

VIRGINIA DIVISION
Of MINES AND QUARRIES
219 Wood Avenue
Big Stone Gap, Virginia 24219

INVESTIGATION REPORT
UNDERGROUND COAL MINE EXPLOSION

McClure No. 1 Mine

CLINCHFIELD COAL COMPANY

McClure, Dickenson County, Virginia

June 21, 1983

by

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Technical Assistant

McClure #1 Mine Explosion Investigation Summary

Facts: At approximately 10:15 p.m., on June 21, 1983, an explosion occurred on the 2-Left Section of the McClure #1 Mine of Clinchfield Coal Company located at McClure, Dickenson County, Virginia. Seven coal miners were killed. Three other miners were injured, but survived the explosion.

Investigation Results: The explosion occurred as the result of a failure to install proper ventilation apparatus at Crosscut #40 when 2-Left Section cut into the set-up entries of 1-Left Section. The failure to properly separate the two air currents caused a significant ventilation change in 2-Left Section. The air coming across the set-up entries continued through the working face of 2-Left Section and out the return. This restricted the ventilating current of #2 and #3 Entries of the 2-Left Section. The ventilating current in #2 and #3 Entries of 2-Left Section was restricted to a point that an adequate velocity of air did not exist to dilute and carry away the methane being liberated. The lack of adequate air velocity allowed methane to accumulate to an explosive level. Due to the lack of severe damage, a very low methane mixture was probably present when it ignited. Estimates place the methane mixture at approximately 6.0%. After the methane reached the explosive range, the methane-air mixture was ignited by electrical arcing from one of the following sources: An interruption of the belt control circuit, dinner hole light circuit, ground fault in the trailing cable for the conveyor belt feeder, automatic operation of one of the circuit breakers in the section power center, or normal operation of the nonpermissible personnel carrier. A contributing factor was the failure to provide an adequate preshift examination for the evening shift in that the fireboss did not ascertain whether the air was traveling in its proper course.

Violations: Two violations of the Virginia Mining Laws were issued in regard to the explosion. The two violations were: 45.1-20(d) The Fire Boss will ascertain that the air is traveling in its proper course, and 45.1-57(d) Changes in ventilation that materially affect the main air current or any split thereof shall be made when the mine is not in operation and with no men in the mine other than those engaged in changing the ventilation.

Action Taken: A copy of the investigation report will be delivered to the Commonwealth Attorney of Dickenson County for his review to determine if cause exists for prosecution of any violations.

Copies of the investigation report will be delivered to the Board of Mine Examiners for their review to determine if cause exists for revocation of certification.

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Clinchfield Coal Company

McClure #1 Mine Explosion

June 21, 1983

At approximately 10:15 p.m., on June 21, 1983, an explosion occurred on the 2-Left Section of the McClure #1 Mine of Clinchfield Coal Company located at McClure, Dickenson County, Virginia. Seven coal miners were killed. Three other miners were injured but survived the explosion. Following is the data gathered on each victim.

FATALITY VICTIMS:

✓ Name: Mary K. Counts	✓ Name: Eugene W. Meade
Occupation: Shuttle Car Operator	Occupation: Shuttle Car Operator
Mining Experience: 3 Yrs. 8 Mo. 5 Days	Mining Experience: 7 Years
Age: 51	Age: 26
Family Status: Single	Family Status: Married
Dependent Children: 3	Dependent Children: 1
✓ Name: Covey J. French	✓ Name: Forest Carter Riner, Jr.
Occupation: Miner Operator	Occupation: Section Foreman
Mining Experience: 13 Yrs. 4 Mo.	Mining Experience: 38 Years
Age: 45	Age: 58
Family Status: Married	Family Status: Married
Dependent Children: 2	Dependent Children: 1
✓ Name: Earnest Avery Hall	✓ Name: Dale Stamper, Jr.
Occupation: Section Foreman	Occupation: Utility Man

Mining Experience: 6 Years

Age: 30

Family Status: Married

Dependent Children: 1

Mining Experience: 16 Yrs. 1 Mo.

Age: 56

Family Status: Married

Dependent Children: 1

✓ Name: Luther Julian McCoy

Occupation: Repairman

Mining Experience: 16 Years

Age: 37

Family Status: Married

Dependent Children: 2

INJURED VICTIMS:

Name: Harold J. Boyd

Occupation: Roof Bolter

Mining Experience: 3 Yrs. 10 Mo.

Age: 25

Family Status: Single

Dependent Children: 0

Name: Emnery Howard

Occupation: Miner Helper

Mining Experience: 3 Yrs. 9 Mo.

Age: 30

Family Status: Married

Dependent Children: 7

Name: Miles W. Sutherland

Occupation: General Inside (Roof Bolter)

Mining Experience: 27 Years

Age: 51

Family Status: Married

Dependent Children: 0

MINE OVERVIEW

Mine History

McClure # 1 Mine is located near McClure, Dickenson County, Virginia. It was licensed on November 13, 1978. The mine was opened by constructing a vertical shaft approximately 460 feet down with a slope extending approximately 1680 feet down to the coal bed. The mine is developed into the Jawbone Seam, which averages 7 feet in thickness. The mine employs 310 workers on three production shifts and produces approximately 2800 tons of coal each day.

Mining Methods

McClure #1 Mine is comprised of seven units, with six units producing coal each shift. The seven units are: Caney 1, Cranes Nest 2, Cranes Nest 3, Cranes Nest 4, Caney 4, 2-Left and 3-Left. The explosion occurred on 2-Left Section. All seven sections produce coal with continuous mining methods. In the spring of 1982, 2-Left Section started developing a longwall panel. Since the explosion the panel has been completed and the longwall has been put into production. Normal section equipment includes a continuous miner, two shuttle cars, a dual boom roof bolter with ATRS, and a battery powered scoop.

Ventilation

At the time of the explosion McClure #1 Mine was ventilated by a 117-inch Jeffery Aerodyne Exhaust Fan installed in a fireproof housing constructed of concrete blocks and metal. The fan was located over the return air shaft and was driven by a 1000 horsepower electric motor. During the last inspection prior to the accident, 737,820 cfm of air were measured at the main return shaft. 32,000 cfm of air were measured at the last open crosscut of 2-Left Section. 2-Left Section started with four entries. The #1 Entry was dropped on January 23, 1983, after having been developed approximately 670 feet. The belt and track was in #2 Entry, #3 Entry was the intake and #4 Entry was the return. The air used to ventilate the belt and track entry was normally coursed through 2-foot vent tubing to the return just outby the section loading point. Permanent stoppings, constructed of concrete blocks, were used to provide the necessary separations between the air courses. Line brattice and check curtains were used to direct the ventilating current in the working places. An auxiliary fan with vent tubing set up in #4 Entry just inby #39 Crosscut was used to direct the face ventilation.

Coal Dust

Application of rock dust has been the primary means for rendering coal dust inert. During development of the working places, rock dust was applied by hand and periodically a portable rock dust machine was used to dust the entries. Loose coal, including coal dust in all entries, was cleaned with a scoop and loaded onto the belt conveyor. Dust was

controlled at transfer points, loading points, underground dumps, along the belt line and at belt drives, in the face area and along the roadways by ventilation, water, calcium chloride, rock dust and a company cleanup program. A 4-inch diameter waterline parallels the belt conveyor, and outlets are provided as required by law. During the last inspection on May 17, 1983, upon Notice of Violation by the inspector, additional rock dust was applied to the intake and return air courses of 2-Left Section. No. 2 Entry of 2-Left Section was rock dusted by machine on the weekend prior to the June 21, 1983 explosion.

Explosives

Explosives are used in limited quantities at the McClure #1 Mine. Their use has been limited to shooting overcasts and rock rolls, when encountered. Permissible explosives and detonators, when used, have been in compliance with regulations regarding storage, transportation, handling and use. At the time of the explosion, no explosives were being used or stored on 2-Left Section.

Smoking

No smoking articles were found on the victims. No smoking articles were found on the section. The company had a search program and it was apparently effective. One cigarette butt was found near the mouth of Caney 4 Entries. It is believed that it was brought into the mine with supplies.

Electricity

Three-phase power is purchased from the Appalachian Power Company at 69,000 volts, reduced to 12,470 volts and transmitted to a surface substation near the mine. At the surface substation the power is connected to a bank of three 750 KVA transformers, 12470 Delta-12470 Wye.

The secondary neutral is properly grounded through a 25-ampere current limiting resistor. A grounding circuit, originating at the grounding side of the resistor, is used to ground the metallic frames of all electric equipment supplied from the underground high-voltage distribution center.

Three 1200-ampere, oil filled circuit breakers in the surface substation are equipped with a ground check circuit and relays designed to provide overload, short-circuit, ground-phase, and undervoltage protection for the underground high-voltage distribution system.

The power is transmitted underground through a 4/0 3 conductor type MP-GC 15KV cable. At the beginning of the sections the power cable is then reduced to a 2/0 3 conductor type MP-GC 15KV cable, which transmits power to the section power centers.

The power center located on 2-Left Section was manufactured by Pemco Corporation and contains a 950 KVA transformer; input voltage 12,470, output voltage, 600 Delta 480 Wye.

The following equipment on 2-Left Section received power from the section power center:

Marietta Miner Type 3080 SN7792 550 Volt AC.

Standard Drive Shuttle car, Joy Type 21SC-56XKKE-1 SN. ET14653 550 Volt AC.

Off-standard drive Shuttle car, Joy Type 215C-56XKKE-1 SN 14654 550 Volt AC.

Roof Bolter, Fletcher Model DDO-15C-D SN 79123 550 Volt AC.

Auxiliary Fan, Buffalo Forge Company Type 25A9-NVF SN 80N-3664-A3 480 Volt AC.

Battery Charger, Gould Ferro Charger Model GFM32-800T2-G SN 78CS15137 575 Volt AC.

Welder, Air Products DC 400 SN SG802037 480 Volt AC.

Trickle Duster, MSA Model 454904 SN TD8226 575 Volt AC.

Belt Feeder, Stamler SN 11781 550 Volt AC.

Mantrip Charger; Chargers are mounted on the mantrips and railrunners. They receive power from the section power center.

Lights at the power center 120 Volt, AC.

Lights at the dinner hole 120 Volt, AC.

Light over supply sled 120 Volt, AC.

Fluorescent fixtures, Daniel Woodhead Company Cat. No. 1051.

Westinghouse heat-ray infrared bulbs 250 Watt 115-125 Volts.

Daniel Woodhead - rubber covered sockets.

Transportation-Haulage

Coal is loaded into shuttle cars at the face and hauled to the belt feeder. The belt conveyor transports the coal to the surface.

The miners enter the mine by means of an automatic elevator to the bottom of the shaft. Battery operated covered mantrips and railrunners are used to reach the working section. Supplies and equipment are lowered into the mine through the slope entry and supply cars are moved from the slope bottom to the section by battery powered track locomotives.

Communication

The mine communication system consists of permissible telephones installed on the surface, in the supply house underground, on all working sections, at belt transfer points and other strategic areas. A commercial telephone is also provided in the underground supply house.

Illumination

Illumination is provided on mobile electric equipment by permissible mounted lighting systems. Permissible battery powered cap lamps are worn by the miners and a fluorescent and incandescent light fixture is provided over the power center and the supply sled. A fluorescent light and heat-ray infrared bulbs illuminate the dinner hole.

Fire Protection

The operator maintains a program of instruction for the miners, including training in the location and use of fire-fighting equipment, location of escapeways, exits and routes of travel and evacuation procedures. According to the mine records all escapeways had been examined and the results were recorded in a book located on the surface.

Dry chemical fire suppression systems are provided on all the mobile electric face equipment that uses hydraulic oil, except the continuous

miner, which has a water system. Fire extinguishers of the proper rating are located at all electrical installations, and at oil storage and at surface areas, where they were required. The belt conveyors are continuously monitored for fire by sensor systems utilizing point-type heat sensors. Belt conveyor drives are protected by water deluge systems.

A four inch waterline runs along the conveyor belt entry.

Mine Rescue

Clinchfield Coal Company maintains three Mine Rescue Teams. A Central Mine Rescue Station is maintained at Dante, Virginia. The three teams are designated McClure #1, Dante, and Open Fork Mine.

Each miner at McClure #1 is provided with a one-hour, filter-type self-rescuer, which is worn on the miner's belt. Each miner was also provided with a self-contained self-rescuer, which is stored on the working section. The miners have been trained in the use of each rescuer. A check-in and check-out system is maintained in the lamp room adjacent to the elevator shaft. The system utilizes a check board and tags corresponding to similar tags worn on the miners' belts.

Explosion

Work on the 2-Left Section was started during April of 1982, with four entries being driven for the development of a longwall panel. The entries had been driven approximately 670 feet, when mine management decided that #1 Entry would be dropped. At that time some accumulations of methane above 1% were found in the face of the #1 Entry, which had been stopped. A line curtain was placed in the face of the stopped #1 Entry and a regulator was placed in the mouth. This allowed air to be moved through the "dogleg", the area where the #1 Entry was stopped. This eliminated the methane accumulations in this area. The development with three entries continued.

The 1-Left Section, which was being driven in conjunction with the 2-Left in development of the longwall panel, was ahead of 2-Left in development. 1-Left was completed to a depth of approximately 3925 feet and had been driven across the projected longwall face to the point where 2-Left would intersect with it. These cross connecting entries are referred to as the set-up entries. After these entries were completed, a crew was assigned to start setting up the longwall pan line.

At approximately 1:30 p.m. on Tuesday, June 14, 1983, the day shift cut #2 Entry of 2-Left into the #3 Entry of the set-up entries, which were completed as part of the 1-Left Section. The day shift Section Foreman was Mr. Harold Leonard. The superintendent was present shortly after the cut through was made. Pursuant to the superintendent's previous

instruction, a curtain was hung in #2 Entry of 2-Left Section between #38 Crosscut and #39 Crosscut. This curtain separated the air currents of 2-Left Section and 1-Left Section. As the breakthrough was cut from #2 Entry to #3 Entry at #39 Crosscut, the curtain was moved from across #2 Entry to a diagonal position across the intersection of #39 Crosscut in Entry 2 and Entry 3 of the set-up entries. This allowed the miner to cut the breakthrough right from #2 and #3 Entries. This also kept the ventilating current on 1-Left and 2-Left separated. Mining proceeded without incident until Friday, June 17, 1983.

On Friday, June 17, 1983, the crew went underground at approximately 8:00 a.m. and arrived on the section at approximately 8:30 a.m. The miner was parked outby the last open crosscut in #3 Entry. When Jimmy Lee Honaker, Miner Helper, turned on the machine, the methane monitor warning light was on. The methane monitor indicated 1.7% methane. Mr. Honaker started checking the area with a methane spotter. Methane was detected from a check curtain in #3 Entry just outby #39 Crosscut and across the #2 Entry and up to a check curtain just outby #39 Crosscut. Methane also extended back to #37 Crosscut. Readings with a methane spotter varied from 1.0% to 1.5% in the area. It was stated that check curtains hung across #2 Entry and #3 Entry had blocked the section ventilation. Mr. Leonard gave orders to arrange the curtains to put the ventilation in its proper course. After the methane was detected, according to Mr. Honaker's statement, it took approximately 45 minutes to clear up the methane buildup. Mr. Harold Leonard, Section Foreman, said it took about ten minutes to clear the methane. After this

incident, no other methane problems, other than normal liberating in the face while loading coal, were encountered.

On Monday, June 20, 1983, the 2-Left Section produced coal on all three shifts. No problems were encountered. The section was idled on the midnight shift on Tuesday, June 21, 1983. Several repairmen were on the section performing maintenance work; some guards were put on the miner, the ripper motor leads were replaced, and a permissibility check was performed on the roof bolter and the miner. Another crew was making a power move while the maintenance work was being performed.

On the day shift on Tuesday, June 21, 1983, Mr. Harold Leonard, Jr., Section Foreman, and his crew entered the mine at approximately 8:00 a.m. and arrived on the section at approximately 8:35 a.m. The shift progressed normally. Mr. John Talbert, Assistant Superintendent, was on the section with Mr. Leonard part of the shift. They were discussing the pending cut through into the set-up entries at #40 Crosscut. Mr Talbert was on the section shortly after the cut through was made. Mr. Leonard indicated that the cut through was made between 1:00 p.m. and 2:00 p.m. After the cut through, the miner went to E-4 heading and the roof bolter went into the crosscut between E-2 and E-3, which had cut into the set-up entries. The roof bolter completed bolting the place at approximately 3:10 p.m. After the place was bolted it was cleaned and rock dusted. The area from E-2 to E-4 was also cleaned and rock dusted. An air reading was taken in Entry 3 of the set-up and Mr. Leonard stated that there was a four thousand cfm difference in readings he had been getting prior to the cut through. A curtain was not hung in the place

when it cut through and a curtain was not hung before the crew left the section. Mr. Leonard stated that he had not been instructed to hang a curtain and he thought everything was fine. Mr. Talbert indicated in his testimony that he had told Mr. Leonard to hang a curtain in the place which cut through. Mr. Leonard called this preshift report out to Mr. Ernie Hall, the oncoming Section Foreman. When Mr. Leonard arrived at the surface he saw Mr. Hall in the lamp house and briefed him on the section conditions. He told Mr. Hall that they had cut the place through. Mr. Leonard proceeded to the mine foreman's office, where he encountered Mr. Talbert. Mr. Talbert asked Mr. Leonard if he had put a curtain in Crosscut 40 between Entry 2 and 3. Mr. Leonard told him he had not. Mr. Talbert instructed him to run back and tell Ernie Hall that he hadn't installed the curtain and to tell Mr. Hall to install the curtain. Mr. Leonard could not find Mr. Hall and he reported this back to Mr. Talbert. Mr. Talbert did not make any further attempt to contact Mr. Hall. Mr. Talbert indicated that he was confident that Mr. F. C. Riner was going to the section and that "he had been instructed". He said he felt that with Mr. Riner's experience and his safety record he would do the right thing. (Mr. Riner, who was retiring, was the regular Foreman on 2-Left. This was his last week. He had been training Mr. Hall.)

The events of the evening shift are very sketchy. Three persons on the section survived the explosion and none recalls details of the shift. The crew entered the mine and arrived on the section at approximately 4:35 p.m. Since the Crosscut 40 had cut into the set-up only E-3 and E-4 were left for the crew to work. According to the survivors no unusual

conditions were experienced prior to the explosion. Mr. Ron Sluss, Assistant Mine Foreman on the evening shift, went to the 2-Left Section sometime prior to 7:00 p.m. He had gone to 2-Left to check on the ribs to be bolted. When he arrived on the section he found that a chain drive on the feeder had been broken and that some of the men were working on it. Mr. Hall, the Section Foreman, asked Mr. Sluss to come up to #3 heading. Mr. Hall was down to one haulway and two places to work and wanted Mr. Sluss to be aware of his circumstances. Mr. Sluss was in the face area for approximately forty seconds, looking at the situation described by Mr. Hall. While walking back down the entry, Mr. Sluss pointed out several corners where rib bolts were to be installed. Sometime around 7:00 p.m., Mr. Johnny Steele and Mr. F. C. Riner arrived on the section with 4-foot conventional bolts and 4-foot headers, which would be used to do rib bolting. While the feeder was down, the crew ate dinner. Mr. Sluss talked to Mr. Hall before he left the section at approximately 7:45 p.m. Mr. Sluss indicated that Mr. Hall was experiencing a normal shift and had no problems. As Mr. Sluss was leaving the section at approximately 7:45 p.m. the guards were being replaced on the chain drive. Mr. Meade had gone to the supply house to obtain a new chain, which was installed on the drive.

At the time of the explosion, the miner was in E-4, not energized. The roof bolter was in E-3, not energized. Both shuttle cars were parked out. According to Emmerly Howard, Miner Helper, a short cut had been made in E-3 and the miner was moved to the face of E-4. The Foreman, Mr. Hall, had instructed them to hang two pieces of ventilation tubing and make sure the slider was near the face. Mr. Howard, Covey French,

Dale Stamper, Eugene Meade, and Mary Counts were engaged in this activity. Mr. Howard and Mr. French were on the top of the miner wiring up the last piece of tubing. At this time, Mr. Howard heard a roaring sound and saw a wall of flame coming through the curtain between #3 Entry and #4 Entry. This was a partial fly curtain that extended up to the roof bolter. When the force struck, it knocked Mr. Howard's light off and knocked him backwards. He tried to remove his filter-type self rescuer from his belt but could not because of the force of the explosion pushing him backwards. Mr. Howard started crawling. As he was crawling he heard Covey French crawl by him. He heard him praying and recognized his voice. He then remembered the whole area around him. People were screaming and praying. At this point Mr. Howard blacked out.

Rescuers found Mr. Miles Sutherland, Roof Bolter Operator, standing at the inch controls of the roof bolter. Mr. Sutherland said he just heard a whistling, roaring sound and saw the fire coming. He tried to get down to avoid the flame. He went right handed around the bolter but does not remember where he went.

Mr. Harold Boyd, the other roof bolter, does not remember anything about the accident.

When the explosion occurred, Mr. Luther McCoy, Repairman, apparently had been taking Mr. Riner off the section in the mantrip. They were found on the track between Crosscut #15 and #17--approximately 2400 feet outby the face.

At approximately 10:00 p.m., the Assistant Mine Foreman, Mr. Sluss, Johnnie Steele and Kellis Barton were at the supply house at the shaft bottom. Shortly after the three stepped out the door, they felt a rush of air and the supply house door blew open.

Some other men moving belt through the air lock doors told Sluss that something had blown one door open while they were coming through the other door. Their first reaction was that a huge roof fall had occurred. Mr. Sluss called Eddie Glover, Maintenance Foreman, and told him to go check the fan. Mr. Glover called him back and told him that the water gauge had dropped from 8 inches down to 5 inches and then had shot back up and leveled off. Mr. Sluss called Caney 1 Section and asked them to get an air reading. The Foreman reported that he had lost about 15,000 cfm of air. At this time people started coming out of the mine. Sluss then called Richard Light, Mine Superintendent. Mr. Light told Sluss to contact all the sections and said that he would be there as quickly as he could. All sections except 2-Left and Caney 4 had been contacted. Mr. Darrell Holbrook came from Caney 4 to the bottom with his crew. This left only 2-Left Section that could not be contacted.

RECOVERY OPERATIONS

Mr. Holbrook, with his utility man and an extra man, was bolting ribs in #4 Entry of Caney 4 Section, the nearest to 2-Left. Mr. Holbrook heard the noise, turned around, and saw the fly curtains rise up. He said it sounded as though a big air line had burst. According to Mr. Holbrook, there was some dust in the air mixed with rock dust and it felt warm.

The flies "sort of settled back down and then came up again". This time black dust came up and visibility was very poor. They went to the feeder, where Holbrook gathered his crew. After attempts were made to call outside, Mr. Holbrook went to pull the power at the power center. Everyone boarded the mantrip and they started out. When they reached the point where 1-Left Entries intersected Caney 4 they encountered better air. Holbrook went into 1-Left for a few feet but he said it was too dusty to see anything. They cleaned some debris off the track and then proceeded down Caney 4 track. The air cleared as they traveled to the elevator bottom. His crew went outside and Holbrook went to the supply house, where he encountered Sluss, Steele, Roy Glover, Kellis Barton and others. He informed them that a roof fall had not occurred but that something else had apparently gone wrong on 2-Left.

Mr. Holbrook and Mr. Sluss took a jeep and drove to 2-Left. When they arrived at Crosscut #2, they found the section mantrip parked between Crosscut #2 and #3. The lights were on, shining toward the outby. They didn't examine it, but it was warm to the touch. They left the jeep and walked to the dogleg where #1 Entry had been dropped. Somewhere up the entry they found a boot, which was warm. At the dogleg they encountered a blanket of dust and stopped. Holbrook indicated to Sluss that they needed a mine rescue team. They then walked back to their jeep, where they encountered Blake Blackstone. They got on their jeep with intentions of going outside, but decided to go up 1-Left to the end of the track. They walked across the longwall face and set-up entries, zig-zagging from one entry to another trying to find the best air. As they neared 2-Left, they heard Miles Sutherland shouting. They went

straight across at #39 Crosscut to #3 Entry, where they found Covey French between #39 and #40 Crosscuts. Holbrook examined Covey but could not detect a pulse. Next they moved on to the face, where they found Miles Sutherland, Joe Boyd and Emmery Howard alive. From there they went to the miner, where they found Dale Stamper, Eugene Meade and Ernie Hall, all of whom were dead. Holbrook, Sluss and Blackstone determined that three people were missing: Mary Counts, Luther McCoy and F. C. Riner. Sluss and Blackstone went down toward the feeder, checking the area as they went. They decided they needed help. Sluss and Blackstone took Miles Sutherland out with them to get more help while Holbrook stayed on the section with Howard and Boyd. Holbrook then heard something and walked down toward the feeder. He saw the welder was smoking from a piece of burned brattice material which had been blown onto the welder. He put a bag of rock dust on it to stop the burning. When help returned Holbrook thought that Boyd needed immediate attention and directed that he be transported first. Emmery Howard was transported next. Mary Counts was found under some debris near the miner. Holbrook stayed with the rescuers until they left. He arrived on the surface at approximately 1:30 a.m.

During the initial rescue effort, company officials were making all the necessary notifications to State and Federal officials, and Mine Rescue Teams were called out. Personnel were assigned to monitor the fan. Other persons were assigned to other duties to carry out control and recovery efforts.

Around midnight State officials, Federal officials and Company officials gathered for a briefing. A Mine Rescue Team had not yet gone underground at that time. They were waiting for a back-up team. The Mine Rescue Team made up of Clinchfield Coal Company Mine Rescue Personnel proceeded to Crosscut 2 where the jeep was located. Mr. Bill Clemons, MSHA, stayed with the lead Rescue Team and Monroe West, CCC, stayed with the outby team, communicating with the surface. Two miners were still missing and the Rescue Team had no idea where they were. The lead team split into three two-man groups and proceeded up the intake entry, belt and track entry, and the return entry. The three crews were instructed to make methane and carbon monoxide tests and, at least at every intersection, to communicate with each other at the crosscuts. The team followed this procedure to a point where #1 Entry of 2-Left had been stopped. The air had been traveling with them to that point, and the ventilation had reversed inby. The air temperature was noticeably higher. The methane reading at this point was .8% and the carbon monoxide reading was only a trace.

After some discussion as to how to proceed, the team continued as before. Mr. Clemons stayed one crosscut outby but in voice contact with them. Mr. West stayed with the back-up team, keeping in communication with the surface. A short distance inby the dogleg they discovered a miner's hat and a boot. They proceeded inby and found the body of F. C. Riner. After visually examining the body and marking the location, they proceeded inby and located the body of Luther McCoy. They examined the body of McCoy and proceeded on inby toward the section. The telephone line was damaged so they had to revert to splicing into the belt control line for a communication line. They proceeded on to the

section without encountering any problems. After locating and marking the other bodies, the team entered the longwall set-up entries, using the same procedures as before. Reports of damage observed by the Caney 4 crew caused concerns about other dangerous conditions, especially short-circuiting of air. They continued exploring to 1-Left. They then proceeded into the Caney 4 Entries. They discovered that slight air movement was going toward the faces of Caney 4 inby the 1-Left connector entries. It was decided that it was safe to recover the bodies from the face area of the 2-Left Section. The location of bodies was marked on a mine map, the mine roof, ribs and floor, and other available places. After the bodies were identified and located, they were loaded and brought to the elevator bottom. All seven bodies were brought to the surface. The rescue effort was completed sometime near 5:00 a.m.

INVESTIGATION

After the mine was examined and patrolled and some methane problems were corrected, an underground investigation was started on June 24, 1983, and continued until August 8, 1983. The investigation was conducted with State, Federal, UMWA, and Company officials participating. After completion of the underground investigation, interviews were conducted to gather information. Company officials, UMWA personnel, and State and Federal inspection personnel were interviewed. The interviews were started on July 26, 1983, at the Wise Court House, Wise, Virginia. The interviews were completed in the Norton City Hall on August 18, 1983. Mr. Miles Sutherland was interviewed at the Burn Center at the University of Virginia Hospital, Charlottesville, Virginia, on August

25, 1983. Interviews were conducted with MSHA, Virginia Division of Mines and Quarries, UMWA, and Company officials participating.

DISCUSSION-EVALUATION

Factors Immediately Preceding Explosion

Methane and Ventilation

McClure #1 mine liberates between three and four million cubic feet of methane in a twenty-four hour period. The last state inspection of the McClure #1 mine was conducted on April 4, 1983 to May 18, 1983. No methane in excess of 1% was detected on the 2-Left Section during this inspection. Gas tests were made frequently during the recovery. These tests showed .3% and .9%. A methane build-up of over 1.0% was encountered prior to the start of the underground investigation, but the problem was resolved. The quantity of air ventilating the mine appeared to be adequate and was not considered a factor in the explosion. However, failure to install ventilation controls between 2-Left Section and 1-Left Section at 40 Crosscut to separate the two air currents was clearly a factor in the explosion. Failure to install the curtain in 40 Crosscut caused a decrease or stall in the air movement up 2-Left. Lack of velocity up 2-Left allowed methane to accumulate to an explosive level.

Coal Dust/Rock Dust

The section appeared to be relatively clean and testimony indicated that rock dust was applied frequently. The face areas apparently received

rock dust as needed. The #2 Entry of 2-Left Section had been rock dusted by machine the weekend prior to the explosion. Loose coal and coal dust were found in excessive amounts across the set-up entries and extending into 1-Left Section. The extent of force and flame indicated that coal dust did not enter significantly into the explosion. No extensive damage was present in the explosion area. In explosions where dust enters significantly into the explosion, extensive damage is usually evident and propagation extends to other or all areas of a mine.

Electricity

The investigation revealed that the following electric equipment and cables were present on the 2-Left Section:

- (1) Approximately 3000 feet of No. 4/0 and 1000 feet of No. 2/0 3 conductor type MP-GC 15KV High Voltage Cable.
- (2) Approximately 4000 feet of telephone line.
- (3) Approximately 3200 feet of Pyott-Boone fire detection cable.
- (4) Approximately 4000 feet of No. 14, 2 conductor type SD belt control cable.
- (5) Approximately 100 feet of No. 16, 3 conductor type SJO portable cable supplying power to the lights over the power center and dinner hole lights.
- (6) Approximately 200 feet of No. 10, 5 conductor type SD portable cable supplying power to the Trickle Duster.
- (7) Approximately 600 feet of No. 6, 3 conductor type GGC portable cable supplying power to the mantrip charger.

- (8) Approximately 38 feet of No. 6, 3 conductor type GGC portable cable supplying power to the portable welder.
- (9) Approximately 613 feet of No. 6, 3 conductor GGC portable cable supplying power to the scoop battery charger.
- (10) Approximately 650 feet of No. 2, 3 conductor type GGC portable cable supplying power to the roof bolter.
- (11) Approximately 300 feet of No. 2/0 3 conductor type GGC portable cable supplying power to the belt feeder.
- (12) Approximately 634 feet of No. 6 type GGC portable cable supplying power to the auxiliary fan.
- (13) Approximately 476 feet of No. 6, 3 conductor type GGC portable cable supplying power to the off standard shuttle car.
- (14) Approximately 627 feet of No. 6, 3 conductor type GGC cable supplying power to the standard shuttle car.
- (15) Approximately 550 feet of No. 4/0 3 conductor type G 2000 Volt portable cable supplying power to the Continuous Miner.

Extent of Forces

It was apparent from the lack of extensive damage found that the accident was primarily a methane explosion with very little force associated with the occurrence. Coal dust did not enter significantly into the explosion. Evidence of force was observed at the power center, where a lid was blown off. The battery covers were blown off the scoop, and the welder was blown over on its side. A few timbers were down along the belt line. The high voltage splice box at #27 Crosscut was damaged and blown in an outby direction for approximately 140 feet. Stoppings

were blown out or blown over throughout the section. The stoppings were constructed of concrete blocks, stacked dry and plastered. Not all stoppings were blown down, but very little force is required to dislodge stoppings constructed in this manner.

Extent of Flame

Although coal dust did not enter significantly into the explosion, coal dust in the entries did contribute to the total length of explosion flame. Evidence of flame was found to extend approximately 2400 feet in the #2 Entry of 2-Left Section, approximately 2600 feet in #3 Entry and approximately 2600 feet in #4 Entry. Evidence of flame stopped at Crosscut 15 in #2 Entry and stopped at Crosscut 13 in #3 Entry. Evidence of flame extended across the set-up entries to their intersection with 1-Left Section. This evidence was in the form of coke, soot, melted plastic brattice material, charred paper, charred cable insulation and other burned material. Some of the victims received severe burns while some appeared to have no burns. Some of the victims' clothing exhibited signs of flame.

Potential Sources of Ignition

Following is a list of possible ignition sources and the condition in which they were found during the investigation:

- (1) Railrunner(referred to variously as the mantrip, jeep, personnel carrier.): The Railrunner was found between Crosscut 2 and 3. It is

not known where the Railrunner was at the time of the explosion. The investigation revealed the following information regarding the status of the Railrunner at the time it was found: Both battery lids were moved toward the operator's side of the machine; the light switch was in the "on" position in the direction of the outby end; the tram controls were centered; the brake was dragging, possibly causing sparks. The Railrunner was not a permissible type. Since the Railrunner could have provided electrical arcing and sparks from a dragging brake, it could have been the possible source of the ignition for the explosion.

(2) Miner: At the time of the explosion the Miner was in the face of #4 Entry. The investigation revealed the following information regarding the status of the Miner.

1. Cutterhead stop - Locked in "Stop" position.
2. Tram Breaker in Deck - "On" position.
3. Gathering head breaker - "Off" position.
4. Main breaker - "On" position.
5. Hydraulic Controls in "Neutral" position.
6. No lights were on.
7. Methane monitor was off.

(Note) Gathering head breaker cuts off all control power and methane monitor power. The Miner was taken through the full sequence of operation and everything worked properly. The methane

monitor was checked; at 1.0% the warning light came on, at 2.0% all lights and motors cut off.

The following permissibility deficiencies were observed:

1. Headlight on operator's side; lens cover in excess of .006. No seal on packing gland. Headlight not secured to frame.
2. Left head motor junction box not secured to frame. No clamp on conduit hose.
3. Packing gland broke on fluorescent light on left side.
4. Defective splice in trailing cable.

The Miner was not operating at the time of the explosion. It was parked in No. 4 Entry. Although permissibility deficiencies existed, there was no evidence found of electrical arcing on the Miner. This would indicate that the Miner was not the ignition source for the explosion.

(3) Roof Bolter: At the time of the explosion the Roof Bolter was in the face of #3 Entry. The investigation revealed the following information regarding the status of the Roof Bolter.

1. Main breaker "On".
2. Tram levers in "Neutral" position.
3. Light switch "On".
4. Reel control in.

The Roof Bolter was in position to install bolts. In taking the bolter through its full sequence of operations, all electrical and hydraulic

controls were found to be in operative condition. All hydraulic and electric components worked properly. There was no evidence to indicate that the Roof Bolting Machine provided the ignition source for the explosion.

(4) Shuttle Cars: The Standard Drive Shuttle Car, Company No. 8, at the time of the explosion was parked in #39 Crosscut between #2 and #3 Entries. The investigation revealed the following information regarding the status of the Standard Shuttle Car.

1. Seat and pedals positioned for inby travel.
2. Tram control lever centered.
3. Conveyor switch in "off" position.
4. Light switch inby direction.
5. Boom lift centered.
6. Manual parking brake in released position.
7. Line breaker in "off" position.
8. Traction breaker in "on" position.

The Shuttle Car was taken through the full sequence of operation and everything worked properly. The following permissibility deficiencies were observed:

1. Audible warning device inoperative.
2. Trailing cable was longer than allowed under schedule 2-G Table 9 in that the No. 6 cable was approximately 627 feet in length.

The Standard Shuttle Car was not being operated at the time of the explosion. Although permissibility deficiencies were found, no evidence of electrical arcing was present. This would indicate that the Standard Shuttle Car was not the ignition source for the explosion.

The Off Standard Drive Shuttle Car, Company No. 7, at the time of the explosion was parked in #3 Entry between 38 and 39 Crosscuts. The investigation revealed the following information regarding the status of the Off Standard Shuttle Car.

1. Pump motor switch on.
2. Conveyor switch off.
3. Tram levers in center position.
4. Light switch on for inby end travel.
5. Manual parking brake in release position.
6. Foot switch was centered.

The Shuttle Car was taken through the full sequence of operation and everything worked properly. The following permissibility deficiencies were found:

1. Suitable short circuit was not provided for the trailing cable in that the breaker was set too high.
2. The reel had an opening.

The Off Standard Shuttle Car was not being operated at the time of the explosion. Although permissibility deficiencies were found, no evidence

of electrical arcing was present. This would indicate that the Off Standard Shuttle Car was not the ignition source for the explosion.

(5) Belt Feeder: At the time of the explosion the Belt Feeder was located in #2 Entry between #35 and #36 Crosscuts. The investigation revealed the following information regarding the status of the Belt Feeder.

1. Main breaker in "on" position.
2. Conveyor switch in "auto" position.
3. Both conveyor controls lying on bottom under Feeder, inby end.
4. Ground fault in the trailing cable for the conveyor belt feeder.

It was not possible to determine whether the Feeder was running at the time of the explosion, due to the type of start and stop switches on the machine. The Feeder was of the permissible type but was not maintained in a permissible condition. The following permissibility deficiencies were observed:

1. Suitable short circuit was not provided as the circuit breaker was set too high as allowed in Schedule 2-G Table 8.
2. One Feeder switch was broken.
3. The external grounding shunt was not connected to the frame of the power center.

A ground fault in the conveyor belt feeder trailing cable could have provided the ignition source for the explosion either directly by electrical arcing at the fault location or indirectly by causing the circuit breaker in the section power center to trip.

(6) Scoop: At the time of the explosion the Scoop was located in #40 Crosscut between #2 and #3 Entries. The investigation revealed the following information regarding the status of the Scoop.

1. All battery tray covers off.
2. Motor cover off.
3. Bucket down.
4. Cab door shut.
5. Control switch off.
6. Control levers in neutral position.(Tram and headlights)

The Scoop was taken through the full sequence of operation and everything worked properly. The Scoop was of a permissible type but was not maintained in a permissible condition. The following permissibility deficiencies were observed:

1. The threaded coupler rings were not provided with padlocks.
2. Two seal wires were missing to entrance glands.
3. Left front headlight not secured solidly to the frame.
4. Battery tray covers were not secured.

The Scoop was not in operation at the time of the explosion. Although permissibility deficiencies were observed, no evidence of electrical arcing was detected. This would indicate that the Scoop did not provide the ignition source for the explosion.

(7) Power Center: The Power Center was located in #3 Entry between Crosscut #37 and #38 at the time of the explosion. The Power Center had one cover blown off. Two covers were buckled up in the middle. One cover was turned. The view window on the high voltage end was broken. The inside of the Power Center was smoked and dusty. The emergency switch was in but it did not appear that it had been touched. It could have been knocked in during the explosion. The tags on the outby end were melted. There was some coking on the inby end of the Power Center. Possible ignition sources at the Power Center were:

- (a) Trip of the circuit breaker due to a fault in the miner cable plug.
- (b) Trip of the circuit breaker due to a fault in the roof bolter cable.
- (c) Trip of the circuit breaker due to a fault in the Auxiliary Fan cable.
- (d) Trip of the circuit breaker due to a fault in the conveyor belt feeder trailing cable.

The Power Center was examined thoroughly during the investigation. It was later removed to the company's electric shop on the surface and

double checked. Since trips of the circuit breakers in the Power Center were present, electrical arcing could have occurred and provided an ignition source for the explosion.

(8) Dinner Hole Lights: It could not be determined conclusively whether the dinner hole lights were burning at the time of the explosion. The fluorescent light had become unplugged and one end of the light was lying on the table. One light bulb had broken out of the base and was hanging by one filament. One bulb was completely broken out. The plastic guards were melted. The cord between the lights was burned and scorched in places. There were exposed wires in the cord. The lights were taken outside to the electric shop. An interruption in the Dinner Hole Light circuit could have provided electrical arcing which could have been the ignition source for the explosion.

(9) Power Center Lights: The lights were found lying beside #7 Shuttle Car. One socket was torn off the cable and was lying on the right hand rib beside #7 Shuttle Car. All the bulbs had burst. No evidence was found to indicate that the lights provided the ignition source for the explosion.

(10) High-Voltage System:

1. The 2-Left vacuum breaker was in the tripped position. (Probably by undervoltage.)

2. The circuit breaker on 2-Left belt transformer was in the tripped position.(Undervoltage)
3. Junction box No. 2 had been moved intact toward #4 Entry. There was no damage to the box. Decals on the inby end were scorched and bubbled. There was evidence of coking on the inby end where the lid and box came together. The box had some dust in it.
4. Junction box No. 3 had been blown about 140 feet. The box was lying on its top. The lid had been blown about 60 feet outby the box. The restraining clamp for the outby entrance cable was broken, and the cable was held with rope. The inby cable had been jerked out of the box during the explosion. All the standoffs inside the box were broken. The high voltage cable had been jerked off its hangers. The cable had been cut and damaged in several places. There was no burning or arcing observed on phase conductors or the box. The high voltage had a ground in a cut place in the cable. This was apparently caused by the explosion. There were no faults in the cable except at the damaged place. There was no arcing at the damaged place.

There was no evidence found to indicate that the high voltage system provided the ignition source for the explosion.

(11) Auxiliary Fan: At the time of the explosion the Auxiliary Fan was located in #4 Entry between #39 and #40 Crosscuts. The

investigation revealed the following information regarding the status of the Auxiliary Fan.

1. The breaker was off(not in tripped position) electrical off.
2. The start and stop switches were clogged up with coal dust.
3. Impact seems to have burst the start switch inside.

It was not possible to determine whether the fan was in operation at the time of the explosion due to the condition of the start and stop switches. The only permissibility deficiency noted was that the trailing cable was longer than allowed under Schedule 2-G Table 9 for a No. 6 cable. There was no evidence found to indicate that the fan provided the ignition source for the explosion.

(12) Welder: At the time of the explosion the Welder was located in #3 Entry between Crosscuts #37 and #38. The investigation revealed the following information regarding the status of the Welder.

1. Lying on its right side.
2. Top lid bent upwards.
3. Ground clamp was under the Welder.
4. Breaker contacts in open position, switch would not close; probably broken in the explosion.
5. The breaker on the transformer was in trip position.
6. Remains of burned brattice material and rock dust were evident on the Welder.

The Welder was taken outside to the rebuild shop where it was put through the full sequence of operation. Everything worked properly. The Welder was not of a permissible type, however the Welder was not in operation at the time of the explosion. It was not provided with suitable short circuit protection as the circuit breaker was set too high. However, no evidence was found to indicate that the Welder provided the ignition source for the explosion.

(13) Battery Charger: At the time of the explosion the Battery Charger was located in the #32 Crosscut between #3 and #4 Entries. The investigation revealed the following information regarding the status of the Charger.

1. Charging cables not hooked up.
2. Timers were in "off" position.
3. There was a set of batteries at the Charger with three lids off and one lid turned crossways lying on the battery.
4. The circuit breaker on the power center was in the trip position.

The Battery Charger was not of the permissible type. The trailing cable was in excessive length allowed for a No. 6 cable as prescribed in 2-G Table 9. Suitable short circuit was not provided as the circuit breaker was set higher than allowed in Schedule 2-G Table 8. The Battery Charger was not in use at the time of the explosion. The batteries were not plugged to the charger. No evidence was found to indicate that the Battery Charger provided the source for the explosion.

(14) Rock Duster: At the time of the explosion the Rock Duster was located in #4 Entry at the intersection of #37 Crosscut. The investigation revealed the following information regarding the status of the Rock Duster.

1. The breaker was in a trip position.
2. The start and stop switches were both out.

There was no evidence found to indicate that the Rock Duster provided the ignition source for the explosion. It was not plugged into the Power Center.

(15) Belts: The belt control line was broken in two places. The belts had rubbed some belt stands in places, however, no evidence of burning could be found on the stands or the belt. An interruption in the belt control circuit could have caused electrical arcing which could have provided the ignition source for the explosion.

(16) Flame Safety Lamp: Tests of the Flame Safety Lamp did not provide any evidence that it provided the ignition source of the explosion.

(17) Smoking: No smoking materials were found on the victims or in the explosion area. No evidence was found to indicate that Smoking provided the ignition source.

Probable Point of Origin

No definite source of ignition could be determined from the examination of the explosion area. All possible sources of ignition were examined and evaluated. All the possible sources of ignition except five were eliminated as the possible ignition source for the explosion. The sources were eliminated based on their location in regard to the point of origin of the explosion or their condition when examined. Based on the direction of forces, it would appear that the forces radiated from somewhere in the vicinity of #31 Crosscut. This was evident from the direction of forces moving in a diversified manner. This was supported by stoppings blown both left and right and by debris such as paper lodged on bolts and belt stands in an outward and inward direction. Based on these observations, the explosion probably originated somewhere between #29 Crosscut and #38 Crosscut. Five possible ignition sources capable of producing electrical arcing, located in this area, could not be eliminated as the possible ignition source for the explosion. The five possible sources were: The Railrunner, the Belt Control Line, the Dinner Hole Lights, the Conveyor Belt Feeder Trailing Cable, and the Power Center. None of the five possible ignition sources could be conclusively identified as the ignition source.

Conclusion

The explosion occurred as the result of a failure to install proper ventilation apparatus at Crosscut #40 when 2-Left Section cut into the

set-up entries of 1-Left Section. The failure to properly separate the two air currents caused a significant ventilation change in 2-Left Section. The air coming across the set-up entries continued through the working face of 2-Left Section and out the return. This restricted the ventilating current of #2 and #3 Entries of the 2-Left Section. The ventilating current in #2 and #3 Entries of 2-Left Section was restricted to a point that an adequate velocity of air did not exist to dilute and carry away the methane being liberated. The lack of an adequate velocity of air allowed methane to accumulate to an explosive level. Due to the lack of severe damage, a very low methane mixture was probably present when it ignited. Estimates place the methane mixture at approximately 6.0%. After the methane reached the explosive range, the methane-air mixture was ignited by electrical arcing from one of the following sources:

1. Belt Control Line: An interruption of the belt control circuit.
2. Dinner Hole Lights: An interruption of the dinner hole light circuit.
3. Conveyor Belt Feeder Trailing Cable: A ground fault in the trailing cable for the conveyor belt feeder.
4. Section Power Center: Automatic operation of one of the circuit breakers in the section power center.

5. Railrunner: Normal operation of the nonpermissible personnel carrier.

A contributing factor was the failure to provide an adequate preshift examination for the evening shift in that the fireboss did not ascertain that the air was traveling in its proper course.

Two violations of the Virginia Mining Laws were issued in regard to the explosion. The two violations were:

1. 45.1-20(d) The Fire Boss will ascertain that the air is traveling in its proper course.
2. 45.1-57(d) Changes in ventilation that materially affect the main air current or any split thereof shall be made when the mine is not in operation and with no men in the mine other than those engaged in changing the ventilation.

VIOLATION SUMMARY
Clinchfield Coal Company
McClure #1 Mine

Inspection Date: April 4, 1983 to May 18, 1983
(Last Inspection prior to the June 21 Explosion)

No. of Violations of Title 45	Section of Title	Date Issued	Date Corrected
1	45.1-66(a)	4/14/83	5/9/83
1	45.1-67(a)	4/18/83	4/22/83
1	45.1-66(a)	5/10/83	5/17/83
1	45.1-67(c)	5/2/83	5/17/83
1	45.1-67(a)	4/5/83	4/13/83
1	45.1-89(1)	4/14/83	4/18/83
1	45.1-67(c)	4/5/83	4/13/83
1	45.1-67(a)	4/13/83	5/10/83
1	45.1-67(c)	4/13/83	4/18/83
1	45.1-34(b)	4/4/83	4/4/83
1	45.1-83(b)	4/5/83	4/5/83
1	45.1-89(b)	4/6/83	4/6/83
1	45.1-41(d)	4/6/83	4/6/83
1	45.1-67(c)	4/6/83	4/6/83
1	45.1-83(b)	4/8/83	4/8/83
1	45.1-83(b)	4/14/83	4/14/83
1	45.1-89(b)	4/14/83	4/14/83
1	45.1-88	4/20/83	4/20/83
1	45.1-66(a)	4/20/83	4/20/83
1	45.1-89(b)	4/25/83	4/25/83
1	45.1-34(b)	4/25/83	4/25/83
1	45.1-36(c)	4/25/83	4/25/83
1	45.1-78(d) (2)	5/11/83	5/11/83

The above violations of Title 45 consisted of violations for accumulations of coal dust, inadequate rock dust, accumulations of spilled oil or grease, permissibility, loose roof and ribs, fire extinguishers, equipment guards, extraneous material, and cable splices.

VIOLATION SUMMARY

CLINCHFIELD COAL COMPANY
McClure #1 Mine

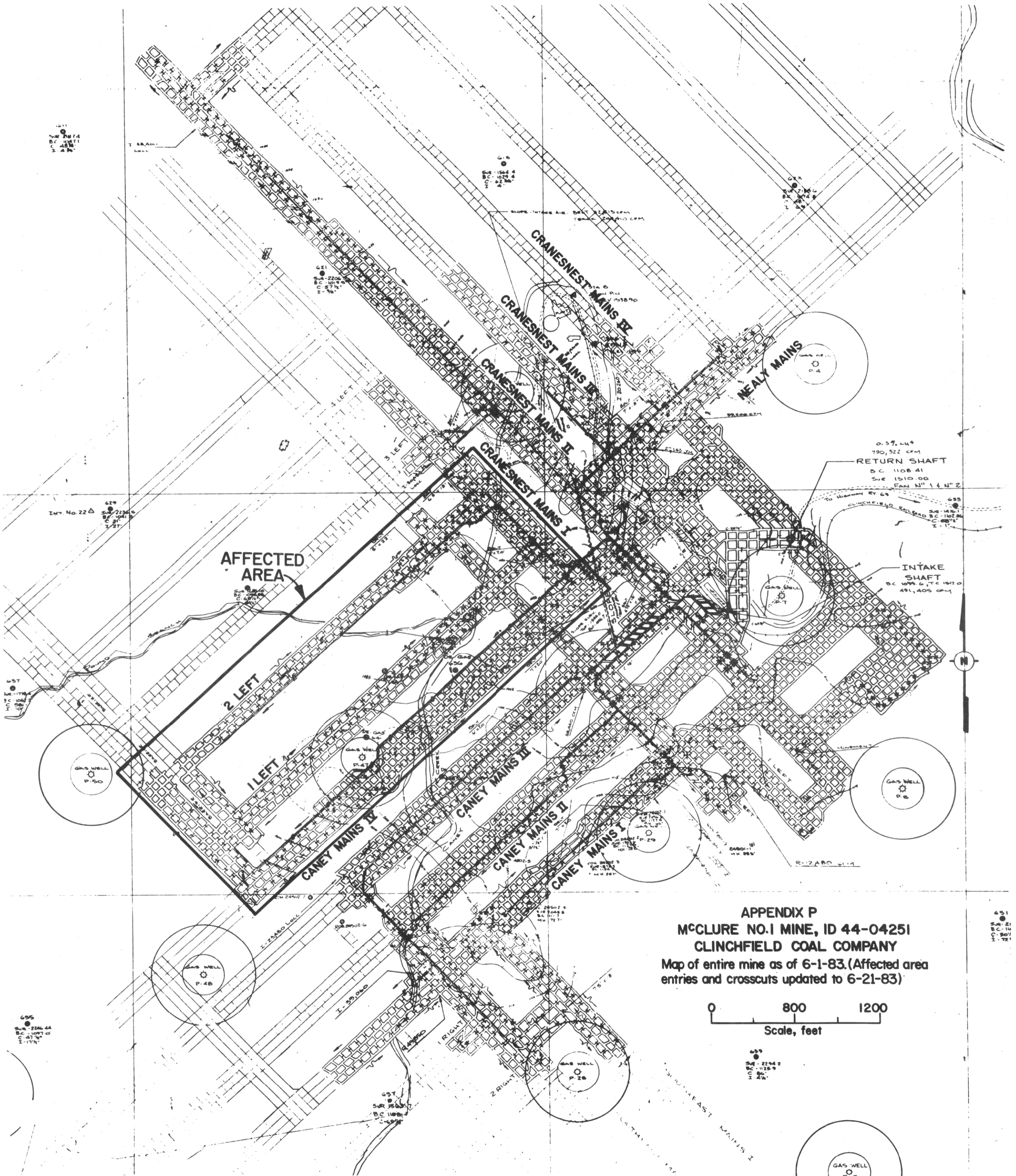
Violations observed
during
Investigation of June 21, 1983 Explosion

No. of Violations of Title 45	Section of Title	Date Issued	Date Corrected
1	45.1-40(d)	7/19/83	7/25/83
1	45.1-40(d)	7/19/83	7/25/83
1	45.1-83(b)	7/18/83	7/25/83
1	45.1-66(a)	7/18/83	7/25/83
1	45.1-83(b)	7/18/83	7/25/83
1	45.1-67(e)	7/18/83	7/25/83
1	45.1-40	7/18/83	7/25/83
1	45.1-80(e)	7/18/83	7/25/83
1	45.1-42(b)	7/18/83	7/25/83
1	45.1-83(b)	7/18/83	7/25/83
1	45.1-78(e)	7/18/83	7/25/83
1	45.1-67(a)	7/18/83	7/25/83
1	45.1-59(g)	7/18/83	7/25/83
1	45.1-67(a)	7/18/83	7/25/83
1	45.1-40	7/18/83	7/25/83
1	45.1-67(e)	7/18/83	7/25/83
1	45.1-78(3)	7/18/83	7/25/83
1	45.1-66(a)	7/18/83	7/25/83
1	45.1-77(a)	7/18/83	7/25/83
1	45.1-67	7/18/83	7/25/83
1	45.1-66	7/18/83	7/25/83
1	45.1-59(e)	7/20/83	7/25/83
5	45.1-83(b)	7/19/83	7/25/83
4	45.1-73(b)	7/19/83	7/25/83
2	45.1-77(a)	7/19/83	7/25/83
1	45.1-85(a)	7/18/83	7/25/83
1	45.1-67(c)	7/18/83	7/25/83
1	45.1-40(a)	7/18/83	7/25/83
1	45.1-83(b)	7/18/83	7/25/83
3	45.1-41(d)	7/18/83	7/25/83
1	45.1-83(b)	7/18/83	7/25/83
1	45.1-40(c)	7/18/83	7/25/83
1	45.1-40(b)	7/19/83	7/25/83
1	45.1-66(a)	7/18/83	7/25/83

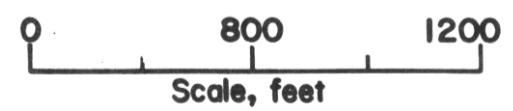
1	45.1-41(d)	7/19/83	7/25/83
1	45.1-41(d)	7/19/83	7/25/83
1	45.1-77(a)	7/18/83	7/25/83
1	45.1-59(g)	7/18/83	7/25/83
1	45.1-41(d)	7/18/83	7/25/83
1	45.1-67(a)	7/18/83	7/25/83
1	45.1-67(c)	7/18/83	7/25/83
1	45.1-66(a)	7/18/83	7/25/83
7	45.1-40	7/18/83	7/25/83
1	45.1-88(c)	7/18/83	7/25/83
1	45.1-95(d)	7/18/83	7/25/83
3	45.1-66(a)	7/19/83	7/25/83
1	45.1-20(d)	7/18/83	7/26/83
1	45.1-100	7/18/83	7/25/83
1	45.1-41(d)	7/18/83	7/26/83
1	45.1-80(e)	7/18/83	7/25/83
1	45.1-67	7/18/83	7/25/83
1	45.1-42(b)	7/18/83	7/25/83
1	45.1-60	7/18/83	7/25/83
1	45.1-67	7/18/83	7/25/83
1	45.1-42(b)	7/18/83	7/25/83
1	45.1-71(d)	7/18/83	7/25/83
1	45.1-67(e)	7/18/83	8/2/83
1	45.1-67(e)	7/20/83	8/2/83
1	45.1-66	7/18/83	7/18/83
1	45.1-59(g)	7/19/83	8/2/83
1	45.1-67(c)	7/18/83	8/2/83
1	45.1-67(c)	7/18/83	8/2/83
1	45.1-67	7/18/83	7/25/83
1	45.1-67(c)	7/18/83	7/25/83
1	45.1-67(a)	7/19/83	8/2/83
1	45.1-67(a)	7/20/83	7/25/83
1	45.1-67(c)	7/18/83	8/2/83
1	45.1-88(3)	7/19/83	8/2/83
1	45.1-66	7/18/83	8/2/83
1	45.1-95(d)	7/20/83	8/7/83
1	45.1-41(d)	7/20/83	8/2/83
1	45.1-100	7/20/83	8/2/83
2	45.1-42(b)	7/18/83	7/25/83
2	45.1-80(c)	7/18/83	7/25/83
1	45.1-6	6/22/83	8/8/83
2	45.1-84(b)	7/15/83	7/15/83
1	45.1-80(b)	7/17/83	7/17/83
1	45.1-79(b)	7/16/83	7/16/83
4	45.1-83(b)	7/17/83	7/16/83
1	45.1-83(b)	7/14/83	7/14/83
7	45.1-83(b)	6/29/83	6/29/83
1	45.1-84(f)	7/14/83	7/14/83
1	45.1-83(b)	6/28/83	6/28/83
1	45.1-73(b)	7/1/83	7/1/83
2	45.1-83(b)	7/14/83	7/14/83

1	45.1-84(b)	7/14/83	7/14/83
1	45.1-84(b)	7/15/83	7/15/83
1	45.1-84(c)	7/15/83	7/15/83
1	45.1-78(b)	7/15/83	7/15/83

The above violations of Title 45 consisted of violations for roof control standards, permissibility, accumulations of coal dust, inadequate rock dust, insulating mats, electrical cables, placement of man-doors, battery charging stations, permanent stoppings, audible warning devices on mobile equipment, inspection of electrical equipment and wiring, escapeways, accumulations of oily waste and waste paper, firebossing, clearance space on the track-haulage roads, equipment guards, disconnecting switches, and equipment grounding.



APPENDIX P
 MCCLURE NO. 1 MINE, ID 44-04251
 CLINCHFIELD COAL COMPANY
 Map of entire mine as of 6-1-83. (Affected area
 entries and crosscuts updated to 6-21-83)



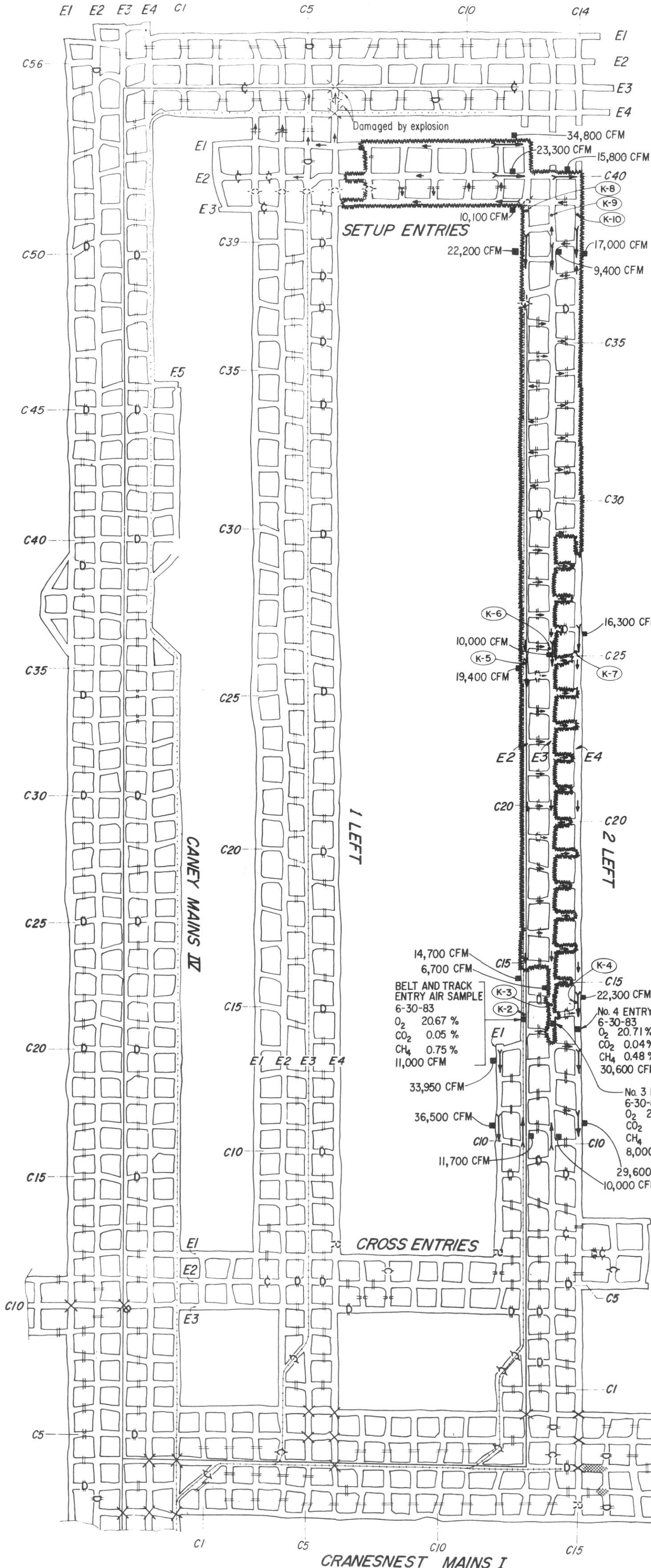
651
 SUE-21
 B.C. 114
 C-501
 I-721

655
 SUE-2246-44
 B.C. 1097-0
 C-47
 I-174

659
 SUE-2244-2
 B.C. 1125-9
 C-501
 I-721

GAS WELL
 P-26

BLEEDER ENTRIES



Note: Air readings taken 7-15-83 (except as otherwise noted) during a ventilation survey conducted by MSHA district personnel July 15, 18, 19, 20, 1983 in conjunction with the investigation.

Location of monitoring stations, average methane concentrations, balanced air quantities, average methane quantities from pressure-air quantity study conducted 7-11 to 16, 1983

Location	Average methane conc. %	Balanced air quantity (cfm)	Average methane quantity (cfm)
K-2	0.61	10,000	61
K-3	0.24	6,000	14
K-4	0.47	28,000	132
K-5	0.48	18,000	86
K-6	0.27	6,000	16
K-7	0.40	20,000	80
K-8	0.08	25,000	20
K-9	0.13	9,000	12
K-10	0.22	10,000	22

LEGEND

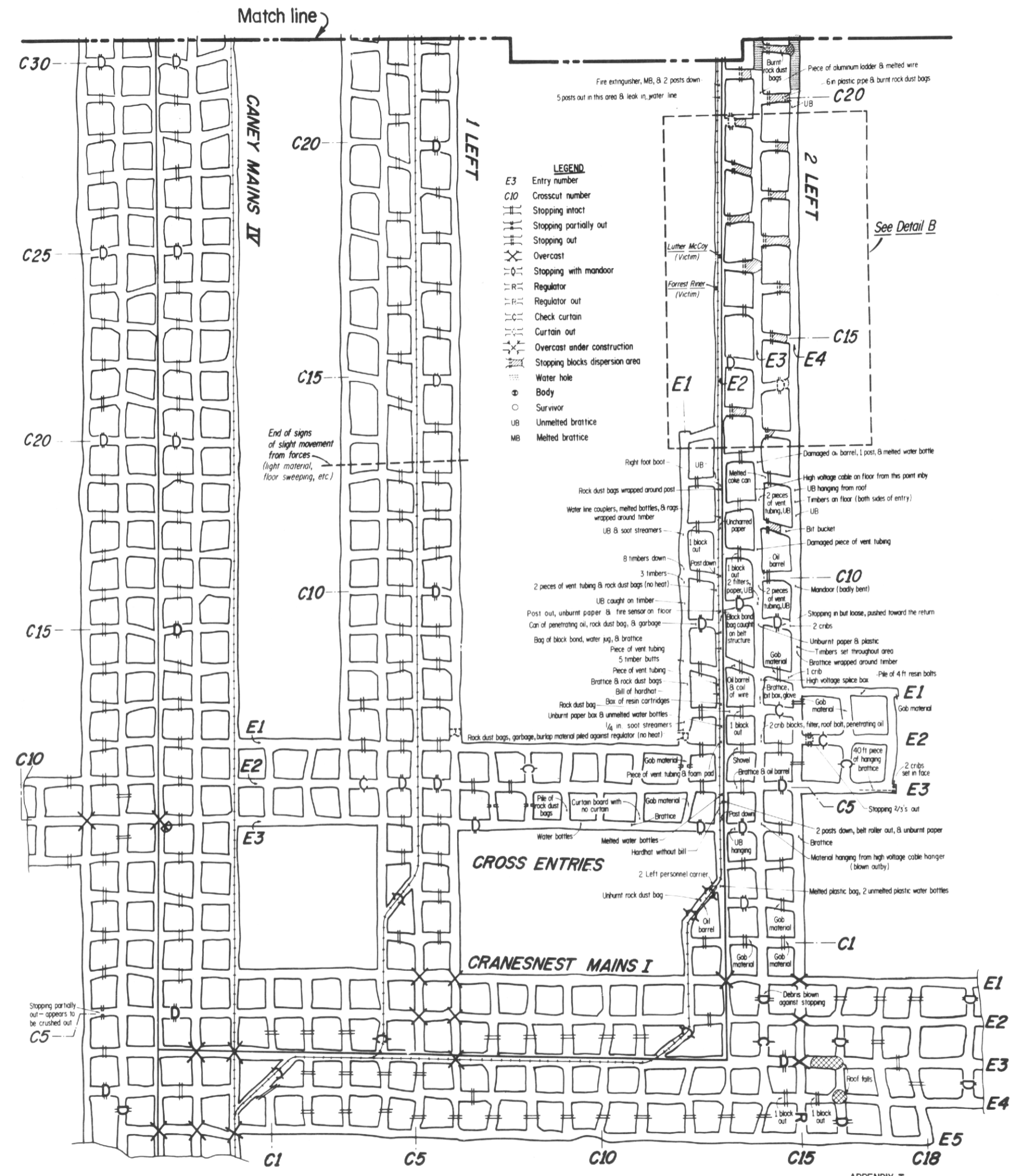
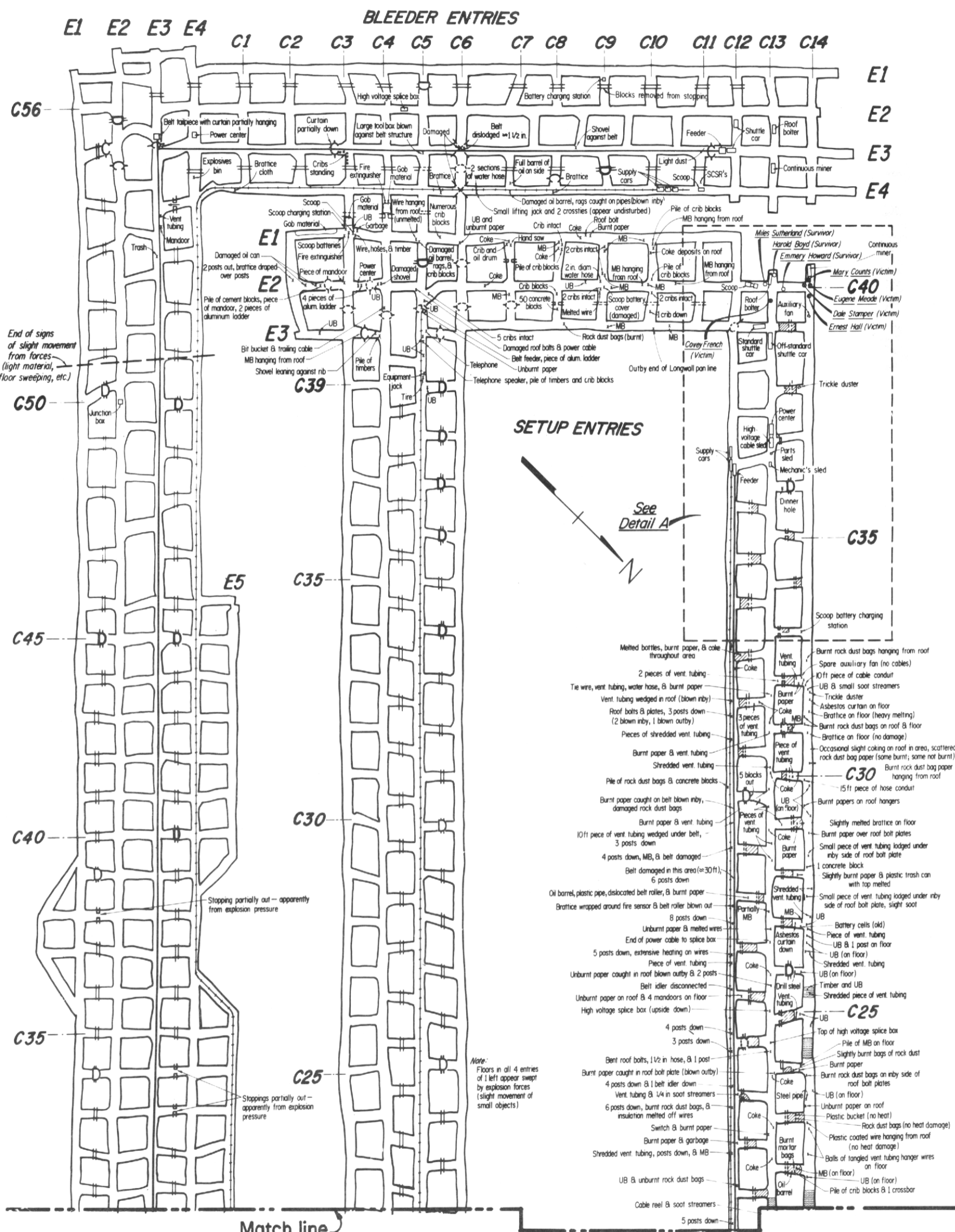
- E1 Entry number
- C5 Crosscut number
- Stopping intact
- Stopping partially out
- Stopping out
- Overcast
- Overcast under construction
- Stopping with mandoor
- Regulator
- Regulator out
- Curtain intact
- Curtain out
- Roof fall
- Extent of flame
- Direction of force
- Airflow direction
- 1,400 CFM Airflow readings
- K-2 Monitoring stations

APPENDIX S

**McCLURE NO. 1 MINE, ID 44-04251
CLINCHFIELD COAL COMPANY**

Map showing direction and extent of major forces, extent of flame, airflow directions and air quantities after explosion.





- LEGEND**
- E3 Entry number
 - C10 Crosscut number
 - Stopping intact
 - Stopping partially out
 - Stopping out
 - Overcast
 - Stopping with mandoor
 - Regulator
 - Regulator out
 - Check curtain
 - Curtain out
 - Overcast under construction
 - Stopping blocks dispersion area
 - Water hole
 - Body
 - Survivor
 - UB Unmelted brattice
 - MB Melted brattice

See Detail B

Note: Floors in all 4 entries of 1 left appear swept by explosion forces (slight movement of small objects)

- ④ Scoop
 - Brattice (melted) in bucket and extends over hydraulic ram.
 - Paper (burnt) behind left front headlight.
 - On top
 Hand held drill
 Rock dust bag (burnt)
 Plastic rope (melted)
 Bundle of roof bolts
 Seat cushion (melted)
 - Lids from battery and motor compartment off

- ② Roof bolting machine
 - On top
 Bundle of roof bolts, bundles of plates, 4 boxes of resin cart.
 Slate bar
 Cardboard box (nails and water bottles) (unburnt)
 1 hammer
 Drill steels
 2 roof jacks
 3 water jugs (melted)
 2 torque wrenches
 1 cable crosser
 Line curtain (slightly melted over cab)

- Operator compartment
 1 rag
 1 roll plastic tape
 1 dust respirator (head strap melted)
 - Underneath
 Aluminum ladder step, shelf, and bracing
 Piece of plastic lunch bucket
 Piece of brattice (melted)
 Piece of paper (burnt)

- ③ Continuous miner
 - On top of miner
 Numerous empty rock dust bags (undamaged)
 2 hemp pull ropes (undamaged)
 1 hammer
 3 full water bottles (undamaged)
 2 cans of spray lubricant
 1 sledge hammer
 1 ventilation tubing tee
 1 bit wrench
 2 10-ft sections of ventilation tubing
 - On floor around miner
 Numerous pieces of paper (undamaged)
 Numerous 10-ft sections of ventilation tubing (damaged and undamaged)
 Numerous pieces of various lengths of ventilation tubing (damaged and undamaged)

- ⑤ Auxiliary fan
 - Pieces of rock dust bags, plastic, dust and debris impacted (unburnt) on outby side of fan

- ⑤ Standard shuttle car

- ⑦ Off-standard shuttle car
 - Coke on left rear headlight
 - In operators deck
 Seat cushion (melted)
 Coke can, gloves, and filter self-rescuer under seat
 - Under shuttle car
 Outby end - Paper and rags
 Inby end - Sutherland's hardhat

- ⑥ Power center
 - Inby cover blown off
 - Outby window broken

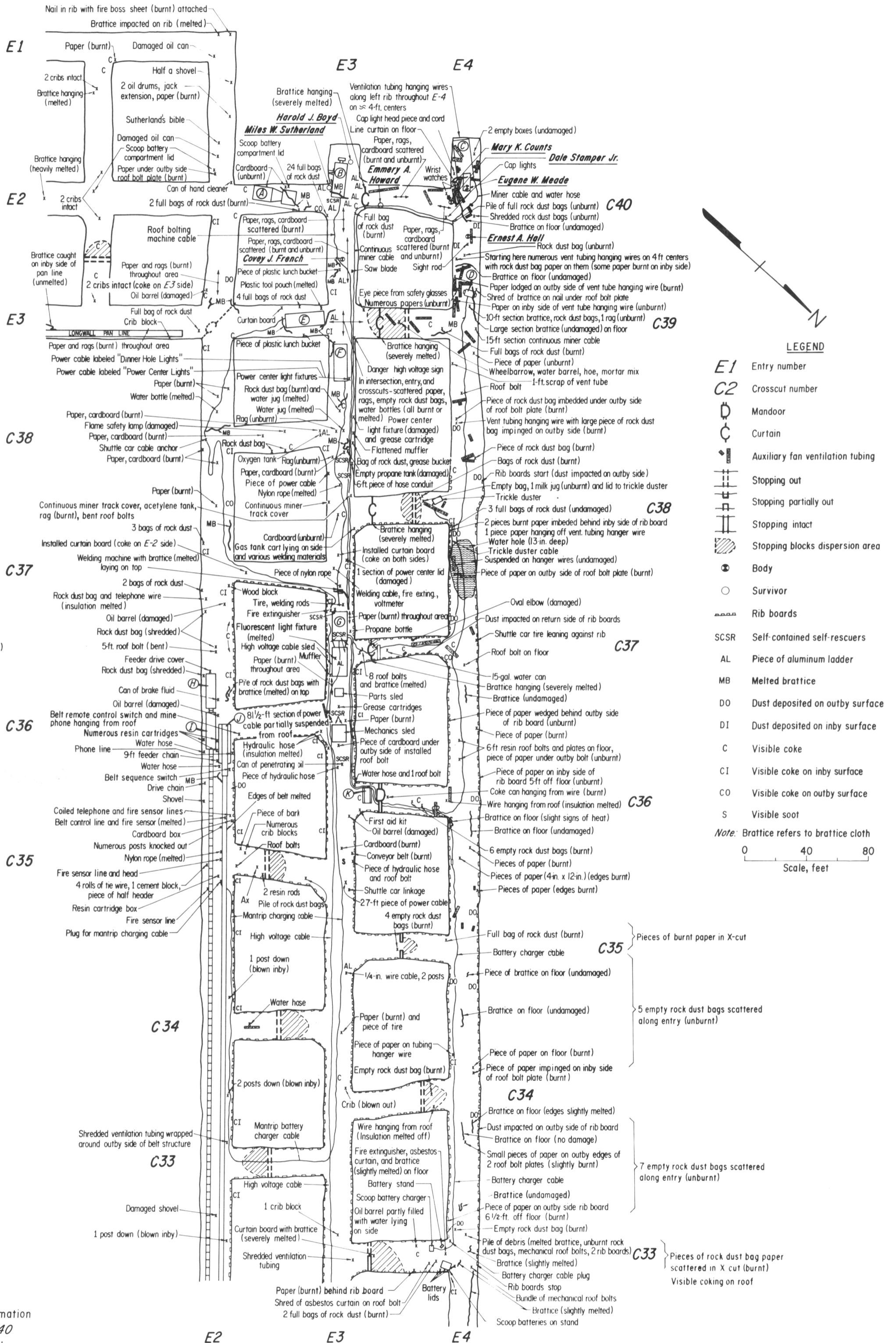
- ⑦ Supply car
 - 1/3 full of bags of rock dust (unburnt)

- ⑦ Supply car
 - Bundles of roof bolts
 - Roof bolt plates
 - Boxes of resin cartridges
 - Posts
 - Header boards
 - Dust impacted on outby end

- ⑦ Feeder
 - On top - chains, bolts, plates, slate bar, brattice (melted)

Note:
 Belt control line pulled apart by forces and thrown under feeder

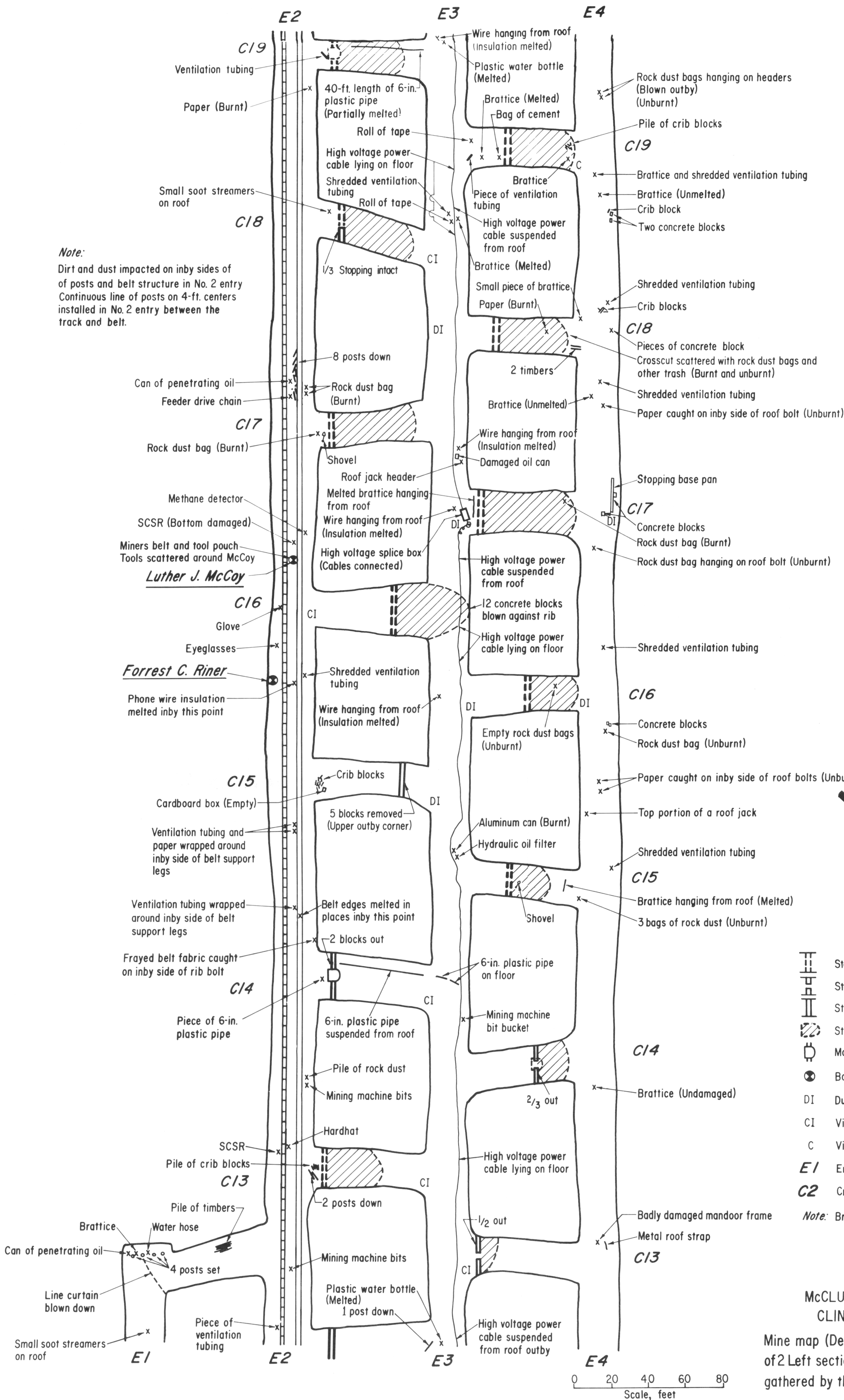
- ⑦ Dinner hole
 - Picnic table
 - Fluorescent light fixture, one end on table, one end hanging (damaged)
 - Garbage box
 - Several stopping blocks
 - Brattice hanging (melted)
 - Brattice on floor (melted)
 - Lunch pails on floor around table
 - Visible coke on roof



APPENDIX U

McCLURE NO. 1 MINE, ID 44-04251
 CLINCHFIELD COAL COMPANY

Mine map (Detail A) showing detailed information of 2 Left section between crosscuts 33 and 40 and the longwall setup entries gathered by the investigation team



Note:
 Dirt and dust impacted on inby sides of posts and belt structure in No. 2 entry. Continuous line of posts on 4-ft. centers installed in No. 2 entry between the track and belt.

Luther J. McCoy

Forrest C. Riner

LEGEND

- Stopping out
- Stopping partially out
- Stopping intact
- Stopping blocks dispersion area
- Mandoor
- Body
- DI Dust deposited on inby surfaces
- CI Visible coke deposited on inby surfaces
- C Visible coke
- E1** Entry number
- C2** Crosscut number

Note: Brattice refers to brattice cloth

APPENDIX V

McCLURE NO. 1 MINE, ID 44-04251
 CLINCHFIELD COAL COMPANY

Mine map (Detail B) showing detailed information of 2 Left section between crosscuts 13 and 19 as gathered by the investigation team

