and found Beverly down near the waterhole and they assisted him to the surface.

In the meantime, West contacted Henry Kiser at the McClure No. 2 mine and informed him of the accident at the Drainway. Immediately they departed for the Drainway in separate vehicles. Enroute Kiser attempted to contact the base operator with his radio but because of terrain and weather conditions he did not make contact. They arrived at the Drainway site where Ross informed them that Ison was still underground. Kiser put his cap lamp on and started toward the portal with the intention of entering the Drainway. West and Ross restrained him and told him the mine was unsafe and protective equipment was needed.

Ross, Mann and West talked to Breeding in an effort to try and determine what had occurred in the face of the Drainway entry and to determine what course of action to take. Breeding told them that the Drainway entry had cut through into old works, and as well as he could remember the line curtain was 20 to 30 feet from the face. Mann stated that he checked the air movement into the Drainway entry and found very little air entering.

Ross, Mann, Kiser and West discussed the Drainway ventilation system and agreed to reverse the fan which would change the exhaust system to a blowing system of ventilation; theorizing that the exhaust system of ventilation could be pulling oxygen deficient air from the abandoned area into the Drainway entry. The fan was stopped at 1:05 p.m. and turned around to operate blowing. The fan was restarted at 1:08 p.m.

While the fan was being turned around Kiser went to his vehicle and contacted the base operator by radio. He advised the base operator about the accident at the Drainway and told him to have oxygen breathing apparatus delivered to

the Drainway site by helicopter and to notify the company mine rescue team and have the team transported to Drainway by helicopter. Kiser also requested that a doctor and nurses be dispatched to the Drainway site by helicopter as soon as possible.

After the fan had been operating blowing for approximately 20 minutes Castle, who had been underground for approximately 40 minutes, walked out of the drift mouth.

At approximately 1:30 p.m. the company helicopter arrived at the Drainway site with three Draeger oxygen breathing apparatus and took off immediately after unloading. W. B. Couch, Division Manager, arrived at the Drainway site about this time. No one present at the Drainway at this time had been trained in the care and use of the Draeger oxygen breathing apparatus. However, West and Couch made a desperate attempt to outfit themselves with the Draeger apparatus with the intent of making rescue attempts underground. Not being familiar with this type of equipment they were unsuccessful in getting the machines to operate properly. At approximately 1:35 p.m. two company emergency medical rescue units arrived at the Drainway site.

The helicopter landed at the Drainway site with Doctor W. A. Davis and two nurses, Lois Buchanan and Virginia Helbert, at approximately 1:40 p.m. and took off immediately.

While awaiting the arrival of the rescue team members, West and Couch decided to explore the Drainway entry by traveling on intake air behind the line brattice. They traveled as far as the waterhole and began to feel the effects of the blackdamp and decided to retreat to the surface.

At approximately 2:00 p.m. the helicopter landed at the Drainway site a third time with Milton McArthur Kiser, Captain, and Archie E. Salyer, team member, of the Moss No. 2 mine rescue team and three additional Draeger oxygen breathing apparatus. The helicopter left immediately. The two mine rescue team members put on the oxygen breathing apparatus and assisted Couch in putting on a machine. The three men were briefed by West regarding the accident and the conditions expected to be found underground and he instructed them to recover the first body that they located. The three men entered the Drainway at 2:10 p.m. By 2:20 p.m. they had recovered the first three bodies. At this time the helicopter landed for the fourth time with Harold N. Phillips, mine rescue team trainer and Wayne Fields and Davis Moore,

mine rescue team members. The five rescue team members and Frank Phillips, construction foreman, all wearing oxygen breathing apparatus went underground and recovered the last two bodies. The last body was brought to the surface at approximately 2:35 p.m. Harold Phillips and Milton Kiser reentered the Drainway and examined the face area to make sure all the bodies had been recovered. While at the face area they made tests for methane with an approved methane detector and made tests for oxygen deficiency with an Edmont Wilson oxygen analyzer. A maximum of 0.5 percent methane and 19.5 percent was detected. 1/ See Appendix I, Figure 2 for location of bodies. During recovery operations on April 4, 1978, air measurements were not taken.

Dr. Davis and the two nurses examined the bodies as they were brought to the surface and found no signs of life. However they gave each one cardiopulmonary resuscitation but to no avail. The five victims were taken by the company ambulances to the Huff-Cook funeral home in St. Paul, Virginia. The certificates of death, signed by Dr. W. A. Davis, list asphyxia, exposure to low oxygen tension, as the cause of death. See Appendix A for Certificates of Death.

The other persons that were overcome by blackdamp during rescue attempts were examined by Dr. Davis at the Drainway site. Mullins and Castle were taken by ambulance to a hospital for observation.

1/ Normal air contains approximately 21 percent oxygen. The following physiological effects of oxygen deficient atmosphere have been observed:

Oxygen Content	Effect
17%	Faster, deeper breathing
15%	Dizziness, buzzing in ears, rapid heart beat
13%	May loose consciousness if explosure prolonged
9%	Fainting, unconsciousness
7%	Life endangered
6%	Convulsive movements, death

It should be pointed out that all such effects vary with the individual and the period of his exposure.

The Federal Mine Safety and Health Act requires all active workings be ventilated by a current of air containing not less than 19.5% oxygen and not more than 0.5% carbon dioxide.

Upon completion of recovery operations, all persons were removed from the Drainway entry, and a danger sign was posted at the portal. Company and MSHA personnel were assigned to guard the site around the clock to prevent anyone from entering the Drainway until an investigation of the occurrence was made. At 5:50 p.m. April 4, 1978, a 103(k) order of withdrawal was issued by Donnie F. Short, MSHA inspector.

Participating Organizations: The following is a list of officials who assisted in directing the recovery operations:

Clinchfield Coal Company

Henry Kiser	General Manager of Mines
W. B. Couch	Division Manager
Strickler Mullins	Superintendent, Moss No. 3, Portal A mine
M. L. West	Manager, Safety Division

Mine Safety and Health Administration

Ray G. Ross	District Manager
Frank C. Mann	Supervisory Mining Engineer

See Appendix C for the names of employees of Clinchfield Coal Company, mine rescue team members and the two service representatives from the National Mine Service Company who participated in the recovery operations.

1/ continued.

There are several processes at work underground which cause oxygen depletion. Removal of oxygen occurs by absorption, adsorption, and oxidation. Ground water depleted of its own oxygen will rob the mine atmosphere of oxygen, by absorption. Coal may occlude oxygen on its surface. Sulfide minerals oxidizing slowly in place can remove some oxygen from the air. In an underground area, such as the abandoned 1 Right area, several processes acting concurrently can create a serious hazard as was evident by the inundation of April 4, 1978.

A report of tests conducted by Michigan Technological University shows oxygen can decrease to 5 percent within one week in a sealed off coal mine section without a fire. (USBM CONTRACT REPORT NO. S0231075. Michigan Technological University College of Engineering, Department of Mining Engineering.)

PART II

INVESTIGATION, DISCUSSION AND EVALUATION

Investigation Committee

The underground investigation of the cause of the inundation (blackdamp) was conducted April 6 and 7, 1978. The following persons were members of the investigation committee:

Virginia Division of Mines and Quarries

Frank Linkous	Technical Assistant

The Pittston Company Coal Group

John W. Crawford	Director of Health and Safety

Clinchfield Coal Company

W. B. Couch	Division Manager
M. L. West	Manager, Safety Division

United Mine Workers of America

Edward Gilbert	International Safety Director
Floyd T. Mullins	Safety Coordinator, District 28
Eugene Marshall	Safety Committeeman

Mine Safety and Health Administration

Frank C. Mann	Supervisory Mining Engineer
James D. Micheal	Coal Mine Specialist
James V. Bowman	Coal Mine Technical Specialist (Ventilation)
Clarence A. Goode	Coal Mine Inspector (Special Investigator)

Other persons who participated in or were present during recovery operations and/or the investigation are listed in Appendix C.

Interviews

As part of the investigation into the cause of the inundation (blackdamp), MSHA, in conjunction with the Virginia Division of Mines and Quarries, conducted interviews with several company officials and employees. These interviews were conducted on April 7 and May 4, 1978, at the Clinchfield Coal Company Training Center at Carbo, Virginia. A list of persons who participated in or were present during all or part of these interviews is in Appendix D.

Transcripts of the interviews are available for examination at the Mine Safety and Health Administration headquarters, 4015 Wilson Boulevard, Arlington, Virginia 22203.

Investigation

On April 5, 1978, MSHA personnel met in District 5 headquarters in Norton, Virginia, selected an investigation team and developed and discussed plans and procedures for conducting the investigation.

On April 6, 1978, MSHA investigation team met with company, State and United Mine Workers of America officials at the Drainway site and discussed plans and procedures for conducting the investigation. At this meeting final plans and procedures were developed and agreed to by all interested parties.

The plans and procedures for conducting the investigation required that a preshift examination of the Drainway be made by four members of a mine rescue team (three company and one MSHA), wearing self contained oxygen breathing apparatus, equipped with a communication system and testing equipment consisting of flame safety lamp, oxygen analyzer and carbon dioxide detectors.

The plan stipulated that four members of a mine rescue team (three company and one MSHA) be present in the face area of the Drainway at all times while investigators were underground. The mine rescue team members would constantly monitor the methane and oxygen content of the air. While persons were underground a back-up mine rescue team, in readiness, was required on the surface. The plan limited to four the number of investigators who could be underground at one time. Each team of investigators consisted of company, State, MSHA and UMWA personnel. The plan also required that a log be kept of all activities during the investigation and a record made of all persons entering and returning from the mine.

The use of the mine rescue teams in the conduct of the investigation was considered necessary because the abandoned area could not be ventilated and cleared of blackdamp; the blackdamp in the abandoned area would tend to flow into the Drainway entry during a drop in barometric pressure; 2/ and the ventilation system employed at the Drainway was considered

---

2/ The atmosphere in a sealed gob area will expand during drops in barometric pressure. A drop in barometric pressure could have contributed to the black damp entering the

marginal. The limitation on the number of people permitted underground at one time was necessary to prevent the restriction of ventilation from the face area of the Drainway.

While the meeting between the company, State, MSHA and UMWA officials was being conducted, James L. Banfield Jr., MSHA mining engineer, took pressure measurements in the ventilation tubing and calculated that the 6F-28 Jeffrey fan was supplying approximately 9,300 cubic feet of air a minute to the Drainway entry.

At approximately 9:31 a.m. on April 6, 1978, the underground investigation into the cause of the inundation was started. A mine rescue team wearing oxygen breathing apparatus made a preshift examination of the Drainway entry and found 21 percent oxygen and 0.05 percent carbon dioxide in the face area near the last row of installed roof bolts. Methane was not detected and no unsafe conditions were found. The team returned to the surface at approximately 9:48 a.m.

A mine rescue team reentered the Drainway and made the necessary tests at the face and found conditions the same as were found during the preshift examination. At 10:08 a.m. the first team (4) of investigators entered the Drainway entry open faced and inspected the area and returned to the surface at 10:28 a.m. with the mine rescue team.

At 10:39 a.m. another similarly equipped mine rescue team entered the Drainway. While making tests in the face area they detected 17 percent oxygen and 0.6 percent carbon dioxide in the vicinity of the continuous mining machine. The team advised the surface control of these conditions and were ordered to return to the surface. All persons had been withdrawn from the Drainway entry at 11:02 a.m.

2/ continued

Drainway. According to the barometric pressure recorder at the MSHA Laboratory in Norton, Virginia, the following pressures were recorded on April 5 - 6, 1978.

Date	Time	Pressure
April 5	12:00 noon	29.90
April 6	9:00 a.m.	29.79
	10:00 a.m.	29.78
	11:00 a.m.	29.76
	12:00 noon	29.73
	2:00 p.m.	29.66

At 11:25 a.m. due to the low oxygen content, a decision was made to install a larger fan. A larger capacity fan had been brought to the Drainway site prior to the beginning of the underground investigation.

The larger capacity Joy fan was installed blowing and placed in operation at 12:37 p.m. on April 6, 1978. Air measurements made with a Pitot tube and Magnehelic gauge in the ventilation tubing near the fan showed that the larger capacity fan was producing approximately 17,800 cubic feet of air a minute. An air measurement taken with an anemometer in the drift mouth showed that approximately 13,600 cubic feet of air a minute was returning from the Drainway entry.

At 1:05 p.m., after the Joy fan had been operating for approximately 28 minutes, a mine rescue team entered the Drainway. Tests made in the face area by the team showed that the oxygen content of the air had been restored to 21 percent and the carbon dioxide had been reduced to less than 0.1 percent and methane was not detected. The air measurement made by the team showed that approximately 8,600 cubic feet of air a minute was reaching the inby end of the line curtain.

At 1:25 p.m. after the Drainway was reported safe by the mine rescue team, the underground investigation resumed. The investigation continued without further disruption following the same procedures as previously described. After all members of the investigation committee and all other interested persons present had inspected the accident area, company engineers, MSHA, and State personnel entered the Drainway for the purpose of obtaining information to prepare a sketch of the Drainway entry and the accident area. This part of the investigation was concluded at 3:11 p.m.

2/ continued

The 0.06 inch pressure drop that occurred between 9:00 a.m. and 12:00 noon on April 6, 1978, while the investigation was being conducted, caused an expansion of the atmosphere in the abandoned area and resulted in a migration of the blackdamp from the abandoned area into the Drainway entry.

During this time the oxygen content in the Drainway entry, as measured with an Edmont Wilson oxygen analyzer, decreased to 17 percent. The carbon dioxide content was 0.6 percent. The ventilation system being used was incapable of providing a sufficient quantity of air to dilute, render harmless and carry away the oxygen deficient atmosphere migrating into the Drainway entry from the abandoned area.

Guards were posted at the Drainway site to prevent anyone from entering the mine. MSHA, company, State and UMWA officials discussed plans and procedures to continue the investigation the following morning.

On Friday, April 7, 1978, the investigation of the accident at the Drainway entry continued. A preshift examination of the Drainway was made by a mine rescue team before other persons were permitted to enter the mine. Air measurements, tests and examinations made during the preshift examination by Harry Markley, MSHA, showed the Joy fan was producing approximately 15,800 cubic feet of air a minute and that approximately 7,600 cubic feet of air a minute was reaching the endby end of the line curtain; that the air in the face area contained 21 percent of oxygen and no methane, and no unsafe conditions were found.

Plans were made on April 6 by the investigators to reconstruct the ventilation system of the Drainway using the Jeffrey fan to simulate as near as possible the ventilation system that existed at the time of the accident on April 4. W. B. Couch requested permission to repair any damages that had occurred to the line curtain during the investigation. MSHA granted this permission and Couch, C. M. Bailes, Vice President, and Pete Capelli, Assistant to the General Manager, accompanied by James Bowman, MSHA, entered the Drainway and repaired and restored the line curtain to good condition.

At 11:14 a.m. the Joy fan was taken out of service and the Jeffrey fan which was in use at the time the accident occurred was reinstalled. During the installation of the Jeffrey fan the ventilation tubing extending inby from the fan to the line curtain was straightened to reduce air resistance and the holes in the ventilation tubing located near the fan were repaired

---

2/ continued

Coincidentally, on Tuesday, April 4, 1978, the date of the accident a similar condition existed. Records of the barometric pressure recorded at the laboratory at the MSHA District 5 office, Norton, Virginia, which is approximately 29 miles from the Drainway site, from 10:00 a.m. to 2:00 p.m. on Tuesday, April 4, 1978, are as follows:

Time	Pressure
10:00	29.94
12:00 noon	29.88
2:00 p.m.	29.82

to reduce air losses. After these repairs had been made and the ventilation system restored, as near as it could be determined, as it was at the time of inundation, a mine rescue team entered the Drainway entry and took air measurements and gas tests. Air measurements made at the fan showed the fan was exhausting approximately 16,000 cubic feet of air a minute and approximately 10,000 cubic feet of air a minute was entering the Drainway portal. An air measurement made by Raymond Strahin, MSHA, at 12:31 p.m. showed that approximately 2,600 cubic feet of air a minute was reaching the endby end of the line curtain which was 30 feet from the face. The gas tests showed oxygen levels ranging from 19.25 to 21 percent in the face area and no methane was present. Using chemical smoke the mine rescue team which included Raymond Strahin and David Wolf of MSHA determined the air flow pattern in the face area. This pattern showed the intake air was moving from the boom of the continuous mining machine to the end of the line curtain and was not penetrating the face area. The face of the Drainway was not being adequately ventilated by the simulated system. The mine rescue team returned to the surface at 12:44 p.m.

After the simulated tests were concluded, in order to continue the investigation the Jeffrey fan was replaced with the Joy fan operating blowing. A mine rescue team entered the Drainway at 2:37 p.m. and made air measurements and gas tests which showed that the ventilation was adequate and the air quality in the face area was satisfactory.

A permissible-type Marietta continuous mining machine, serial number 7486 was in the face area. The cutting head of the machine was down near the mine floor and against the face of the coal and was partially obscured by loose coal and thin layers of draw rock which had fallen from the mine roof. See Appendix F, , Photo No. 3. The opening that had

---

2/ continued

A barometric pressure drop of 0.12 inches occurred during the 4-hour period.

Also, when the lower levels of the mine between the main entries and the 1 Right Section were being inundated, the water encroachment sealed the 1 Right area from the rest of the mine and pressurized it. This along with the falling barometer made the pressure within the sealed abandoned area greater than the pressure at the face of the Drainway entry causing airflow from the gob area into the Drainway when the area was mined into.

been made into the abandoned area by the continuous mining machine and the test borehole that had penetrated the abandoned area were not visible. See Appendix F, Photo No. 4. The last 13 feet advance of the Drainway entry was 13 feet wide, which was the width of the machine cutting head. See Appendix I, Figure 2 and Appendix F, Photo No. 2. The continuous mining machine controls were in the "off" position and the control switch for the illumination system was in the "on" position.

At 2:52 p.m. power was applied to the continuous mining machine and the machine was trammed back from the face for a distance of approximately 15 feet by the mine rescue team. The machine was then deenergized.

After temporary roof supports (posts and jacks) were installed inby the permanent roof supports (roof bolts), an examination of the face area by the investigators revealed an irregularly shaped opening into the abandoned area approximately 14 x 20 inches on the left side of the place approximately 2 feet from the bottom which had been made by the continuous mining machine. See Appendix F, Photo No. 4. Also a test borehole was observed in about the center of the place approximately 18 inches from the roof. This test hole had also penetrated the abandoned area and was approximately 5 feet 3 inches in depth.

The quality of the air in the abandoned area was determined by putting detection equipment through the 14 x 20 inch opening. These gas tests showed the air in the abandoned area contained 12 percent oxygen, 2 percent carbon dioxide and no methane. The flame safety lamp that was found underground by the investigators on April 6, was taken into custody and removed to the surface by James Bowman of MSHA.

At 4:30 p.m. all persons returned to the surface and the underground investigation was concluded.

Following the official investigation into the cause of the inundation, including the interviews with company officials and employees on April 7, and May 4, 1978, nine 104(a) and one 104(d)(1) citations, one 103(k) and one 107(a) orders of withdrawal were issued to the Clinchfield Coal Company. See Appendix E.

Discussion and Evaluation

Planning - Drainway Project

According to testimony of Henry Kiser, General Manager, plans for draining the Moss No. 3 mine had been discussed

with Max Bailes, Vice President, Robert Ryland, Chief Engineer, W. B. Couch, Division Manager, and Monroe West, Manager, Safety Division, over the past two years. These discussions increased and included M. L. West, Manager, Safety Division during the last six months. Kiser stated that during this planning "There was not a great discussion within itself, just any particular, about blackdamp; but of course, you know, anytime you're cutting into it, you're going to be thinking of that." He stated that the hazards presented by water and gas were discussed with these mine officials during the initial planning of the Drainway project. Kiser said, "I'm sure everybody was of the same opinion that there was more gas, that it was a real gassy part of the mine." He stated that he took part in planning the Drainway project and that Monroe West submitted the plans to MSHA and the State.

Kiser visited the Drainway entry about every day from the time it started. He did not visit the Drainway on Friday, March 31, 1978, because J. E. Nypaver, Vice President, Operations, and Max Bailes visited the Drainway that day. On April 3, the day before the accident, Kiser visited the Drainway. He stated that he knew the Drainway entry was getting close to the abandoned area, and that he discussed the possibilities of encountering methane and water when the Drainway holed through into the abandoned area with Strickler Mullins. However, he did not discuss the possibilities of encountering blackdamp with him.

W. B. Couch stated he had knowledge of and was involved in developing plans for the Drainway entry for a period of from three to six months prior to the starting of the Drainway project. About the first of March 1978, plans were made to develop the Drainway entry with a continuous mining machine. Couch stated that during the planning of the Drainway the only hazardous conditions that he was concerned about were water and methane and that to his knowledge, no one ever talked to him about blackdamp nor considered a method of checking for blackdamp through a borehole, except that Strickler Mullins was informed to have a flame safety lamp.

Couch also stated that from a study of the water levels and contours in this area of the mine, he knew that the abandoned area in question was pressurized and that the atmosphere in this area "would back up on them" in the Drainway. Couch visited the Drainway on April 3, 1978, the day before the accident and talked to Strickler Mullins. However, he did not mention or discuss blackdamp in any way with him nor suggest that blackdamp was a hazard that he should be concerned about when cutting through into the abandoned area.

According to Monroe West's testimony, he was involved in the initial planning of the Drainway project. He stated that during the development of the plans for the Drainway he discussed with Couch "the possibilities of having a big body or a body of methane and/or blackdamp in behind there." However, he did not discuss this possibility with Strickler Mullins. In early March, West visited MSHA District 5 headquarters and discussed the initial planning of the Drainway with MSHA officials. During this discussion West mentioned the possibilities that the abandoned area in question might contain methane but did not expect the area to contain water accumulations. The possibility that the abandoned area might contain blackdamp was not mentioned or discussed during this meeting.

On March 17, 1978, West informed MSHA officials that the initial plan for the Drainway, which consisted of drilling an 8-inch hole into the abandoned area, had failed. The same day West submitted to MSHA a written plan to develop the Drainway entry with a continuous mining machine. This plan, which was approved by the District Manager on March 27, 1978, made no reference to the possibility that the abandoned area in question might contain methane or blackdamp.

Strickler Mullins, Superintendent of the Moss No. 3 Portal A mine, which included the Drainway project, stated that he never saw a written plan for driving the Drainway but that his superiors had discussed such a plan with him several times. He stated that these discussions and final planning for developing the Drainway entry dealt with the problems of methane and water and what course of action he would take if methane and/or water were encountered when the Drainway entry penetrated the abandoned area. Mullins stated that none of his superiors nor anyone from the Safety Department ever discussed the possibility of the abandoned area containing blackdamp, that he did not consider such possibility himself, and that he did not discuss such possibility with his supervisors and workmen assigned to perform the work at the Drainway project. Mullins stated, "I was more afraid of methane than anything else, or water; because we just about knew where the water was by the elevations on the map, and by it being sealed with water, (it meaning the abandoned area), the methane bothered me more than anything else. Because I figured when we bored a hole through it, the thing would come out pure methane."

MSHA investigators conclude that the planning of the Drainway project by mine management and the Safety Department was inadequate and incomplete because: (a) due consideration

was not given to the possibility of the abandoned 1 Right area containing blackdamp; (b) the final plan contained no provisions or safety precautions that would permit the Drainway to penetrate the abandoned area in a safe manner and under controlled conditions in the event blackdamp was encountered; (c) mine management did not discuss the possibility of the abandoned 1 Right area containing blackdamp with the employees at the Drainway prior to or during development of the Drainway entry and four workmen were caught unaware by the inrush of blackdamp when the entry cut through into the abandoned area; and (d) during the investigation the Drainway ventilation system was found to be inadequate which indicates that the ventilation system was a product of inadequate and incomplete planning.

Ventilation of Drainway Entry

Development of the 1 Right northwest area of the Moss No. 3 Portal A mine (area involved in the accident) was completed in 1972 and second mining in this area was started the same year. Pillars of coal were left around the perimeter of the area to serve as a bleeder system for the gob area. The Bucu fan located in the northwest area of the mine was supposed to have been ventilating the 1 Right gob area as well as other gob areas in the mine. It is unknown how effectively the 1 Right gob area was ventilated because as second mining progressed dewatering pumps were removed and water was permitted to accumulate in the lower elevations of the mine. By March 1978, water had inundated all areas of the mine below the 1,495 foot elevation. The rising water sealed the 1 Right gob area from the rest of the mine and rendered the Bucu fan ineffective. On March 17, 1978, after an inspection and evaluation of Bucu fan by MSHA, the company was given permission to remove the Bucu fan from service. The encroachment of the rising water pressurized the 1 Right abandoned area.

The Drainway (single entry) approximately 265 feet in length was developed from the surface into the abandoned 1 Right area of the Moss No. 3 Portal A mine. Since the Drainway entry was developed from the surface, the main mine ventilating system could not be utilized to provide the ventilation. The Drainway entry was ventilated by a Jeffrey 6F-28 aerodyne fan located on the surface and operated exhausting. In development of the Drainway entry, management planned to use 24-inch diameter, spiral reinforced collapsible tubing to direct the air to the face area. However, when a few sections of the tubing had been installed, some of the tubing collapsed from the fan pressure. All but about 50 feet of the collapsible tubing was replaced by 18 ounce plastic line brattice which was used from the end of the tubing inby to within 30 feet of the face. See Appendix F, Photo Nos. 1 and 5.

From observations and measurements made during the investigation, the Jeffrey fan, equipped with a 40 horsepower motor, was operating in the B-blade position. The fan characteristic curves indicate that for this fan to operate efficiently with this ventilation system in the B-blade position a larger horsepower motor would be required.

The approved Ventilation System and Methane and Dust Control Plan for the Moss No. 3, Portal A mine, of which the Drainway was a part, required the line brattice to be maintained to within 18 feet of the deepest point of penetration of the face and that the continuous mining machine operator be a minimum of 2 feet outby the end of the line brattice when the machine is cutting coal from the face. A minimum of 5,000 cubic feet of air a minute was to be provided at the end of the line brattice. It was evident from the testimony that the mine superintendent was not familiar with these requirements. According to the records of the preshift examiners, as recorded in the book for that purpose, the quantities of air measured at the end of the line brattice were 3,045 cubic feet a minute on March 30, 1978, 4,200, 4,600 and 4,800 cubic feet a minute on April 3, 1978, and 5,400 cubic feet a minute on April 4, 1978, the day of the inundation. Air measurements were not made during recovery operations on April 4, 1978; However, the fan was changed from exhausting to blowing during the recovery operations.

After the ventilation system was reconstructed and the line curtain repaired and restored to good condition by mine officials, to simulate as close as practicable the ventilation system in use at the time of the accident, MSHA investigators determined that the Jeffrey fan was delivering approximately 2,600 cubic feet of air a minute to the inby end of the line curtain, and that 10,000 cubic feet of air a minute was entering the Drainway portal. Also the air flow pattern in the face area as determined by chemical smoke showed that the face area was not ventilated adequately with this simulated system of ventilation because of the low air quantity and the line curtain being 30 feet from the deepest point of penetration of the face.

MSHA investigators conclude that the Drainway ventilation system was inadequate to comply with the minimum requirements of the approved Ventilation System and Methane and Dust Control Plan which requires at least 5,000 cubic feet of air a minute at the end of the line curtain in places where coal is being cut, mined or loaded and where roof bolts are being installed.

On April 4, 1978, at the time of the accident, the ventilation system did not provide sufficient air in the Drainway entry to dilute and render harmless and carry away the inrush of blackdamp from the abandoned area.

On April 6, during the investigation, the ventilation system was found to be inadequate and the investigation was delayed until a larger capacity fan was installed which provided adequate face ventilation.

On April 7, after the ventilation system was reconstructed and repaired only 2,600 cubic feet of air a minute was measured at the end of the line curtain which is less than the minimum requirements of the approved Ventilation System and Methane and Dust Control Plan.

Test Boreholes, Gas testing Procedures and Gas testing Equipment

The investigation revealed that the Drainway (single entry) approximately 15 - 17 feet wide and 6 feet high had been developed a distance of 265 feet. Six test boreholes, three in each coal rib, had been drilled from 12.66 feet to 22 feet in depth and were from 13 to 19 feet apart. The first rib boreholes had been drilled when the face of the Drainway was approximately 70 feet from the abandoned area. See sketch in Appendix I, Figure 1.

According to the testimony of company officials the 1 Right area liberated methane during development and therefore they anticipated encountering methane when the Drainway entry penetrated the abandoned 1 Right area. Company officials knew the 1 Right abandoned area was sealed off from the rest of the mine by water; that the sealed area was pressurized from the rising water; and that the air would flow from the abandoned area into the Drainway entry when the Drainway entry penetrated the abandoned area.

Both Mullins and Carson (victim) had approved methane detectors in their possession underground in the Drainway entry when the accident occurred. According to Mullins' statements, adequate tests for methane were made immediately after the test drill hole penetrated the abandoned area and tests for methane were made continuously until the continuous mining machine cut a hole into the abandoned area, and the highest methane content detected was 0.15 percent.

Although mine management knew on April 4, 1978, that the Drainway entry had advanced close to the abandoned area and would most probably hole through that day, means for detect-

ing oxygen deficiency were not available in the working place at the time the test borehole penetrated the abandoned area. As expected, air from the abandoned area entered the Drainway entry through the borehole with high velocity. After making methane tests in front of the borehole and in the face area which showed only 0.15 percent methane, Mullins had a flame safety lamp that was located on the surface brought into the face area. Mullins stated that when tests were made with the flame safety lamp in front of the borehole, the flame on the safety lamp which "had a little red on it." was extinguished. He stated that he thought the flame on the safety lamp was blown out by the velocity of the air coming out of the borehole.

After the flame safety lamp was relighted, tests were made across the face of the place and the flame was not extinguished. Mullins stated that during these tests he kept the flame safety lamp about 4 feet from the borehole to prevent the flame on the safety lamp from being blown out again and no further tests were made with the flame safety lamp.

The air from the abandoned area was permitted to enter the Drainway entry through the borehole for a period of approximately 45 minutes and, without first determining by adequate testing or air analysis the content of this air, the continuous mining machine was permitted to cut through into the abandoned area.

The fact that the content of the atmosphere in the abandoned area on April 7, 1978 showed 2 percent carbon dioxide and 12 percent oxygen, MSHA investigators conclude that the air entering the Drainway entry through the test borehole from the abandoned area on April 4, shortly before the accident, contained blackdamp; that when tests were being made with the flame safety lamp, the red color on the flame of the lamp indicated the presence of blackdamp; that the flame of the safety lamp was extinguished by the blackdamp rather than being blown out by the force of the air when the lamp was placed in front of the borehole; that adequate tests for blackdamp were not made near the mine floor; and that the blackdamp, being heavier than normal air, accumulated near the mine floor at the lower elevations of the Drainway entry and did not affect those persons in the face area until a larger hole was made into the abandoned area by the continuous mining machine. See profile of Drainway entry in Appendix I, Figure No. 2.

Although the permissible-type flame safety lamp is an approved instrument for testing oxygen deficiency, its limitations are well-known. Technology has in recent years made avail-

able reliable and more sophisticated equipment that is capable of determining the actual percentage of oxygen and carbon dioxide in the air while the flame safety lamp only determines the presence of oxygen deficiency. The company's mine rescue teams are equipped with and trained in the use of an approved Edmont Wilson oxygen analyzer which determines the percent of oxygen in the air, and an approved Draeger carbon dioxide detector which determines the percent of carbon dioxide in the air.

MSHA investigators believe that the very nature of the Drainway project, which could not be considered as a "business as usual" mining operation, should have dictated the use of the more sophisticated gas testing equipment, particularly since such equipment was available on mine property.

PART III

FINDINGS: SUMMARY OF EVIDENCE

The findings in this part are derived from the following sources: Conditions observed in the mine by MSHA personnel during recovery operations and the investigation following the inundation; information obtained from the mine rescue team and other persons taking part in the recovery operations and the investigation; information obtained from special tests conducted by MSHA; information obtained from mine records and previous Federal coal mine inspection reports and plans; information obtained from company officials and miners through interviews. After analysis of all available evidence, MSHA investigators have summarized their findings below.

1. The 1 Right Section of the Moss No. 3, Portal A mine (the abandoned area that was involved in the accident) was developed in 1972 and second mining started immediately thereafter.

2. Pillars of coal were left around the perimeter of the 1 Right area to serve as a bleeder system for the gob area. This area was ventilated by the Bucu fan.

3. As retreat mining progressed the lower elevations between 9 Right and 1 Right were inundated with water below the 1,495-foot elevation.

4. Due to the rising water the Bucu fan became ineffective and was taken out of service on March 17, 1978.

5. The rising water sealed the 1 Right abandoned area from the remainder of the mine, and the area was pressurized by the encroachment of the water.

6. The company estimated that approximately 23 million gallons of water was flowing into the mine in 24 hours and that approximately 6 million gallons of water was being pumped from the mine daily.

7. The rising water, if permitted to continue, would inundate the areas below the 1,504-foot elevation in the interconnected Portal A-2 entries. See mine map, Appendix J.

8. Management officials had informally discussed plans over the past two years that would alleviate the threat of water in the worked-out areas of the Portal A mine from flowing into the interconnected Portal A-2 mine. During the last six months

prior to the accident, the water problem became more acute and more discussions were held and informal plans were developed for the Drainway project.

9. Management and Safety Department officials discussed plans that included drilling an 8-inch diameter horizontal borehole from a surface location to penetrate the abandoned 1 Right area; enlarging the 8-inch borehole to 24 - 36 inches, and driving a single entry with a continuous mining machine from the surface to penetrate the abandoned 1 Right area, a distance of approximately 265 feet. These plans were designed to provide a path for the rising water to gravity flow from the worked-out areas of the mine into Fryingpan Creek which would prevent flooding of the Portal A-2 entries. (See mine map Appendix J).

10. Early in March 1978, M. L. West, Manager, Safety Department, met with MSHA officials in Norton, Virginia, and discussed the company plans for the Drainway project. On March 17, 1978, West informed MSHA officials in Norton, Virginia, that the plan to drill the 8-inch diameter borehole into the abandoned area had failed. West requested and received oral permission from the MSHA District Manager to proceed with the plan to develop the single entry Drainway with a continuous mining machine. The same day West submitted a written plan for the Drainway project. This plan was approved by the District Manager on March 27, 1978. See Appendix G, Plan No. 1.

11. During management's initial planning, and during the final development of the plans for the Drainway project, the possibility of the abandoned 1 Right area containing blackdamp was not considered and/or discussed, except M. L. West stated that he discussed with W. B. Couch, Division Manager, the possibility that the abandoned 1 Right area might contain "a body of methane and/or blackdamp." However, Couch stated that no one ever mentioned blackdamp to him during any discussions and planning of the Drainway project and that he was concerned only with the hazards of water and methane. During West's discussions of the company's plan for the Drainway project with MSHA officials including the written plan, the possibility of the abandoned 1 Right containing blackdamp was not discussed.

12. The possibility of the abandoned 1 Right area containing blackdamp was not discussed with Strickler Mullins by mine management or officials of the Safety Department prior to or during the development of the Drainway entry.

At no time, prior to or during the development of the Drainway entry, did any mine official or an official from the Safety Department discuss the possibility of the abandoned 1 Right area containing blackdamp with any foremen or workmen at the Drainway project.

13. The development of the Drainway entry with a continuous mining machine began on March 28, 1978. On March 31, the single entry Drainway had been driven approximately 191 feet and the drilling of test boreholes was started.

14. According to mine record books the following air quantities were measured by mine examiners at the inby end of the line curtain during development of the Drainway entry:

March 30	-	3,045 cubic feet a minute
April 3	-	4,200 cubic feet a minute
		4,600 cubic feet a minute
		4,800 cubic feet a minute
April 4	-	5,400 cubic feet a minute

Except for the air measurement of April 4, these air quantities did not comply with the minimum requirements of the approved Ventilation System and Methane and Dust Control Plan. According to records of the preshift examination of the Drainway entry on April 4, 1978, no unsafe conditions were found in the Drainway entry.

15. On April 4, 1978, at approximately 11:00 a.m. a test borehole, drilled in the face of the Drainway entry, penetrated the abandoned 1 Right area. Air from the abandoned area flowed through the borehole into the Drainway entry with a high velocity. Mullins and Carson made tests for methane with approved methane detectors and the highest methane content found was 0.15 percent.

16. Mullins, anticipating that the abandoned area contained high concentrations of methane, became concerned with the accuracy of the gas testing equipment which showed the methane content of the air coming through the borehole from the abandoned area contained only 0.15 percent. He ordered the flame safety lamp to be brought in from the surface.

17. Means for testing for blackdamp were not available underground at the time the test borehole penetrated the abandoned area.

18. While gas tests were being made at the face area with the flame safety lamp, the flame of the lamp was extinguished when the lamp was placed in front of the borehole. The lamp was relighted and Mullins made additional gas tests at the

face area with the flame safety lamp, but he did not make adequate tests for blackdamp near the mine floor and did not approach closer than about 4 feet of the borehole during such tests. The flame of the safety lamp was not extinguished during these tests. No further tests for gas were made with the flame safety lamp.

19. Air from the abandoned 1 Right area was permitted to flow through the borehole into the Drainway entry for approximately 45 minutes. Before determining by adequate testing, or by air analysis, the content of this air, the mining of the remaining 13-foot coal barrier was begun at approximately 11:45 a.m. April 4, 1978.

20. Mullins stated that after the third shuttle car of coal had been loaded he observed the lighted flame safety lamp sitting on the continuous mining machine. However, the continuous mining machine operator stated that he did not see the flame safety lamp sitting on the continuous mining machine. The last time he saw the flame safety lamp Mullins had it.

21. At approximately 12:30 p.m. while cutting coal for the next shuttle car, the continuous mining machine cut a hole approximately 14 by 20 inches into the abandoned 1 Right area in the left side of the face of the Drainway entry.

22. Mullins was on the left side of the machine and Carson was on the right side, both inby the operator, making tests for methane. Johnson was behind the continuous mining machine operator observing mining operations when the continuous mining machine cut into the abandoned area. See Appendix I, Figure 1.

23. When the continuous mining machine holed through into the abandoned area, the inrush of blackdamp caught the four men unaware; Carson, Johnson, and Breeding were overcome immediately. Mullins dragged Breeding toward the surface for a distance of approximately 150 feet and left him at the edge of the waterhole. Although affected by the blackdamp Mullins struggled to the surface.

24. Approximately 15 minutes after the accident had occurred, Ray G. Ross, District Manager, Willis Ison, Subdistrict Manager, Frank C. Mann, Supervisory Mining Engineer, all MSHA District 5 personnel from Norton, Virginia, and M. L. West, Manager, Safety Division, arrived at the Drainway site. Attempts to rescue Carson and Johnson, who were overcome by blackdamp near the face of the Drainway entry, had already started. At this time the following persons were underground: Carson, Johnson, Breeding, Castle, Nowlin and Arden. Mullins, Shelby and Beverly were on the surface.

25. Ross, Ison, Mann, and West joined Mullins, Shelby, and Beverly in the rescue attempts. None of the rescuers had protective equipment or adequate gas testing equipment. Ross, Mann, and West did not have full knowledge of the occurrence except, that they were informed by Mullins that some men were down on bad air.

26. During the rescue attempts 10 men entered the Drainway entry, some of whom made more than one trip underground. Three of the rescuers were overcome by blackdamp and perished. Three others, who were also overcome by blackdamp, were rescued including one man who returned to the surface unassisted approximately 40 minutes after the ventilation system had been changed from exhausting to blowing.

27. A company mine rescue team, self-contained breathing apparatus, a doctor and two nurses were airlifted to the Drainway site by a company helicopter. The five bodies were recovered by the mine rescue team wearing the oxygen breathing apparatus by 2:35 p.m. April 4.

28. On April 6 - 7, 1978, MSHA personnel conducted an underground investigation into the cause of the inundation.

29. The Drainway ventilation system in use at the time of the inundation was inadequate to dilute, render harmless and carry away the inrush of blackdamp. Also, the ventilation system proved to be inadequate during the investigation on April 6, and a higher capacity ventilating fan had to be installed to permit the continuation of the underground investigation.

30. On April 7, after the ventilation system was reconstructed and the line curtain repaired by company officials, to simulate as near as practicable the ventilation system in use at the time of the inundation, approximately 2,600 cubic feet of air a minute was measured at the inby of the line curtain.

31. At the time of the inundation the approved Ventilation System and Methane and Dust Control Plan was not being complied with in that, the line curtain was approximately 30 feet outby the point of deepest penetration of the face and the continuous mining machine operator was approximately 10 feet inby the end of the line curtain. According to testimony, the mine superintendent was not familiar with the requirements of the approved Ventilation and Methane and Dust Control Plan pertaining to face ventilation.

32. The barometric pressure drops of 0.12 and 0.06 on April 4 and April 6, respectively increased the migration of blackdamp from the abandoned area into the Drainway.

33. First-aid equipment was not provided within 500 feet of the Drainway entry working place on April 4, 1978.

34. Three of the six test boreholes drilled in the ribs of the Drainway entry as the entry was advanced within 50 feet of the 1 Right abandoned area ranged from 15 feet 5 inches to 19 feet 2 inches in depth and were from 13 feet to 19 feet 7 inches apart.

35. Telephone service or two-way communication facilities were not provided on the surface at the Drainway nor underground in the Drainway entry.

36. The Marietta continuous mining machine operating in the face area of the Drainway entry was not maintained in permissible condition in that a bolt was missing from the end-bell housing on the tramming motor, an opening in excess of .007-inch was present in this motor housing and an opening in excess of .007-inch was present in the left control panel cover.

37. The circuit for the continuous mining machine was not provided with a fail-safe ground check monitoring circuit; also, a portion of the circuit breakers protecting circuit conductors originating at the power center were not marked for identification.

PART IV

CONCLUSIONS

MSHA investigators conclude that the inundation of blackdamp from the abandoned 1 Right area into the active workings of the Drainway entry was caused by the following:

1. Failure to consider the possibility that the abandoned and water-sealed 1 Right area of the mine contained blackdamp. Failure to develop and initiate adequate plans which would have permitted the Drainway entry to penetrate the abandoned area in a safe manner and under controlled conditions which would have provided protection for the Drainway employees from the hazard of blackdamp.

2. Intentionally cutting into the abandoned 1 Right area with a continuous mining machine before first determining by adequate and sufficient testing or by air analysis, the contaminates in the air coming from the abandoned area after a test borehole had penetrated the abandoned area.

3. Failure to comply with the minimum requirements of the approved Ventilation System and Methane and Dust Control Plan and failure to provide an adequate ventilation system for the Drainway entry.

MSHA investigators also conclude that the rescue attempts by the rescuers in the blackdamp contaminated area of the mine without protective equipment contributed to the severity of the accident.

Respectfully submitted,

/s/ James D. Micheal

James D. Micheal
Coal Mine Specialist

/s/ Robert A. Elam

Robert A. Elam
Mining Engineer

/s/ Paul J. Componation

Paul J. Componation
Coal Mine Safety Specialist

Approved by:

/s/ Joseph O. Cook

Joseph O. Cook
Administrator for Coal Mine Safety and Health

APPENDIX A

Victims of Mine Inundation (Blackdamp)
Moss No. 3 Portal A Mine
April 4, 1978

Name and Social Security Number	Age	Job Classification	Experience at that Job	Total Mining Experience
Willis D. Ison 402-42-5984	46	MSHA Subdistrict Mgr.	4 months	23 years
Richard Carson 420-66-4236	29	Superintendent	4 months	6 years
Marion Johnson 225-62-1317	34	Maintenance Foreman	2 years, 3 months	2 years, 3 months
William Arden 226-74-9653	25	Roof Bolter	1 year, 4 months	1 year, 4 months
Lawrence Shelby 410-42-0207	56	Equipment Service Manager, National Mine Service	10 years 3 months	None

APPENDIX A

DEPARTMENT OF HEALTH—BUREAU OF VITAL RECORDS AND HEALTH STATISTICS—RICHMOND

MEDICAL EXAMINER'S CERTIFICATE

Field	Entry
Registration Area Number	125
Certificate Number	12
State File Number	
1. Full Name of Deceased (first) (middle) (last)	Richard Lawrence Shelby
2. Sex	male ☒ female ☐
3. Race	White
4. Date of Death	April 4 1978
5. Age	56
6. Date of Birth	Dec 3 1921
7. Was Decedent Ever in U.S. Armed Forces?	☒
8. Name of Hospital or Institution of Death	None
9. County of Death	Dickenson
10. City or Town of Death	Duty (inside city or town limits: no ☒)
11. Street Address or Rt. No. of Place of Death	
12. State (or Foreign Country) of Deceased's Residence	Kentucky
13. County of Deceased's Residence	Letcher
14. City or Town of Residence	Jenkins, Ky 41537 (inside city or town limits: yes ☒)
15. Street Address or Rt. No. of Residence	Box 427
Zip Code	41537
16. Name of Father of Deceased	R H Shelby
17. Maiden Name of Mother of Deceased	Rhodina McPeek
18. Citizen of What Country	USA
19. Birthplace (state or country)	Jenkins, Ky
20. Never Married ☐ Married ☒ Widowed ☐ Divorced ☐	Married
21. If Married or Widowed, Name of Spouse	Mary H Shelby
22. Social Security Number	410 42 0207
23. Usual or Last Occupation	Service Engineer
24. Kind of Business or Industry	Mine Supply
25. Informant or Source of Information	Wife
26. Cause of Death. Part I. Death was caused by: Immediate Cause (a)	Asphyxia
Interval between onset and death	Minutes
Due to (b)	
Due to (c)	
Part II. Other significant conditions contributing to death but not related to the terminal disease condition given in Part I (a)	
26a. Autopsy? Authorized by	yes ☐ no ☐
26b. If female, was there a pregnancy in past 3 months?	yes ☐ no ☐ unknown ☐
26c. If external cause, it was	☒
26d. Describe how injury relating to death occurred	Exposure to low oxygen tension
26e. Time of Injury	12:15 P.M. 4/4/78
26f. Injury occurred	while at work ☒ not while at work ☐
26g. Place of Injury (home, farm, factory, street, office bldg., etc.)	McClure #2 mine, Dickenson Co., Va.
26h. I certify that I took charge of the remains described above, viewed the body, made inquiry and in my opinion death resulted at or about	12:15
Natural causes ☐ Accident ☒ Suicide ☐ Homicide ☐ Undetermined ☐ Pending ☐	Accident
Actual Signature	W. A. Davis, M.D.
Date Signed	4/11/78
Name of Medical Examiner	Dr. W. A. Davis
Address of Medical Examiner	St. Paul, Va. 24283
27. Burial ☒ Removal ☐ Cremation ☐	Burial
28. Place of Burial, Removal, etc.	Green Acres Cemetery, Ermine, Ky
29. Signature of funeral director or person legally filing this certificate	Glen Polly
Name of Funeral Home and Address	Polly & Craft Funeral Home, ~~Jenkins, Ky~~
30. Signature of Registrar	Gayle Adkins
Date Record Filed	4/12/78

This is to certify that this is a true and correct reproduction of the original record filed with the Dickenson County Department of Health, Clintwood, Virginia.

Date issued 4/27/78

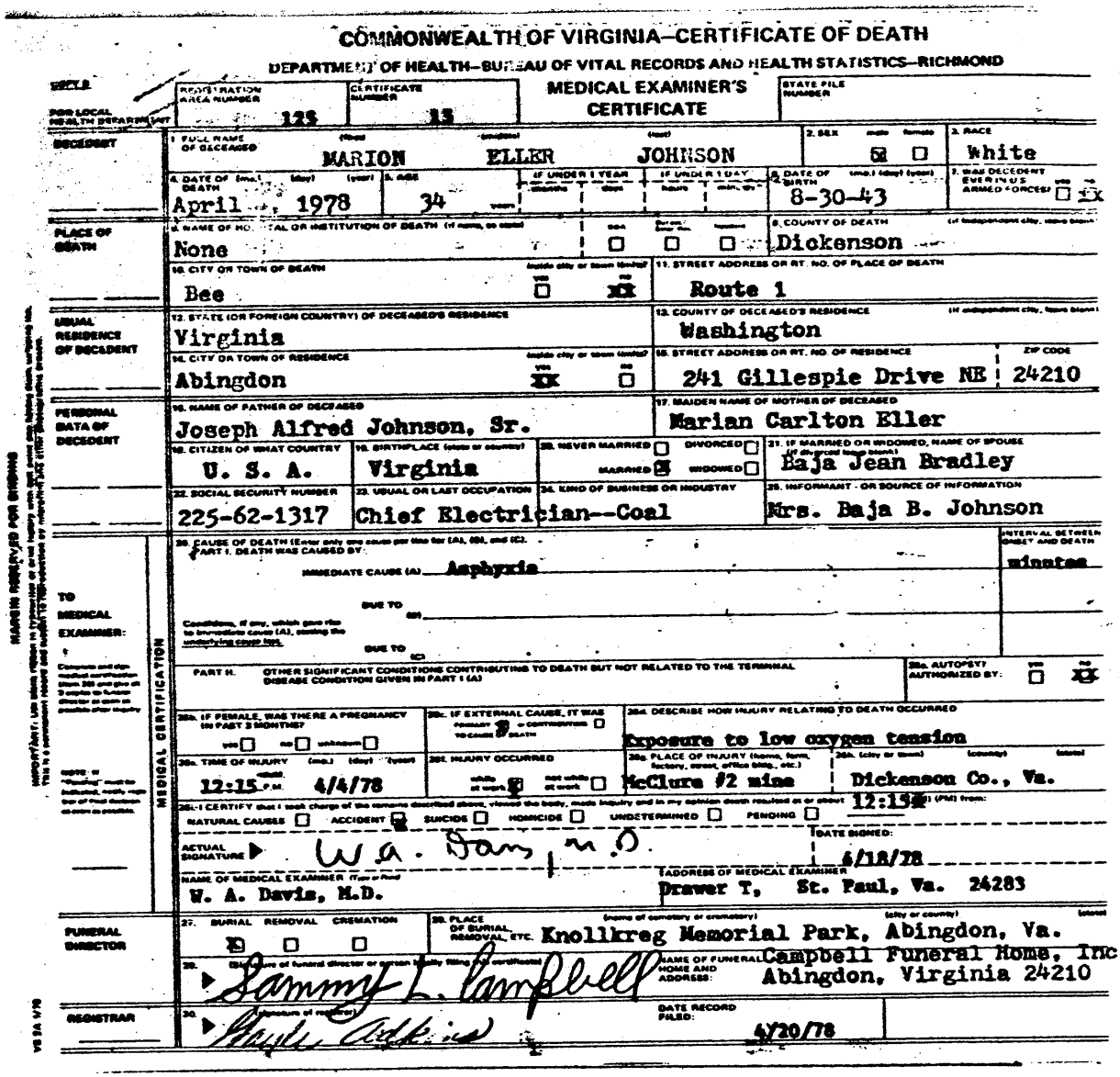
Gayle Adkins
Deputy Registrar

(SEAL)

VS 17

VOID IF ALTERED OR DOES NOT BEAR IMPRESSED SEAL OF REGISTRAR

APPENDIX A



COMMONWEALTH OF VIRGINIA—CERTIFICATE OF DEATH

DEPARTMENT OF HEALTH—BUREAU OF VITAL RECORDS AND HEALTH STATISTICS—RICHMOND

MEDICAL EXAMINER'S CERTIFICATE

REGISTRATION AREA NUMBER: 125
CERTIFICATE NUMBER: 13
STATE FILE NUMBER:

DECEDENT

1. FULL NAME OF DECEASED: MARION ELLER JOHNSON
2. SEX: Male ☒ Female ☐
3. RACE: White
4. DATE OF DEATH: April 1978
5. AGE: 34 years
If under 1 year: months / days
If under 1 day: hours / min.
6. DATE OF BIRTH: 8-30-43
7. WAS DECEDENT EVER IN U.S. ARMED FORCES? yes ☐ no ☒

PLACE OF DEATH

8. NAME OF HOSPITAL OR INSTITUTION OF DEATH (If not in hospital, give street and number): None
Inpatient ☐ Emergency Room ☐ DOA ☐
9. COUNTY OF DEATH: Dickenson
10. CITY OR TOWN OF DEATH: Bee
Inside city or town limits? yes ☐ no ☒
11. STREET ADDRESS OR RT. NO. OF PLACE OF DEATH: Route 1

USUAL RESIDENCE OF DECEDENT

12. STATE (OR FOREIGN COUNTRY) OF DECEASED'S RESIDENCE: Virginia
12. COUNTY OF DECEASED'S RESIDENCE: Washington
14. CITY OR TOWN OF RESIDENCE: Abingdon
Inside city or town limits? yes ☒ no ☐
15. STREET ADDRESS OR RT. NO. OF RESIDENCE: 241 Gillespie Drive NE
ZIP CODE: 24210

PERSONAL DATA OF DECEDENT

16. NAME OF FATHER OF DECEASED: Joseph Alfred Johnson, Sr.
17. MAIDEN NAME OF MOTHER OF DECEASED: Marian Carlton Eller
18. CITIZEN OF WHAT COUNTRY: U. S. A.
19. BIRTHPLACE (State or country): Virginia
20. NEVER MARRIED ☐ MARRIED ☒ DIVORCED ☐ WIDOWED ☐
21. IF MARRIED OR WIDOWED, NAME OF SPOUSE: Baja Jean Bradley
22. SOCIAL SECURITY NUMBER: 225-62-1317
23. USUAL OR LAST OCCUPATION: Chief Electrician--Coal
24. KIND OF BUSINESS OR INDUSTRY:
25. INFORMANT - OR SOURCE OF INFORMATION: Mrs. Baja B. Johnson

TO MEDICAL EXAMINER:

MEDICAL CERTIFICATION

26. CAUSE OF DEATH (Enter only one cause per line for (A), (B), and (C)).
PART I. DEATH WAS CAUSED BY:
IMMEDIATE CAUSE (A): Asphyxia
DUE TO (B):
Conditions, if any, which gave rise to immediate cause (A), stating the underlying cause last.
DUE TO (C):
INTERVAL BETWEEN ONSET AND DEATH: minutes

PART II. OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO THE TERMINAL DISEASE CONDITION GIVEN IN PART I (A)

26a. AUTOPSY? AUTHORIZED BY: yes ☐ no ☒

27a. IF FEMALE, WAS THERE A PREGNANCY IN PAST 3 MONTHS? yes ☐ no ☐ unknown ☐
27b. IF EXTERNAL CAUSE, IT WAS ACCIDENT ☐ SUICIDE ☐ HOMICIDE ☐ TO CAUSE OF DEATH
28d. DESCRIBE HOW INJURY RELATING TO DEATH OCCURRED: Exposure to low oxygen tension
28c. TIME OF INJURY: 12:15 P.M. 4/4/78
28f. INJURY OCCURRED: while at work ☐ not while at work ☐
28e. PLACE OF INJURY (home, farm, factory, street, office bldg., etc.): McClure #2 mine
28h. (city or town) (county) (state): Dickenson Co., Va.

28i. I CERTIFY that I took charge of the remains described above, viewed the body, made inquiry and in my opinion death resulted at or about 12:15 (AM) (PM) from:
NATURAL CAUSES ☐ ACCIDENT ☐ SUICIDE ☐ HOMICIDE ☐ UNDETERMINED ☐ PENDING ☐

ACTUAL SIGNATURE: W. A. Davis, M.D.
DATE SIGNED: 4/18/78
NAME OF MEDICAL EXAMINER (Type or Print): W. A. Davis, M.D.
ADDRESS OF MEDICAL EXAMINER: Drawer T, St. Paul, Va. 24283

FUNERAL DIRECTOR

27. BURIAL ☒ REMOVAL ☐ CREMATION ☐
28. PLACE OF BURIAL, REMOVAL, ETC. (name of cemetery or crematory) (city or country) (state): Knollkreg Memorial Park, Abingdon, Va.
29. Signature of funeral director or person handling final disposition: Sammy L. Campbell
NAME OF FUNERAL HOME AND ADDRESS: Campbell Funeral Home, Inc Abingdon, Virginia 24210

REGISTRAR

30. Signature of registrar: Gayle Adkins
DATE RECORD FILED: 4/20/78

This is to certify that this is a true and correct reproduction of the original record filed with the Dickenson County Department of Health, Clintwood, Virginia.

Date issued 4/27/78

Gayle Adkins
Deputy Registrar

(SEAL)

VOID IF ALTERED OR DOES NOT BEAR IMPRESSED SEAL OF REGISTRAR

APPENDIX A

COMMONWEALTH OF VIRGINIA—CERTIFICATE OF DEATH

DEPARTMENT OF HEALTH—BUREAU OF VITAL RECORDS AND HEALTH STATISTICS—RICHMOND

STATE FILE

REGISTRATION AREA NUMBER: 128 | CERTIFICATE NUMBER: 13

MEDICAL EXAMINER'S CERTIFICATE

DECEDENT

1. FULL NAME OF DECEASED: William Joe Arden
2. SEX: X | 3. RACE: White
4. DATE OF DEATH: April 4, 1978 | 5. AGE: 25 years | IF UNDER 1 YEAR | IF UNDER 1 DAY | 6. DATE OF BIRTH: Feb. 15, 1953 | WAS DECEDENT EVER IN U.S. ARMED FORCES: No

PLACE OF DEATH

8. NAME OF HOSPITAL OR INSTITUTION OF DEATH: None | 9. COUNTY OF DEATH: Dickenson
10. CITY OR TOWN OF DEATH: Duty | 11. STREET ADDRESS OR RT. NO. OF PLACE OF DEATH

USUAL RESIDENCE OF DECEDENT

12. STATE (OR FOREIGN COUNTRY) OF DECEASED'S RESIDENCE: Virginia | 13. COUNTY OF DECEASED'S RESIDENCE: Washington
14. CITY OR TOWN OF RESIDENCE: Abingdon | 15. STREET ADDRESS OR RT. NO. OF RESIDENCE: Route 4 | ZIP CODE: 24210

PERSONAL DATA OF DECEDENT

16. NAME OF FATHER OF DECEASED: Claude Arden | 17. MAIDEN NAME OF MOTHER OF DECEASED: Joyce Clark
18. CITIZEN OF WHAT COUNTRY: USA | 19. BIRTHPLACE: Virginia | 20. NEVER MARRIED ☐ MARRIED ☒ DIVORCED ☐ WIDOWED ☐ | 21. IF MARRIED OR WIDOWED, NAME OF SPOUSE: Sheila Thompson Arden
22. SOCIAL SECURITY NUMBER: 226-74-9653 | 23. USUAL OR LAST OCCUPATION: Miner | 24. KIND OF BUSINESS OR INDUSTRY: Coal Industry | 25. INFORMANT - OR SOURCE OF INFORMATION: Mrs. Dorothy Worley-sister

MEDICAL CERTIFICATION

TO MEDICAL EXAMINER:

26. CAUSE OF DEATH (Enter only one cause per line for (a), (b), and (c).)
PART I. DEATH WAS CAUSED BY:
IMMEDIATE CAUSE (a): Asphyxia — INTERVAL BETWEEN ONSET AND DEATH: Minutes
DUE TO (b):
Conditions, if any, which gave rise to immediate cause (a), stating the underlying cause last.
DUE TO (c):

PART II. OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO THE TERMINAL DISEASE CONDITION GIVEN IN PART I (a)

26a. AUTOPSY AUTHORIZED BY: yes ☐ no ☐

26b. IF FEMALE, WAS THERE A PREGNANCY IN PAST 3 MONTHS? yes ☐ no ☐ unknown ☐
26c. IF EXTERNAL CAUSE, IT WAS accident ☐ or self-inflicted ☐ to cause of death
26d. DESCRIBE HOW INJURY RELATING TO DEATH OCCURRED: Exposure to low oxygen tension
26e. TIME OF INJURY: 12:15 P.M. 4/4/78
26f. INJURY OCCURRED at work ☐ not at work ☐
26g. PLACE OF INJURY: McClure #2 mine | 26h. City or town (county): Dickenson Co., Va.

26i. I CERTIFY that I took charge of the remains described above, viewed the body, made inquiry and to my opinion death occurred at (or about) 12:15 (AM) (PM) from:
NATURAL CAUSES ☐ ACCIDENT ☐ SUICIDE ☐ HOMICIDE ☐ UNDETERMINED ☐ PENDING ☐
ACTUAL SIGNATURE ▶ W. A. Davis, M.D. | DATE SIGNED: 4/13/78
NAME OF MEDICAL EXAMINER (Type or Print): Dr. W. A. Davis | ADDRESS OF MEDICAL EXAMINER: St. Paul, Va. 24283

FUNERAL DIRECTOR

27. BURIAL ☒ REMOVAL ☐ CREMATION ☐
28. PLACE OF BURIAL, REMOVAL, ETC.: Forest Hills Memory Gardens | Abingdon, Virginia
29. ▶ Frank D. Hall 20-856 | NAME OF FUNERAL HOME AND ADDRESS: Farris Funeral Service, Abingdon, Va.

REGISTRAR

30. ▶ Gayle Atkins | DATE RECORD FILED: 4/17/78

This is to certify that this is a true and correct reproduction of the original record filed with the Dickenson County Department of Health, Clintwood, Virginia.

Date issued 4/27/78 — Gayle Atkins, Deputy Registrar

(SEAL)

VOID IF ALTERED OR DOES NOT BEAR IMPRESSED SEAL OF REGISTRAR

COMMONWEALTH OF VIRGINIA—CERTIFICATE OF DEATH

DEPARTMENT OF HEALTH—BUREAU OF VITAL RECORDS AND HEALTH STATISTICS—RICHMOND

MEDICAL EXAMINER'S CERTIFICATE

STATE FILE NUMBER

REGISTRATION AREA-NUMBER: 125 — REGISTRAR'S NUMBER: 14

DECEDENT

1. FULL NAME OF DECEASED: Richard Wallace Carson
2. SEX: Male ☒ Female ☐
3. RACE: White
4. DATE OF DEATH: April 4, 1978
5. AGE: 29 years
IF UNDER 1 YEAR: months days
IF UNDER 1 DAY: hours minutes
6. DATE OF BIRTH: Jan. 22, 1949
7. WAS DECEASED EVER IN U.S. ARMED FORCES? yes ☐ no ☒

PLACE OF DEATH

8. NAME OF HOSPITAL OR INSTITUTION OF DEATH: None — inpatient ☐ emergency room ☐ dead on arrival ☐
9. COUNTY OF DEATH: Dickenson
10. CITY OR TOWN OF DEATH: Duty — inside city or town limits? yes ☐ no ☒
11. STREET ADDRESS OR RT. NO. OF PLACE OF DEATH:

USUAL RESIDENCE OF DECEDENT

12. STATE (OR FOREIGN COUNTRY) OF DECEASED'S RESIDENCE: Virginia
13. COUNTY OF DECEASED'S RESIDENCE: Washington
14. CITY OR TOWN OF RESIDENCE: Abingdon — inside city or town limits? yes ☐ no ☒
15. STREET ADDRESS OR RT. NO. OF RESIDENCE: 192 McCray Drive
ZIP CODE: 24210

PERSONAL DATA OF DECEDENT

16. NAME OF FATHER OF DECEASED: Thomas J. Carson, Sr.
17. MAIDEN NAME OF MOTHER OF DECEASED: Captola Foster
18. CITIZEN OF WHAT COUNTRY: USA
19. BIRTHPLACE (State or country): Alabama
20. NEVER MARRIED ☐ MARRIED ☒ DIVORCED ☐ WIDOWED ☐
21. IF MARRIED OR WIDOWED, NAME OF SPOUSE (If divorced, name blank): Charan Robertson Carson
22. SOCIAL SECURITY NUMBER: 420-66-4236
23. USUAL OR LAST OCCUPATION: Mining Engineer
24. KIND OF BUSINESS OR INDUSTRY: Clinchfield Coal Co.
25. INFORMANT OR SOURCE OF INFORMATION: Charan R. Carson-wife

MEDICAL CERTIFICATION

TO MEDICAL EXAMINER:

26. CAUSE OF DEATH (Enter only one cause per line for (a), (b), and (c)).
PART I. DEATH WAS CAUSED BY:
IMMEDIATE CAUSE (a): Asphyxia — INTERVAL BETWEEN ONSET AND DEATH: minutes
DUE TO (b):
Conditions, if any, which gave rise to immediate cause (a), stating the underlying cause last.
DUE TO (c):
PART II. OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO THE TERMINAL DISEASE CONDITION GIVEN IN PART I (a)
26a. AUTOPSY? AUTHORIZED BY: yes ☐ no ☐
27a. IF FEMALE, WAS THERE A PREGNANCY IN PAST 3 MONTHS? yes ☐ no ☐ unknown ☐
27b. IF EXTERNAL CAUSE, IT WAS (Accident ☐ Suicide ☐ Homicide ☐) contributory ☐ to cause of death
27c. DESCRIBE HOW INJURY RELATING TO DEATH OCCURRED: Exposure to low oxygen tension
27d. TIME OF INJURY: 12:15 A.M. 4/4/78
27e. INJURY OCCURRED: while at work ☐ not while at work ☐
27f. PLACE OF INJURY (Home, farm, factory, street, office bldg., etc.): McClure #2 mine
27g. (City or town) (county) (state): Dickenson Co., Va.
28. I CERTIFY that I took charge of the remains described above, viewed the body, made inquiry and in my opinion death resulted at or about 12:15 (AM) (PM) from:
NATURAL CAUSES ☐ ACCIDENT ☒ SUICIDE ☐ HOMICIDE ☐ UNDETERMINED ☐ PENDING ☐
ACTUAL SIGNATURE ▶ W. A. Davis M.D.
DATE SIGNED: 4/13/78
NAME OF MEDICAL EXAMINER (Type or Print): Dr. W. A. Davis
ADDRESS OF MEDICAL EXAMINER: St. Paul, Va. 24283

FUNERAL DIRECTOR

27. BURIAL ☒ REMOVAL ☐ CREMATION ☐
28. PLACE OF BURIAL, REMOVAL, ETC. (name of cemetery or crematory; city or county; state): Greenview Memorial Park — Florence, Alabama
29. Signature of funeral director or person acting as such (Certificate completed): ▶ Jack Odell 73-856
NAME OF FUNERAL HOME AND ADDRESS: Farris Funeral Service, Abingdon, Va.

REGISTRAR

30. ▶ Signature of registrar: Gayle Adkins
DATE RECORD FILED: 4/17/78

This is to certify that this is a true and correct reproduction of the original record filed with the Dickenson County Department of Health, Clintwood, Virginia.

Date issued 4/27/78

Gayle Adkins
Deputy Registrar

(SEAL)

VOID IF ALTERED OR DOES NOT BEAR IMPRESSED SEAL OF REGISTRAR

APPENDIX A

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF HEALTH—BUREAU OF VITAL RECORDS AND HEALTH STATISTICS—RICHMOND

MEDICAL EXAMINER'S CERTIFICATE

Field	Entry
Registration area number	125
Certificate number	11
State file number	
1. Full name of deceased (first, middle, last)	Willis Danis Ison
2. Sex	male ☒ female ☐
3. Race	White
4. Date of death	4-4-78
5. Age	45 years
6. Date of birth	Nov. 26, 32
7. Was decedent ever in U.S. armed forces?	
8. Name of hospital or institution of death	None
9. County of death	Dickenson
10. City or town of death	Duty (inside city limits: no ☒)
11. Street address or Rt. no. of place of death	
12. State (or foreign country) of deceased's residence	Kentucky
13. County of deceased's residence	Letcher
14. City or town of residence	Isom (inside city limits: no ☒)
15. Street address or Rt. no. of residence / Zip code	41824
16. Name of father of deceased	Jeff Ison
17. Maiden name of mother of deceased	Hattie Adams
18. Citizen of what country	U.S.A.
19. Birthplace	Kentucky
20. Never married ☐ Married ☒ Divorced ☐ Widowed ☐	Married
21. If married or widowed, name of spouse	Hellen Marie Noe Ison
22. Social security number	402-42-5984
23. Usual or last occupation	Fed. inspector
24. Kind of business or industry	Coal mining
25. Informant or source of information	Mrs. Hellen Ison-wife
26. Cause of death, Part I, immediate cause (a)	ASPHYXIA
Interval between onset and death	Minutes
Part II. Other significant conditions	
26a. Autopsy?	
26c. If external cause, it was	Accidental ☒
26d. Describe how injury relating to death occurred	Exposure to low oxygen tension
26e. Time of injury	12:15 P.M. 4/4/78
26f. Injury occurred	While at work ☒
26g. Place of injury	McClure #2 Mine
26h. Location (city or town) (county) (state)	Dickenson Co., Va.
26i. Time of death	12:15
Certification	Accident ☒
Actual signature	W. A. Davis, M.D.
Date signed	4/11/78
Name of medical examiner	Dr. W. A. Davis
Address of medical examiner	St. Paul, Va. 24283
27. Burial ☒ Removal ☐ Cremation ☐	Burial
28. Place of burial, removal, etc.	Ison Cemetery, Letcher, Ky.
29. Signature of funeral director	Warren Blair
Name of funeral home and address	Blair Funeral Home, Whitesburg, Ky.
30. Signature of registrar	Gayle Adkins
Date record filed	4/12/78

This is to certify that this is a true and correct reproduction of the original record filed with the Dickenson County Department of Health, Clintwood, Virginia.

Date issued 4/27/78

Gayle Adkins
Deputy Registrar

(SEAL)

VOID IF ALTERED OR DOES NOT BEAR IMPRESSED SEAL OF REGISTRAR

VS 37

APPENDIX B

GENERAL INFORMATION

Portal A-2 mine was opened in June 1976, and is located approximately 4,000 feet north of and interconnected with Portal A mine. In Portal A-2 mine, three entries were driven from the surface and intersected the parallels of 5 Right off 1 Right off A Main of Moss No. 3 Portal A mine. The Drainway entry (accident scene) was developed to allow incoming water to flow to the surface before flowing into the Moss No. 3 Portal A-2 mine. Mining had been completed at Portals B, C and D. Mining at Portal A is near completion with present activity consisting of one coal producing section mining in barrier pillars. Two coal producing sections are active in developing the new Portal A-2 mine.

The Thick Tiller coalbed averages about 12 feet locally and consists of the Tiller and Jawbone Coalbeds. In some areas of the mine, where the coalbeds were separated by a relatively thin parting, mining was done in both coalbeds. In areas where the rock parting between coalbeds was too thick to mine, only the upper (Jawbone) coalbed, which averages 7 feet in thickness was mined. Approximately 70 percent of all mining in Moss No. 3 Portal A mine, including the abandoned area where the Drainway entry penetrated, was mined in the Jawbone coalbed.

At the Drainway entry a total of 14 men was employed on 3 shifts a day, 5 days a week. The entry was to be developed approximately 265 feet from the surface into the mined out 1 Right area of the Moss No. 3 Portal A mine. The Drainway entry, designed to be used as a waterway for the extensive gob area, was located in an area where elevation of the coalbed was determined to be low enough to permit water to gravity flow out the opening before reaching the active mine workings in Moss No. 3 Portal A-2 mine. Reportedly, the water level in the Portal A mine had been rising daily since pumping stations in 9 Right off A Mains had been deactivated when pillar recovery was started in the area in August 1977.

MINING METHODS, CONDITIONS AND EQUIPMENT

Mining Methods

The Drainway entry was being developed with a Marietta (drum-type) continuous mining machine. The coal was mined and loaded into a Joy 15-SC shuttle car which transported the coal to the surface coal storage area. Approximately 2 - 8 inches of water was present along the shuttle car roadway beginning about 75 feet from the portal and extending

inby for a distance of approximately 30 feet. Roof bolts were installed on not more than 4-foot centers in the 15-foot wide entry in accordance with the Approved Roof Control Plan, dated April 16, 1976. A hand-held air operated drill was utilized to drill 2-inch diameter test boreholes in the Drainway face and ribs as the entry face approached the abandoned area. See Appendix I, Fig. 2

Ventilation

The Moss No. 3, Portal A mine was being ventilated by a Jeffrey, Model 8H-84 Aerodyne fan driven by a 300 horsepower alternating current electric motor. During the survey conducted March 13 and 14, 1978, by personnel from MSHA ventilation section, District 5 office, Norton, Virginia, the fan was exhausting 224,000 cubic feet of air a minute at 2.25 inches water gauge pressure. The methane content of the return air was 0.11 percent. Approximately 169,000 cubic feet of air a minute was measured at the three intake openings. The difference between return and intake air quantities, as measured, was due to air intaking through numerous breaks to the surface in the abandoned pillared areas. Air flow was controlled by permanent stoppings, overcasts and regulators constructed of incombustible material. Plastic, flame resistant, brattice material was used to direct the ventilation to the working faces. All accessible areas of the mine were ventilated. Much of the abandoned area was inaccessible due to bad roof conditions and water.

Preshift and onshift examinations and tests were made by certified persons and the results were recorded in a book on the surface.

The Ventilation System and Methane and Dust-control plan for the Moss No. 3, Portal A mine, of which the Drainway entry was a part, was approved by the MSHA District Manager on July 14, 1970, amended May 5, 1975, and last reviewed February 6, 1978.

Ventilation of the Drainway entry was induced by a Jeffrey 6F-28 Aerodyne fan located on the surface and operated exhausting. The fan was operating in the "B" blade position. Motive power was provided by a 440 volt, 3 phase 40 horsepower electric motor rated at 3,450 r.p.m. In directing the ventilating current through the entry, 24-inch spiral wound collapsible tubing was utilized from the fan installation inby for a distance of approximately 50 feet. Flame resistant line brattice was used from the end of the tubing to conduct the air to the working face. See Appendix F, Photo Nos. 1, 5, and 6.

Electrical Equipment

The electric face equipment in use at the Drainway entry was of the permissible-type and consisted of a Marietta drum-type continuous mining machine, a Fletcher roof-bolting machine, and a Joy 15-SC shuttle car. Generally the equipment was maintained in good condition by qualified personnel; however, a bolt was missing from the end-bell housing on the tramming motor and an opening in excess of .007 inches was present in the motor housing of the continuous mining machine.

Communication and First Aid Equipment

There was no communication system provided underground in the Drainway entry or at the Drainway site. The nearest two-way communication facilities at the time of the accident were located at the Bucu airshaft approximately 1,500 feet from the Drainway entry. First-aid equipment was not available at the Drainway site.

Training Program - Medical Assistance Program

The training program for the Moss No. 3 mine was approved by MSHA District Manager during 1970. Clinchfield Coal Company also operates a training mine for new employees. The new employee receives training in First-Aid Methods, Principles of Mine Rescue, Use of Self-Rescuer, the Coal Mine Safety and Health Act, Coal Mine Ventilation, Roof and Rib control, and Electricity. Certified officials receive the training required by the Act. Workmen are assigned duties at other company mines, as required, upon completion of training at the training mine. Workmen at the Drainway entry were assigned from the training mine.

According to company records, the fourteen men at the Drainway site except Dale Hess, a certified foreman, have received the above training.

On August 11, 1971, management submitted to MSHA an acceptable Emergency Medical Assistance program. There are five company ambulances available on mine property. First-aid equipment and supplies were provided at Moss No. 3 mine but were not provided at the Drainway site.

Mine Rescue

The company maintains five mine rescue teams in the area and rescue teams from other nearby companies are available in an emergency. Two mine rescue teams from the Moss Nos. 2 and 3 mines participated in the recovery operations. M.S.A. self-rescuers were provided for all underground employees and they have been trained in their use.

APPENDIX C

List of persons who participated in or were present during recovery operations and/or investigation.

Clinchfield Coal Company

John Nypaver	Vice President of Operations The Pittston Company
John W. Crawford	Director of Health and Safety The Pittston Company
Max Bales	Vice President
Henry L. Kiser	General Manager
W. B. Couch	Division Manager
Walter B. Crickmer	Assistant Division Manager
Pete Capelli	Assistant to the Division Manager
Frank Phillips	Construction Foreman
Robert Gullet	Safety Inspector
Sidney Southerland	Staff Assistant
Harold N. Phillips	Mine Rescue Team Trainer
Milton McArthur Kiser	Member Mine Rescue Team
Homer Wayne Fields	Member Mine Rescue Team
Archie E. Salyer	Member Mine Rescue Team
David Lee Moore	Member Mine Rescue Team

Virginia Division of Mines and Quarries

Auty Branham	Inspector
Fred Carty	Inspector
Clyde Breeding	Inspector

United Mine Workers of America

Donald Dalton	International Safety Inspector
Danny Davidson	International Safety Inspector
Alonzo Mullins	Assistant Safety Coordinator, District 28
Harold Hartsock	International Safety Inspector
Jonathan Willims	Safety Inspector and International Teller
Willard A. Esselstyn	Secretary and Treasurer

Mine Safety and Health Administration

Ray G. Ross	District Manager
Robert A. Cohen	Trial Attorney - U. S. Department of Labor
Robert A. Elam	Mining Engineer
Paul J. Componation	Coal Mine Safety and Health Specialist
Elmer Simmons	Supervisory Mining Engineer

APPENDIX C (continued)

Merian O'Bryan	Supervisory Coal Mine Technical Specialist
Ewing C. Rines	Coal Mine Inspection Supervisor
James L. Banfield	Mining Engineer - Technical Support
Edward J. Miller	Mining Engineer, Technical Support
Arvil C. Gallihar, Jr.	Coal Mine Inspector
Clarence A. Goode	Coal Mine Inspector (Special Investigator)
Harry Markley	Member MSHA Mine Rescue Team
David Wolfe	Member MSHA Mine Rescue Team
Raymond A. Strahin	Member MSHA Mine Rescue Team

APPENDIX D

Persons who participated in or were present during interviews:

Clinchfield Coal Company

John Nypaver	Vice President of Operations The Pittston Company
John W. Crawford	Director of Health and Safety The Pittston Company
Raymond E. Davis	Attorney, The Pittston Company
Henry L. Kiser	General Manager (witness)
W. B. Couch	Division Manager (witness)
M. L. West	Manager Safety Division (witness)
Strickler Mullins	Superintendent (witness)
Edward Coffey	Safety Inspector
Delmer Hess	Foreman (witness)
Gary Owens	Foreman (witness)
Darrell Lynn Stoots	Continuous Mining Machine Operator (witness)
Charles Breeding	Continuous Mining Machine Operator (witness)
John B. Porter	Shuttle Car Operator (witness)
Jack Nowlin	Roof bolter (witness)
Eugene Marshall	Continuous Mining Machine Operator (witness)
Earl Castle Jr.	Shuttle Car Operator (witness)
Harold N. Phillips	Mine Rescue Team Trainer (witness)
Milton McArthur Kiser	Member Mine Rescue Team (witness)
Homer Wayne Fields	Member Mine Rescue Team (witness)
Archie E. Salyer	Member Mine Rescue Team (witness)
David Lee Moore	Member Mine Rescue Team (witness)

National Mine Service Company

Ambrose Grayson Conley	Representative
Glen Darrell Beverly	Representative

Virginia Division of Mines and Quarries

Frank Linkous	Technical Assistant

APPENDIX D (Continued)

United Mine Workers of America

Edward Gilbert	International Safety Director
Floyd T. Mullins	Safety Coordinator, District 28

Mine Safety and Health Administration

Ray G. Ross	District Manager
James D. Micheal	Coal Mine Specialist
Robert A. Elam	Mining Engineer
Paul J. Componation	Coal Mine Safety and Health Specialist
Merian O'Bryan	Supervisory Coal Mine Technical Specialist
Clarence A. Goode	Coal Mine Inspector (Special Investigator)
Robert A. Cohen	Attorney, Department of Labor

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78) No. 033901

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE) DATE 02/22/78 TIME 1810 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-___ (CONTRACTOR)

TYPE OF ACTION 104-A-__,___-__-__ (SEE REVERSE) VIOLATION OF SECTION ___-__-__ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.3011-_____

TYPE OF INSPECTION AFA [X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE At approximately 12:30 p.m., April 4, 1978, the volume and velocity of the current of air ventilating the working face of the Drainway was not sufficient to dilute, render harmless and carry away the blackdamp (oxygen deficient air) which entered the working face when the Drainway holed through into an unventilated inaccessible abandoned area of the same mine. The blackdamp resulted in the death of five men. This citation is being issued as a result of the subsequent fatal accident investigation.

AREA OR EQUIPMENT

REC. DATA CODES AFA/C/11 ASMT. TRANS. DATE
DATE 6-21-78 P 5 L 14

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. _____ DATED __/__/__ (MO DA YR)

TERMINATION DUE DATE __/__/__ (MO DA YR) TIME _____ (24 HR CLOCK) SIGNATURE D. Jones O Bryan AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 02/22/78 (MO DA YR) TIME 1812 (24 HR CLOCK) SIGNATURE D. Jones O Bryan AR [ ] SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78) No. 033902

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE) DATE 02/22/78 TIME 0920 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-___ (CONTRACTOR)

TYPE OF ACTION 104-A-__,___-__-__ (SEE REVERSE) VIOLATION OF SECTION ___-__-__ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.3041-_____

TYPE OF INSPECTION AFA [X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE On April 4, 1978, means were not available in the working place of the Drainway to make onshift examinations and tests for oxygen deficiency immediately after a test drill hole penetrated an unventilated and inaccessible abandoned area of the same mine. After a flame safety lamp was obtained from the surface of the Drainway, examinations and tests for oxygen deficiency were not made continuously during the holing through operations into the abandoned area by the continuous mining machine. Blackdamp (oxygen deficient air) entered the active workings of the Drainway and five men died as a result. This citation is being issued as a result of the subsequent fatal accident investigation.

AREA OR EQUIPMENT

REC. DATA CODES AFA/C/11 ASMT. TRANS. DATE
DATE 6-21-78 P 5 L 15

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. _____ DATED __/__/__ (MO DA YR)

TERMINATION DUE DATE __/__/__ (MO DA YR) TIME _____ (24 HR CLOCK) SIGNATURE D. Jones O Bryan AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 02/22/78 (MO DA YR) TIME 0922 (24 HR CLOCK) SIGNATURE D. Jones O Bryan AR [ ] SEE SUBSEQUENT ACTION SHEET

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No 033903

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE) DATE 05/25/78 (MO/DA/YR) TIME 0955 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-___ (CONTRACTOR)

TYPE OF ACTION 104-D-1 (SEE REVERSE) VIOLATION OF SECTION ___-___-___ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.3160 ___

TYPE OF INSPECTION AFA [X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE The ventilation system and methane-and-dust-control plan for this mine as approved July 14, 1970, and amended May 7, 1975, and last reviewed in February 1978, requiring the line brattice to be maintained to within 18 feet of the point of deepest penetration of the face, that the continuous mining machine operator shall remain a minimum of two feet outby the end of the line brattice and that a minimum quantity of 5,000 cubic feet of air a minute be maintained at the end of the line brattice in all places where coal is being cut, drilled, mined or loaded and where roof bolts are being installed, was not being complied with in the Drainway entry when the entry was mined through into an abandoned area of the mine at approximately 12:30 p.m., April 4, 1978. The investigation on April 6 and 7

AREA OR EQUIPMENT (SEE CONTINUATION SHEET)

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. ___ DATED ___/___/___ (MO/DA/YR)

TERMINATION DUE DATE ___/___/___ (MO/DA/YR) TIME ____ (24 HR CLOCK) SIGNATURE ▶ Clarence A. Goode AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 05/25/78 (MO/DA/YR) TIME 1000 (24 HR CLOCK) SIGNATURE ▶ Clarence A. Goode AR [ ] SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3a (3-78)

No 033903-___ DATED 05/25/78 (MO/DA/YR)

[ ] SUBSEQUENT ACTION [X] CONTINUATION [ ] CITATION [ ] ORDER DATE 05/25/78 (MO/DA/YR) TIME 0955 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-___ (CONTRACTOR)

JUSTIFICATION FOR ACTION CHECKED BELOW 1978, revealed that the end of the line brattice was 30 feet from the face of the entry at the cut-through point, and the operator's control station on the continuous mining machine was 10 feet inby the end of the line brattice. On April 7, 1978, after the ventilation system had been reconstructed and the line brattice repaired by company officials in the presence of MSHA personnel, approximately 2,600 cubic feet of air a minute was measured at the inby end of the line brattice. This citation is being issued as a result of a subsequent fatal accident investigation.

REC. DATA CODES AFA, C+A, 13 ASMT. TRANS. DATE
DATE 6-21-78 R 5, 16

[ ] EXTENDED TO: DATE ___/___/___ (MO/DA/YR) TIME ____ (24 HR CLOCK) [ ] VACATED DATE ___/___/___ (MO/DA/YR) TIME ____ (24 HR CLOCK)

[ ] TERMINATED [ ] MODIFIED [ ] SEE SUBSEQUENT ACTION SHEET

TYPE OF INSPECTION AFA SIGNATURE ▶ Clarence A. Goode AR

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No 032324

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE)

DATE 04/25/78 (MO/DA/YR) TIME 1020 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS

OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3 PORTAL "A"

MINE I.D. 44-01642-___ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A-___,___-___-___

VIOLATION OF SECTION ___-___-___ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.503-___

TYPE OF INSPECTION AFA

[X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE The permissible-type Marietta continuous mining machine Serial Number 7486 was operated in the face area of the mine at the drainway entry on April 4,1978, and was not maintained in permissible condition in that a bolt was missing from the end-bell housing on the tramming motor and an opening in excess of .007-inch was present in this motor housing; also, an opening in excess of .007-inch was present in the left control panel cover. This citation is being issued as a result of the subsequent fatal accident investigation.

AREA OR EQUIPMENT

REC. DATA | CODES APH, CHA II ASMT. TRANS. DATE
DATE 6-21-78 P 5, 12

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. ___ DATED ___/___/___ (MO/DA/YR)

TERMINATION DUE DATE ✓ ___/___/___ (MO/DA/YR) TIME ____ (24 HR CLOCK) SIGNATURE Marion O Bryan AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 04/22/78 (MO/DA/YR) TIME 1025 (24 HR CLOCK) SIGNATURE Marion O Bryan AR

[ ] SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No 030303

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE)

DATE 04/10/78 (MO/DA/YR) TIME 1110 (24 HR CLOCK)

SERVED TO Bill Gerald, Chief Electrician

OPERATOR Clinchfield Coal Company

MINE Moss #3, A-Mine Drainway

MINE I.D. 44-01642-___ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A-___,___-___-___

VIOLATION OF SECTION ___-___-___ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.902-___

TYPE OF INSPECTION AFA

[ ] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE A failsafe ground check monitoring circuit was not provided for the Energized Continuous Miner (ACCIDENT) in that the circuit failed to deenergize the machine when test resistor was inserted in the pilot check wire.

AREA OR EQUIPMENT

INITIAL ACTION [ ] NOTICE [X] CITATION [ ] ORDER NO. 030303 DATED 04/10/78 (MO/DA/YR)

TERMINATION DUE DATE 04/10/78 (MO/DA/YR) TIME 1210 (24 HR CLOCK) SIGNATURE Harold E. Bloomer AR

ACTION TO TERMINATE The monitoring package was adjusted so that it deenergized Machine when test resistor was inserted in pilot check wire.

DATE 04/10/78 (MO/DA/YR) TIME 1210 (24 HR CLOCK) SIGNATURE Harold E. Bloomer AR

[ ] SEE SUBSEQUENT ACTION SHEET

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR — MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No 030304

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE)

DATE 04 / 10 / 78 (MO DA YR) TIME 1030 (24 HR CLOCK)

SERVED TO [illegible], Chief Electrician

OPERATOR Clinchfield Coal Company

MINE Moss #3 A-Mine Drainway

MINE I.D. 44-01642 - ___ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A

VIOLATION OF SECTION ___ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 77.904

TYPE OF INSPECTION AEA

[ ] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE The Cable Coupler for the 2/0 3C CCC (440VAC 3Ø) fan (100hp) motor Cable was not marked for identification at the power center nor on the coupler itself to prevent it from being plugged into a wrong circuit breaker since 600VAC 3Ø circuits were located on the same power center.

AREA OR EQUIPMENT

INITIAL ACTION [ ] NOTICE [X] CITATION [ ] ORDER NO. 030304 DATED 04 / 10 / 78

TERMINATION DUE DATE 04 / 10 / 78 TIME 1230 (24 HR CLOCK) SIGNATURE Harold E. Bloomer AR

ACTION TO TERMINATE Each circuit breaker and cable coupler on power center was marked for identification

DATE 04 / 10 / 78 TIME 1230 (24 HR CLOCK) SIGNATURE Harold E. Bloomer AR [ ] SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR — MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No 033904

[x] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE)

DATE 05 / 26 / 78 (MO DA YR) TIME 0955 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS

OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A"

MINE I.D. 44-01642 - ___ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A

VIOLATION OF SECTION ___ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.1600

TYPE OF INSPECTION AFA

[x] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE On April 4, 1978, telephone service or two-way communication facilities were not provided on the surface of the Drainway nor underground in the Drainway entry which had been advanced approximately 260 feet underground. This citation is being issued as a result of a subsequent fatal accident investigation.

REC. DATA CODES AFA, CPA ASMT. TRANS. DATE
DATE 6-21-78 P 5 L 17

AREA OR EQUIPMENT

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. ___ DATED ___ / ___ / ___

TERMINATION DUE DATE ___ / ___ / ___ TIME ___ (24 HR CLOCK) SIGNATURE [signature] AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 05 / 22 / 78 TIME 1000 (24 HR CLOCK) SIGNATURE [signature] AR [ ] SEE SUBSEQUENT ACTION SHEET

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No - 033906

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE) DATE 05/25/78 (MO/DA/YR) TIME 0950 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-____ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A-____ VIOLATION OF SECTION ____ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.1701-____

TYPE OF INSPECTION AFA [X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE Three of the six boreholes drilled in the ribs of the Drainway entry as the entry was advanced within 50 feet of an abandoned area of the mine ranged from 15 feet 5 inches to 19 feet and 2 inches in depth and ranged from 13 feet to 19 feet and 7 inches apart. This citation is being issued as a result of a subsequent fatal accident investigation.

REC. DATA | CODES AFA, C/A, 11 | ASMT. TRANS. DATE
DATE ____ P ____ L ____

AREA OR EQUIPMENT

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. ____ DATED ____/____/____ (MO/DA/YR)

TERMINATION DUE DATE ____/____/____ (MO/DA/YR) TIME ____ (24 HR CLOCK) SIGNATURE Clarence A. Goode AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 05/25/78 (MO/DA/YR) TIME 0955 (24 HR CLOCK) SIGNATURE Clarence G. Goode AR [ ] SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No - 033908

[X] CITATION (SEE REVERSE) [ ] ORDER OF WITHDRAWAL (SEE REVERSE) DATE 05/25/78 (MO/DA/YR) TIME 1002 (24 HR CLOCK)

SERVED TO STRICKLER MULLINS OPERATOR CLINCHFIELD COAL COMPANY

MINE MOSS NO. 3, PORTAL "A" MINE I.D. 44-01642-____ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 104-A-____ VIOLATION OF SECTION ____ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION 75.1713-____

TYPE OF INSPECTION AFA [X] SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE On April 4, 1978, first aid equipment was not provided within 500 feet of the Drainway entry working place. This citation is being issued as a result of the subsequent fatal accident investigation.

REC. DATA | CODES AFA, C/A, 11 | ASMT. TRANS. DATE
DATE 6-21-78 P 5 L 19

AREA OR EQUIPMENT

INITIAL ACTION [ ] NOTICE [ ] CITATION [ ] ORDER NO. ____ DATED ____/____/____ (MO/DA/YR)

TERMINATION DUE DATE ____/____/____ (MO/DA/YR) TIME ____ (24 HR CLOCK) SIGNATURE Nelson O'Bryan AR

ACTION TO TERMINATE This violation was abated prior to the issuance of the citation due to the drainway project having been completed and abandoned.

DATE 05/25/78 (MO/DA/YR) TIME 1010 (24 HR CLOCK) SIGNATURE Nelson O'Bryan AR [ ] SEE SUBSEQUENT ACTION SHEET

APPENDIX E

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No - 032264

☐ CITATION (SEE REVERSE) ☒ ORDER OF WITHDRAWAL (SEE REVERSE) DATE 04/04/78 TIME 1750 (24 HR CLOCK)

SERVED TO Buck Couch, Division Supt. OPERATOR Clinch Field Coal Company

MINE A-3 Mine MINE I.D. 44-01642-____ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 103-K-_____ VIOLATION OF SECTION ____ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION ____

TYPE OF INSPECTION ____ ☐ SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE This order is issued Due To multiple FATAL Accident And is in Effect pending The investigation of The Accident Area.
only Those persons NECESSARY TO MAKE The investigation OF The Accident shall be permitted To Enter This AREA.

AREA OR EQUIPMENT The ENTRY being DRIVEN For DRAINAGE into The A 3 mine

INITIAL ACTION ☐ NOTICE ☐ CITATION ☐ ORDER NO. _____ DATED __/__/__ (MO/DA/YR)

TERMINATION DUE DATE __/__/__ (MO/DA/YR) TIME _____ (24 HR CLOCK) SIGNATURE ▶ Dannie F. Short AR ____

ACTION TO TERMINATE

DATE __/__/__ (MO/DA/YR) TIME _____ (24 HR CLOCK) SIGNATURE ▶ AR ____ ☐ SEE SUBSEQUENT ACTION SHEET

UNITED STATES DEPARTMENT OF LABOR – MINE SAFETY AND HEALTH ADMINISTRATION
MSHA FORM 7000-3 (3-78)

No - 033644

☐ CITATION (SEE REVERSE) ☒ ORDER OF WITHDRAWAL (SEE REVERSE) DATE 04/08/78 TIME 1245 (24 HR CLOCK)

SERVED TO W.B. Couch OPERATOR Clinchfield Coal Company

MINE Moss No. 3 Portal A MINE I.D. __-_____-_____ (CONTRACTOR)

TYPE OF ACTION (SEE REVERSE) 107-A-_____ VIOLATION OF SECTION ____ OF THE ACT OR OF TITLE 30 CODE OF FEDERAL REGULATIONS.

PART AND SECTION ____

TYPE OF INSPECTION AEA ☒ SIGNIFICANT AND SUBSTANTIAL (SEE REVERSE)

CONDITION OR PRACTICE The mine atmosphere contaiminated with black damp (oxygen deficency) which resulted in the death of five (5) persons. This multiple fatal accident occurred at the single drainway entry. The mine atmosphere also contains heavy concentrations of carbondioxide and these conditions of the mine atmosphere still prevail.

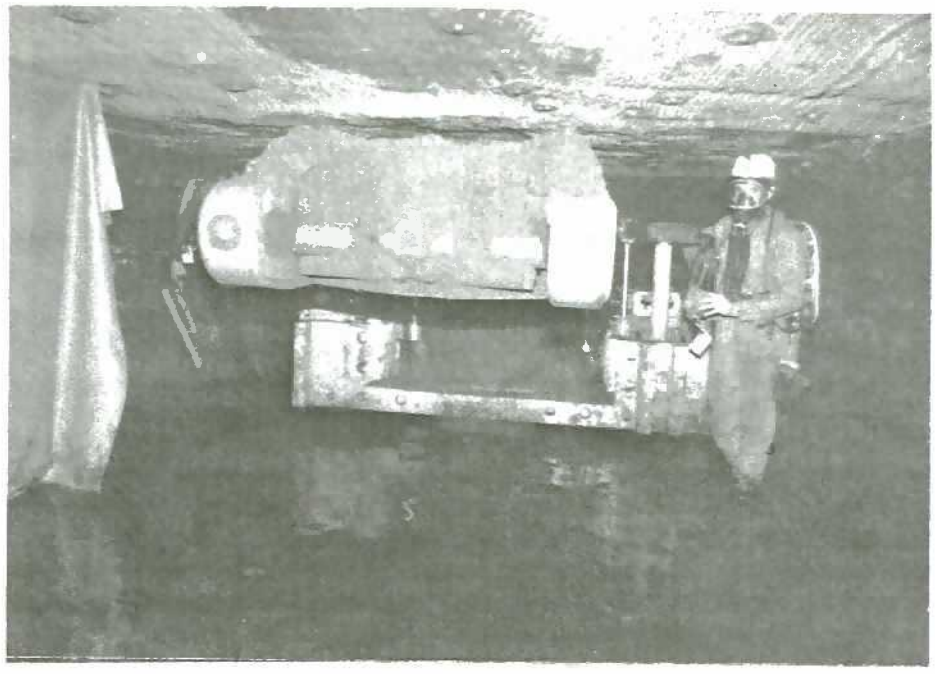
AREA OR EQUIPMENT The single drainway entry located on Frying Pan Creek approximately 1600 feet from Buck Fan installation.

INITIAL ACTION ☐ NOTICE ☐ CITATION ☐ ORDER NO. _____ DATED __/__/__ (MO/DA/YR)

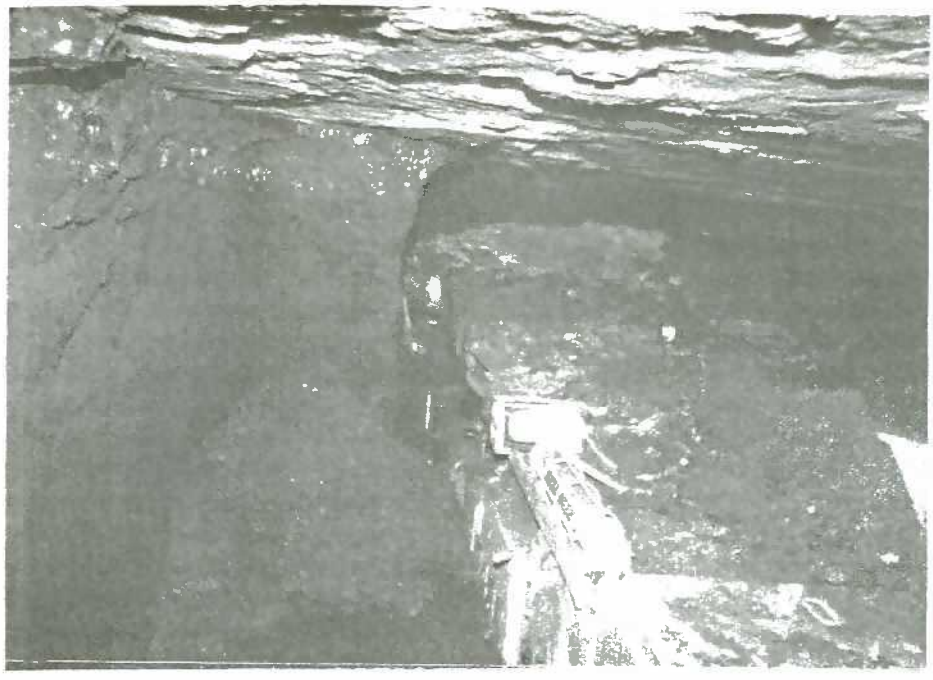
TERMINATION DUE DATE __/__/__ (MO/DA/YR) TIME _____ (24 HR CLOCK) SIGNATURE ▶ Nathan O'Bryan AR ____

ACTION TO TERMINATE

DATE __/__/__ (MO/DA/YR) TIME _____ (24 HR CLOCK) SIGNATURE ▶ AR ____ ☐ SEE SUBSEQUENT ACTION SHEET

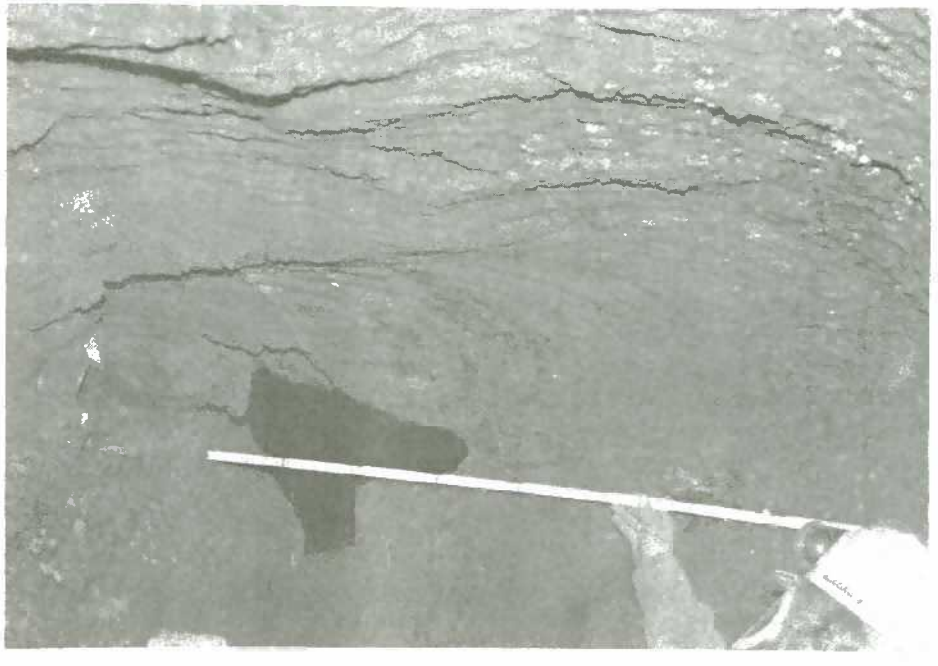


No. 1 End of line curtain with continuous mining machine at face

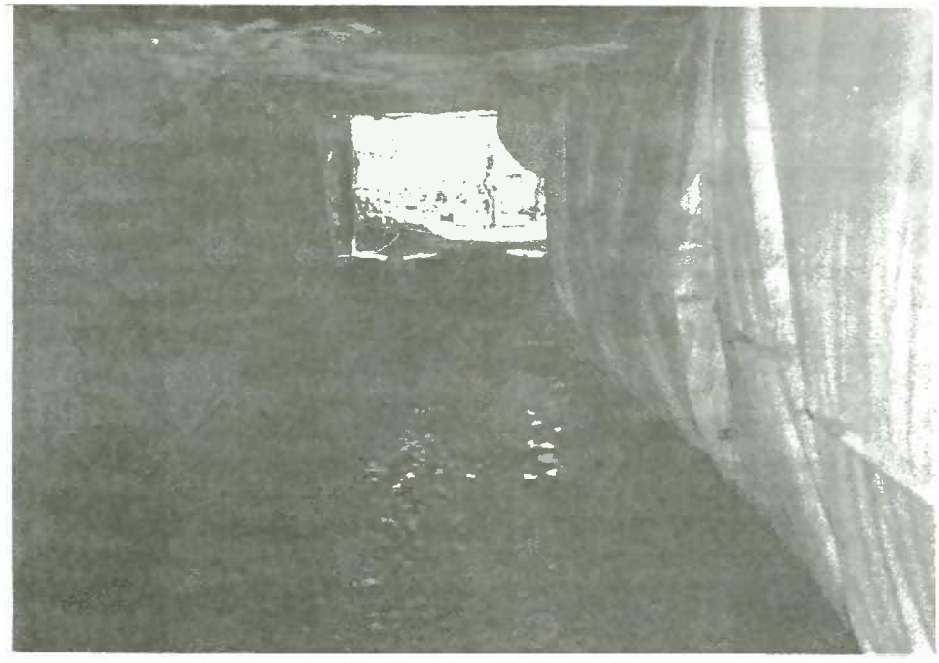


No. 2 Offset left side showing extent of last continuous mining machine advance in Drainway entry

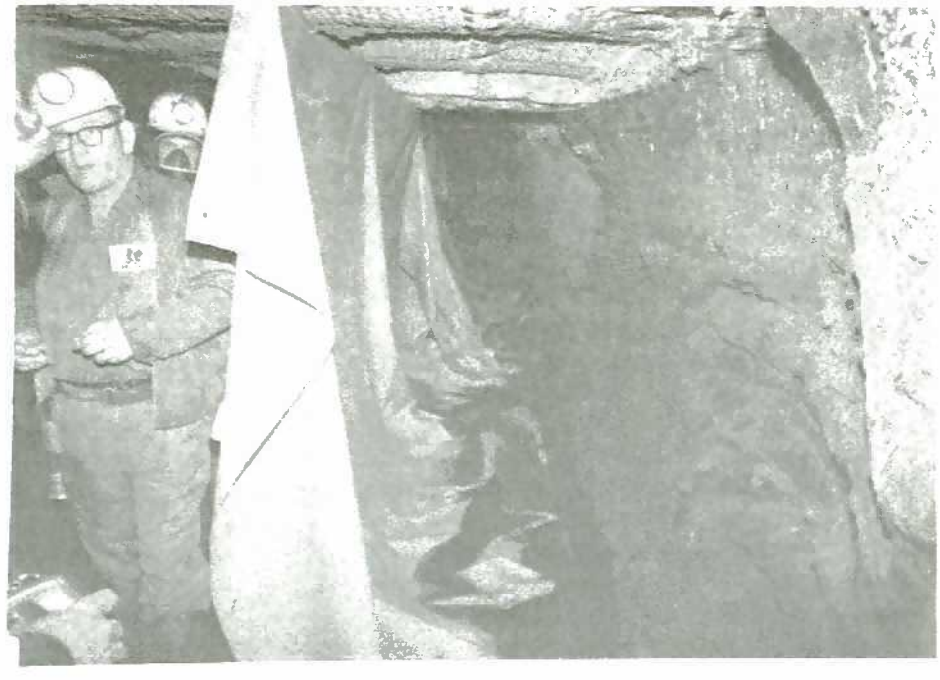
No. 3 Position of continuous mining machine at time of cut through into abandoned area



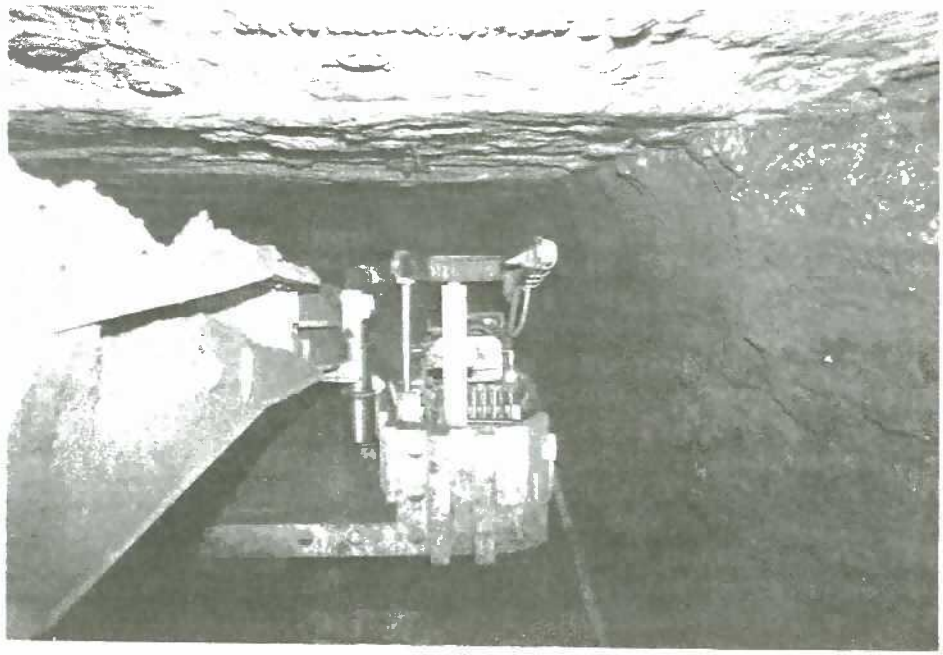
No. 4 Opening made by continuous mining machine at time of inundation



No. 5 View from waterhole looking outside showing line curtain and ventilation tubing



No. 6 View from face area looking toward outside showing return air side of line curtain



No. 7 Right side of continuous mining machine after last advance

No. 8 Mine rescue team members near face area of Drainway entry during investigation

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
COAL MINE SAFETY AND HEALTH DISTRICT 5
P. O. BOX 560
NORTON, VIRGINIA 24273

File
1642

March 24, 1978

Mr. M. L. West, Manager
Safety Division
Clinchfield Coal Company
Dante, Virginia 24237

Dear Mr. West:

This acknowledges receipt of your letter of March 17, 1978, outlining your plans to make an opening from the surface into an abandoned area of your Moss No. 3 "A" Mine for water drainage purposes.

The procedure as outlined is acceptable.

Sincerely,

Ray G. Ross
District Manager

cc:
F. C. Mann ✓

CLINCHFIELD COAL COMPANY
DIVISION OF THE PITTSTON COMPANY
DANTE, VIRGINIA 24237

March 17, 1978

Mr. Ray G. Ross
District Manager
Coal Mine Health & Safety
District 5, MSHA
P. O. Box 560
Norton, Virginia 24273

Dear Mr. Ross:

Re: Our conversation this A.M.

Permission is requested to make an opening from the surface into an abandoned area of our Moss #3 "A" Mine for the purpose of alleviating a threatening water situation in our "A" Mine and "A"2 Mine.

The connection is to be made with a continuous mining machine with test holes kept 20 feet in advance of the face. Our surveys show that the abandoned area where the connection will be made does not now contain water but the elevations at this point are 3 feet lower than the "A" Mine connection with "A"2 Mine; consequently, the water will flow out of the abandoned area connection before reaching our "A"2 Mine.

The opening will be about 225 feet in length. A fan with ventilation tubing will be utilized to provide adequate face ventilation. The roof will be supported with either conventional roof bolts or resin grouted rods and supplemented with timbers and/or crossbars where needed. The map submitted shows other pertinent information concerning the operation.

We will promptly submit any other information you may need in considering this request.

Sincerely,

M. L. West
Manager, Safety Division

APPENDIX G - Plan No. 1 continued

APPENDIX G , Plan No. 2

CLINCHFIELD COAL COMPANY

PLAN TO COMPLETE CONNECTION OF DRAINWAY INTO

MOSS NO. 3 "A" MINE

1. Big fan operating blowing to provide ventilation.

2. Five-man crew underground during hole-through operation with every man under oxygen utilizing Draeger O^2 breathing apparatuses. Men to be assigned as follows:

   (a) Certified man with methane and oxygen detecting devices at continuous mining machine. He is to make necessary tests at not more than five-minute intervals with CM machine shut down. Continuous tests are to be made during mining operations.

   (b) Continuous miner operator - He will work under strict instructions from the certified man.

   (c) One shuttle car operator.

   (d) Two men stationed near halfway point of drainway. They will be equipped with methane and oxygen detecting devices and smoke tube assembly and tubes. They are to constantly monitor the movement of air and test for methane and oxygen. They will determine each re-entry of the shuttle car and operator.

3. Two-way communications to be established from surface to the certified man underground.

4. Complete backup mine rescue team will be on the surface and kept in a state of preparedness.

5. Line curtain is to be maintained to the last permanent support.

6. Operation to be stopped at any disruption of the ventilation fan or controls until adequate repairs are made.

7. Comply with existing rules governing methane content during operation.

8. Equipment to be checked for permissibility and safe operating condition and any defects found will be corrected before operation begins.

9. After connection is made, the continuous miner and shuttle car will be brought to the surface.

10. The roof bolting machine will be trammed to the connection area. Two roof bolters under oxygen will install bolts under the direction of the certified man who will perform the same tests as outlined in Item 2(a).

11. Line curtain is to be maintained to the last row of bolts as roof bolting progresses.

12. If the shuttle car is needed to transport supplies during roof support operations, the shuttle car operator will move the car under the direction of the two men stationed at the half-way point.

13. All underground work during this phase of operation will be done on the day shift. If more than one shift is needed, responsible persons will be kept on duty during idle hours.

14. After this phase of operation is completed, the fan will be changed to operate exhausting so as to pull any undesirable atmosphere directly to the fan if possible. The fan is to be operated in this manner for 24 hours. At the end of that period, at least three persons (members of the mine rescue team) are to examine the drainway to the inby end of the line curtain (where the last support was installed) and at that point, tests for methane and oxygen are to be made. Six team members will be on the surface as backup. If oxygen and methane contents are satisfactory, this plan of operation will be completed.

M. L. West

MW/eh

APPENDIX G, Plan No. 3

PLAN FOR COMPLETION OF MOSS NO. 3 "A" MINE DRAINWAY PROJECT

1. Drainway floor to be cut 12-13 feet wide down to 1501.50 foot level from surface to the 1501.50 level underground, a distance of about 150 feet (see attached profile sketch).
2. A Marietta continuous mining machine will be used to cut the floor from about 50 feet outby the drainway entrance to the 1501.50 level underground. A backhoe will establish the desired grade from the point on the surface where continuous miner started to near Frying Pan Creek.
3. Ventilation will be maintained in the drainway during grade work with a minimum of 7,000 CFM of air intaking over the continuous mining machine.
4. Underground grade work will be done on one shift a day (day shift) with a 4-man crew (certified foreman, continuous miner operator, continuous miner operator's helper and a shuttle car operator). These men are to work open face.
5. Two trained rescue men wearing Draeger Oxygen breathing apparatuses will patrol the drainway inby the continuous mining machine. Continuous tests for methane and oxygen deficiency will be made and air measurements will be made at no more than one-hour intervals.
6. One of the mine rescue men underground will be in constant communications (sound powerd telephone) with person

APPENDIX G, Plan No. 3 continued
on surface near drainway entrance. All tests and measurements will be logged.

7. Six trained rescue men with Draeger Oxygen breathing apparatuses will be kept on surface in state of preparation while grade work underground is done.

8. It is estimated that the underground grade will be completed in five working shifts.

9. After grade work (underground and surface) is completed a quonset shaped metal drain pipe 8 feet high will be installed. The pipe will extend about 20 feet underground and to near Frying Pan Creek (see attached sketch).

10. The openings around the drain pipe at the drainway entrance will be closed with 8 inch concrete block with mortared joints. Positive ventilation will be maintained in the area where work is being done to seal the openings.

11. The open end of the drain pipe (Near Frying Pan Creek) will be guarded with metal rods or the equivalent. Also a chain link fence at least 10 feet high will be erected at least 10 feet away from the end of the pipe.

12. Danger signs will be posted around the fence and vehicle access from the main road to across Frying Pan Creek will be removed.

13. A trained mine rescue team will be kept at the work site while work is in progress until the project is completed.

14. All tests, examinations and other pertinent information relative to the project will be recorded.

M. L. West
Manager Safety Division

APPENDIX H

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
APPROVAL AND CERTIFICATION CENTER
Box 201B, Route 1
Industrial Park Road
Triadelphia, West Virginia 26059

June 26, 1978

MEMORANDUM FOR: Ray G. Ross
District Manager, Coal Mine Health and Safety, District 5

FROM: Stephen G. Sawyer
Chief, Approval and Certification Center

SUBJECT: Evaluation of an MSA "Spotter" Methane Detector and an MSA Wolf Flame Safety Lamp from the Moss No. 3, Portal A Mine, Clinchfield Coal Company accident investigation

Our Intrinsic Safety and Instrumentation Branch has completed tests on the subject methane detector and flame safety lamp. Both instruments were found to be in permissible condition. Details of the evaluation are documented below. If you have any technical questions on these tests, feel free to contact Mr. Robert Lenart of the Intrinsic Safety and Instrumentation Branch, under whose direction the tests were conducted (412 621-4500), ext. 357). These tests were witnessed by Mr. Calvin Philips of the Clinchfield Coal Company.

MINE SAFETY APPLIANCES COMPANY "SPOTTER" METHANE DETECTOR, APPROVAL NO. 8C-24, Part No. 457176:

The MSA "Spotter" Methane Detector was visually examined and no defects in the instrument construction were observed. The battery was discharged and as a result, the instrument did not respond to methane as received. After the battery was charged, the instrument sensor was exposed to a series of five calibrated gas mixtures ranging from 0.25% to 2.01% methane in air by volume. In all instances the detector indication was within the accuracy limits of 30 CFR, Section 22.7 (d) (2). These tests were repeated on the following day with similar results.

MINE SAFETY APPLIANCES COMPANY FLAME SAFETY LAMP, APPROVAL NO. 210:

A visual inspection of the flame safety lamp revealed that it was assembled in a permissible manner. However it was not operational because the wick and igniter assemblies were covered with close to one inch of coal dust and the wick and fuel cotton were waterlogged.

After the lamp was cleaned and dried, it was performance tested in methane-air mixtures and oxygen deficient atmospheres.

Methane Detection Tests:

The lamp was placed in a plexiglass chamber and exposed to a series of gas mixtures ranging from 1.0% to 4.0% methane in air by volume. The flame height rose accordingly, indicating proper flame safety lamp function. On a few occasions the methane concentration was increased to 8.3% and the flame safety lamp was promptly extinguished.

Oxygen Deficiency Tests:

The flame safety lamp was placed in a plexiglass chamber and exposed to various oxygen deficient atmospheres containing 15% to 20% oxygen. The flame size decreased accordingly until it was finally extinguished in an atmosphere containing approximately 16.25% oxygen.

All of the above tests indicate that the subject methane detector and flame safety lamp were constructed and maintained in permissible condition.