

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

INTERIM REPORT OF INVESTIGATION
UNDERGROUND COAL MINE EXPLOSION

Ferrell No. 17 Mine – ID No. 46-02493
Westmoreland and Coal Company
Uneeda, Boone County, West Virginia

November 07, 1980

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INTRODUCTION

This is an interim report of the investigation of a coal mine explosion that occurred at approximately 3:30 a.m. on November 7, 1980, in the Ferrell No. 17 Mine (MSHA ID No. 46-02493), Westmoreland Coal Company, Uneeda, Boone County, West Virginia. The explosion occurred in 1 east 2 south and resulted in the deaths of five miners. Rescue and recovery efforts commenced on November 7, 1980, and the bodies of the five miners were recovered on November 8, 1980. On November 11, 1980, the decision was made to build seals outby the affected area. The seals were completed on November 13, 1980. The names of the miners who died as a result of the explosion and their ages, job classifications, experience at the mine, and total mining experience are listed in Appendix A to this report.

On November 12, 1980, the Mine Safety and Health Administration (MSHA) began an investigation of the explosion. During this investigation, MSHA investigators and support personnel took sworn statements from approximately 70 individuals, performed an absolute mine ventilation pressure-air quantity distribution study of the portion of the mine unaffected by the explosion, and reviewed numerous documents of the Westmoreland Coal Company. The sealing of the area of the mine affected by the explosion prevented the MSHA investigators from completing the underground portion of the investigation.

This interim report is based on an analysis of the information obtained in the course of MSHA's preliminary investigation of the explosion.

The investigation is being made pursuant to section 103(a) of the Federal Mine Safety and Health Act of 1977, Public Law 95-173, as amended by Public Law 95-164, 30 U.S.C. 813(a) (Supp. IV, 1980).

PART I

GENERAL INFORMATION

Mine Layout and History

The Ferrell No. 17 Mine, in the vicinity of Uneda, Boone County, West Virginia, was opened in 1972 into the Cedar Grove coalbed. The height of the coalbed varied from 32 to 60 inches. All mining consisted of development work until July 1980, when retreat mining began in 1st and 2nd right off 1 south. At the time of the explosion, the ventilation system for most of 1 east inby 1 south and 2 north consisted of one split of ventilating air current with Nos. 1 and 2 entries used as return airways, Nos. 3 and 4 entries (separated from the intake and return airways) used for track and belt conveyor haulage, and Nos. 5, 6, and 7 entries used as intake airways.

Development of 1 east 2 south began early in 1978, with one production unit in 7 entries with one split of ventilating air current. After advancing four crosscuts, No. 1 entry was discontinued. At that point in development, No. 2 entry was used as a return airway, Nos. 3 and 4 entries (separated from the intake and return airways) were used for track and belt conveyor haulage, and Nos. 5, 6, and 7 entries were used as intake airways. After advancing four additional crosscuts, No. 5 entry was grouped with Nos. 3 and 4 entries (separated from intake and return airways) which left two intake airways, Nos. 6 and 7 entries. By July 1980, 2 south had been developed about 6,800 feet and production was stopped.

At the time of the explosion, there were one shaft, two slopes, and three drift openings at the mine. The shaft had two ventilating fans mounted on the surface, but only one fan operated exhausting at any one time. One slope was used primarily as an intake airway, while the other slope was used for belt conveyor haulage from the coalbed level to the coal preparation facility and also as the main portal for the miners. One drift opening had a ventilating fan, which operated exhausting. A second drift opening was used as a track haulage entry for supplies, and a third drift opening was used as an intake airway.

Belt conveyors were used for coal haulage, and track with trolley wire was used for transporting miners and supplies. The track and belt conveyors were generally in the same entry and were normally separated from the intake and return aircourses by concrete block stoppings.

Coal was produced at the face with continuous mining machines and transported to the belt conveyors by shuttle cars. There were six production units at the time of the explosion with none operating on the midnight shift. About 2,000 tons of coal was produced per day and 207 miners were employed on the surface and underground.

Methane Liberation and Inspection Schedule

The mine liberated 351,000 cubic feet of methane in 24 hours according to the results of air samples collected on September 22, 1980, and was on a section 103(i) 15-day spot inspection schedule. The mine was also on an

annual ventilation impact inspection schedule as well as a weekly ventilation spot inspection schedule because of the methane liberation. The annual ventilation impact inspection for the year 1980 had not been conducted at the time of the explosion.

Ventilation System and Methane and Dust Control Plan

The 14th review of the ventilation system and methane and dust control plan was received in MSHA's Madison field office on January 15, 1980. It was found to be unsatisfactory and was returned to the operator. The 14th review was resubmitted to the Madison field office on February 7, 1980, and was approved in the District office by a letter dated February 27, 1980. The material submitted by the operator for the 14th review consisted of a cover letter and mine ventilation map (scale 1 inch equals 400 feet). The map indicated that four production units were active in the northern portion of the mine and two units were active in the southern portion of the mine.

A revised ventilation plan was received in the Madison field office on July 11, 1980. The revised plan consisted of a cover letter, a working section ventilation plan (8-1/2 inches by 11 inches) for 1st and 2nd right off 1 south, and a mine ventilation map (scale 1 inch equals 400 feet). The Madison field office recommended it for approval and mailed it to the District office the same day. The revised plan was approved in the District office by a letter dated August 18, 1980.

The revised plan indicated that major mine ventilation changes were being made. These changes included: installing a ventilating fan at one of the drift openings, idling two production units in the northern portion of the mine, adding two production units in the southern portion of the mine, discontinuing the production in 2 south, and isolating the two ventilating fans by building certain stoppings in 1 south between 1 east and 1 west.

The 14th review indicated the quantities of intake and return air in 1 east inby 2 north and 1 south were 51,000 cubic feet per minute (cfm) and 37,000 cfm, respectively, while the quantity of air in the last open cross-cut in 2 south was 12,400 cfm. The comparable air quantities on the revised plan were 56,000 cfm, 54,300 cfm and 14,750 cfm, respectively.

The method of ventilating the track and belt haulage entries in 1 east and 2 south as well as the air velocities in these entries were identical on the 14th review and the revised plan. The air directional arrows on the maps indicate an outby movement of air in 2 south and 1 east. The indicated air velocities in these entries varied from 25 feet per minute to 35 feet per minute. Before the explosion, according to one of the mine operator's safety inspectors, air actually flowed toward the face for a considerable distance in 1 east and entered the return through manddoors or leaky stoppings.

The revised ventilation plan map submitted on July 11, 1980, shows the fan operating at the air shaft was exhausting 348,000 cfm of air at a water gauge of -4.0 inches. The plan indicated that the fan operating at the drift opening was exhausting 183,000 cfm of air at a water gauge of -4.0 inches.

Ventilation Change

Without notifying MSHA, on October 27, 1980, mine officials reduced the quantity of air exhausted by the fan located at the air shaft. Reportedly, this change was made because of a high air velocity where miners traveled in the belt conveyor haulage slope and because the mandrels near the bottom of the slope were being damaged. It was also reported that the operating fan was exhausting 325,000 cfm of air at a water gauge of -3.4 inches. Mine officials decided to make the change on-shift while the mine was operating by resetting the fan blade position on the standby fan to 1B & 1S. According to a company official, resetting the blade should have caused the fan to exhaust 225,000 cfm of air at a water gauge of -3.0 inches. (According to the 14th review plan, the blade setting was 3B & 3S.)

After the fan blade position was changed on the standby fan, the operating fan was stopped and the adjusted fan started, taking less than one minute for the changeover. Reportedly, after the change, the fan was exhausting 289,000 cfm of air at a water gauge of -3.0 inches.

Absolute Mine Ventilation Pressure-Air Quantity Distribution Study

During the period of December 29, 1980, to January 5, 1981, inclusive (after the explosion and sealing), an absolute mine ventilation pressure-air quantity distribution study was made by MSHA personnel. A complete report of the study is available for examination at the Office of the Chief, Ventilation Division, Pittsburgh Health Technology Center, Mine Safety and Health Administration, 4800 Forbes Avenue, Pittsburgh, Pennsylvania 15213. The following is a summary of the conclusions from the report:

1. Ventilation of the Ferrell No. 17 Mine was induced through two slopes and two drift openings by surface-mounted exhaust fans installed at a return air drift entry and a return air shaft.
2. At the time of the investigation, there were six normally active units in the mine. Airflow induced by the No. 1 fan was used to ventilate two units in 4 east and the seals in 1 east (northern portion of the mine). Airflow induced by the No. 3 fan was used to ventilate the four units in the southern portion of the mine (1 left 1 south, 2 right off 1 left 1 south, 2 right 1 south and 2 left off 1 west 1 south).
3. Although each fan had its own separate return airway system, both fans shared common intake entries in 1 east.
4. Approximately 31 percent of the air entering the mine was used to ventilate the normally active production units in the mine and the seals in 1 east. The major portion of the remaining 69 percent of the air was lost through uncontrolled leakage caused by poorly maintained overcasts and stoppings.
5. During the survey, line brattice was installed to direct the intake air current across the faces of the seals in 1 east to dilute the methane liberated to acceptable concentrations.

6. The airflow direction in the 1 east belt conveyor and track haulage entries (B-T) varied, depending upon which manddoors were open between the intake and B-T entries.
7. The return airways from 1 east were restricted in various locations along their length by water accumulations and roof falls.
8. Approximately 80 percent of the ventilation pressure induced by the No. 1 fan was consumed between the 1 east surface openings and 1 east inby 2 north and 1 north inby 2 east, and approximately 85 percent of the pressure induced by the No. 3 fan was consumed in the intake and return drift entries of 1 west 1 south.
9. The opening and closing of doors in the B-T entries caused airflow fluctuations, air reversals, and areas with no air movement. These conditions existed in the B-T entries in 1 east, 1 west 1 south, and 1 south between 1 east and 1 west 1 south.
10. Low pressure differentials across existing regulators in the main air splits of the mine and the lack of regulators in other main air splits indicated a lack of a positive means of controlling and directing the airflow to the various parts of the mine.
11. The roof cavity that existed in the 1 south belt entry, four crosscuts north of the 1 west 1 south belt transfer point, was not positively ventilated nor was a safe access provided to examine the cavity for methane.
12. Airflow in several areas was restricted by ventilation controls that were no longer necessary.
13. Water accumulations were observed in several areas of the mine. These water accumulations limited access to these areas and created the potential of blockage or major restriction of main intake or main return airways.
14. Airflow measurements taken on the 1 left 1 south unit and the lack of regulation on this section indicate that, with the existing ventilation system, it may have been difficult to maintain the required minimum air quantity on this unit.
15. Ventilation controls were inadequate to insure that the return airflow from one of the two retreat units (2 left off 1 west 1 south and 2 right 1 south) operating off the same gob could not enter the working places of the other unit.
16. The mine maps supplied by the company did not accurately indicate the location of all stoppings, overcasts, regulators, and haulage doors.

Mine Water Pumping System in 2 South and 1 East

There were four pumps that were normally used to pump water from the area between No. 40 crosscut in 1 east and the No. 17 crosscut in 2 south.

There was a pump in the No. 40 crosscut between the Nos. 2 and 3 entries of 1 east that pumped water from the return airways. This pump was removed from the mine about one month before the explosion for use at the coal preparation plant which allowed water to accumulate in the return airways. This accumulation of water may have restricted the ventilating air currents in 1 east and 2 south.

There were two pumps located in or near the track and belt conveyor haulage entries of 1 east and 2 south. These pumps were probably not operating for some time prior to the explosion, but the water that accumulated, if any, did not materially affect mine ventilation.

The fourth pump was located in the No. 17 crosscut of 2 south between Nos. 2 and 3 entries and was normally used to pump water from the No. 2 entry (return). This pump was probably not used for several weeks prior to the explosion which allowed water to accumulate in the No. 2 entry. This accumulation of water may have also restricted the ventilating air currents in 1 east and 2 south.

Electrical

Three-phase power was purchased from the Appalachian Power Company at 69,000 volts and transmitted to a surface substation approximately 460 feet from the belt conveyor slope portal. At the surface substation, the electric power was reduced to 7,200-volt, 3-phase power for surface and underground distribution by a 10,000 kVA, 3-phase power transformer that was connected delta-wye. The secondary neutral was properly grounded through a 40-ampere, current-limiting resistor. Grounding circuits, originating at the grounded side of the grounding resistor, were used to ground the metallic frames and enclosures of the surface and underground electric equipment supplied from the substation.

A 560-ampere, oil recloser in the surface substation was equipped with a ground check circuit and protective devices designed to provide under-voltage, grounded-phase, short-circuit and overcurrent protection for the underground high-voltage distribution circuit.

An overhead power line conducted the underground high-voltage distribution circuit from the surface substation to a two-pole structure located near the belt conveyor slope portal. Three, single-pole disconnect switches were provided at the two-pole structure to open the phase conductors of the underground high-voltage distribution circuit.

From the two-pole structure, the underground high-voltage distribution circuit entered the mine through the belt conveyor slope portal.

The underground power distribution system and electric equipment will be discussed when the investigation is completed.

PART II

EXPLOSION AND RECOVERY OPERATIONS

The Explosion

Gary Neil, Midnight Shift Supervisor, had the overall responsibility for the activities on the third shift at Westmoreland Coal Company's Ferrell No. 17 Mine. Because he had served as third shift foreman for only three weeks, he had been instructed by Mark McClure, Mine Foreman, to telephone each night to receive work assignments to be performed on the midnight shift. Normally, the general mine work activities on the midnight shift were supervised by John Workman, Terry Price, and Roger Lovejoy, General Foremen. Lovejoy did not work on November 7, 1980, and his work assignments were distributed between Workman and Price. Robert Heater and Era Ferrell supervised the mechanics and electricians on the midnight shift.

On November 6, 1980, at approximately 11 p.m., Neil reported for work at the Ferrell No. 17 Mine. Shortly after arriving at the mine, Neil telephoned McClure for the work assignments for the 12:01 a.m. to 8 a.m. shift on November 7, 1980. In addition to other work assignments, Neil was instructed by McClure to have track rails removed from 2 north 3 east, an area where mining operations had been discontinued. Neil instructed Workman to send five miners into 2 north 3 east to retrieve rails. Workman subsequently assigned Howard Gillenwater, designated crew leader, and four other miners, the work of removing the rails from 2 north 3 east.

On Friday, November 7, 1980, at approximately 12:01 a.m., the midnight shift crews entered the mine. Howard Gillenwater, Freddie W. Pridemore, Carlos Dent, Howard Williamson and Herbert E. Kinder III, Laborers, boarded their locomotive and traveled to 1 east to get a rail car located about six crosscuts inby the intersection of the 2 north and 1 east. They then proceeded to 2 north 3 east. Upon arrival in 3 east, the miners encountered a roof fall across the track entry about two crosscuts inby the intersection of 2 north and 3 east which prohibited further travel into 3 east. Gillenwater notified Neil by telephone of the occurrence. Neil told Gillenwater to go to the 1 east 2 south and remove the needed rails from that area. Mining operations had been terminated in 2 south. Gillenwater informed Neil he would need a sledgehammer if he were to go into 1 east 2 south because a large piece of rock was on the track. Neil told Gillenwater that he would have someone leave the sledgehammer at the intersection of 1 east and 2 north. At 1:30 a.m., Gillenwater notified the dispatcher that he was leaving the inby end of the 2 north and was going to 1 east 2 south.

Neil, who was in 1 south 1 left section when he received the call from Gillenwater, left that section and traveled to 1 west 2 left to deliver a pipe wrench. After spending some time observing the miners, Neil left the section. He arrived at the intersection of 1 west and 2 left at approximately 3:30 a.m., at which time the mine electrical power went off. Neil sat in his mine jitney a few minutes, waiting for the power to come back on. Neil decided that the power was not coming back on and went to a nearby telephone and called the dispatcher to find out what the problem was. The dispatcher informed Neil that both the AC and DC power were off in the entire mine, but that he did not know what the problem was. Heater,

who was in the 1 south 1 left section, called Neil and reported that the power was off and that he had felt a concussion of air. Neil received several calls from different miners throughout the mine that they had felt a concussion of air at about the same time the power went off.

Neil decided that a major roof fall had occurred somewhere in the mine which had damaged the 7,200-volt power cable. Neil assigned miners in various areas to travel entries where the 7,200-volt cable had been installed to determine where the roof fall had occurred. Neil traveled the entry in 1 west where the 7,200-volt cable had been installed, but found no falls. The miners who traveled along the 7,200-volt cable in other areas of the mine reported to Neil that they had not observed any falls on the cable.

Neil then called the dispatcher and instructed him to tell John Dolin, Preparation Plant Foreman, to go to the main transformer on the surface and put the power back on. Neil called Terry Price, who was at the slope bottom, and told him to pull all visible disconnects and knock all breakers in several transformers at that location, in order to isolate the power problem. Dolin tried to reset the breakers on the surface, but the power would not stay on. Neil again called Price and instructed him to look through the windows of the transformers to make certain the visible disconnects were out. Dolin tried again to reset the breaker on the surface, but it would not stay in. He observed that all of the visible disconnects on the surface were in the closed position.

Neil started walking toward the slope bottom from 1 west when he met Steve Blair, Pumper, at the intersection of 1 south and 1 east. They noticed coal dust, rock dust, bottles and other debris in the track entry of 1 east. After discussing how the debris got there, they decided that a roof fall must have occurred in 1 east. Neil told Blair to walk cautiously into 1 east to see if he could locate a fall. Neil then continued to the slope bottom to try to get the mine power back on.

Neil called Dolin again and told him to try to put the power back on while Neil would watch and listen to determine why the power would not stay on. Neil did not observe or hear anything that may have caused the power not to stay on. He then traveled to the rectifiers and line splitters which were located near the intersection of 1 east and 1 south. An examination of these rectifiers and line splitters did not reveal anything that was contributing to the power outage. Another unsuccessful attempt was made to put the power back on.

Neil decided to walk back to the slope bottom and disconnect all transformers and directly connect the main power cable leading underground to one rectifier which would provide DC power to the trolley wire circuit. After the necessary switching of the power cables was completed, Neil informed Dolin to put the power back on in the mine, and the power stayed on.

Neil told Price to get a mantrip vehicle and accompany him into 1 east. A deadblock was located in the trolley wire circuit of 1 east just inby 2 north. Neil placed a wire jumper across the deadblock so the inby trolley wire could be energized. They traveled into 1 east to within 8 or 9 crosscuts of 2 south when they met Blair. Blair informed them that he had encountered smoke near

the outby end of 2 south. Neil and Price proceeded, on foot, in 1 east to 2 south where they encountered dense smoke. They immediately retreated to where they had parked the mantrip vehicle.

Neil instructed Price and Blair to go to the slope bottom, get help and have the miners evacuated from the mine. Price noticed that the time was 5:15 a.m. He gave his self-rescuer to Neil and told him that he would return in approximately one hour. Price and Blair had to walk to the slope bottom because the wire jumper which was used to bridge across the deadblock had come off. They arrived at the slope bottom at approximately 6 a.m.

Price told Workman and Heater to have the miners evacuated from the mine. Price also notified the dispatcher to call Kyle Jones, Mine Manager, and Mark McClure, and have them report to the mine. Price and Blair returned to 1 east where they met Neil at the No. 40 crosscut. Price pulled the trolley wire switch just inby the No. 40 crosscut so that the trolley wire would be energized only to that point. Price then left the 1 east enroute to the slope bottom to make travel arrangements for Jones and McClure.

Neil and Blair made another attempt to travel into 2 south. Reportedly, they traveled about nine crosscuts into 2 south where they encountered permanent stoppings that had been blown out and dense smoke. They retreated to No. 40 crosscut in 1 east and waited for Price to return with Jones and McClure. Jones and McClure arrived at the mine and immediately went underground to 1 east where Neil and Blair were waiting. After confirming that an explosion had occurred, they instructed Connie Chewing, Safety Inspector, to call the mine rescue teams of Westmoreland Coal Company and request their assistance in the rescue and recovery operation.

Activities of MSHA Personnel

On November 7, 1980, at 7:15 a.m., Bart Lay, Jr., Deputy Director, West Virginia Department of Mines, called Herbert Pauley, Coal Mine Inspection Supervisor, Madison Field Office, to inform him of the possibility of a fire or explosion at the Ferrell No. 17 Mine, Westmoreland Coal Company. At 7:25 a.m., Orville Boggs and R. D. Goldsberry, Coal Mine Inspectors, were dispatched to the mine to determine if there had been a fire or explosion. At 7:30 a.m., Paul Meeks, Jr., Health and Safety Manager, Westmoreland Coal Company, notified Pauley that a fire or explosion had occurred at the Ferrell No. 17 Mine, and that five men were missing. Meeks informed Pauley that smoke was encountered at the entrance of 2 south. Meeks also stated that a concussion of air had been felt by the miners in the mine at approximately 3:30 a.m., the same time that the underground electrical power had gone off.

Pauley notified Fred Casteel, Subdistrict Manager, of the accident at 7:20 a.m. Casteel then notified James Krese, District Manager, of the occurrence at 7:45 a.m. Krese informed Ronald Schell, Acting Administrator, of the occurrence at approximately 8 a.m.

Several coal mine inspectors were dispatched to the mine to assist in the recovery operation. Casteel arrived at the mine at 8:30 a.m. and assumed direction of MSHA activities. The mine fans were monitored for carbon monoxide and methane by MSHA personnel. Orders under sections 103(j) and 107(a)

of the Act were issued covering the entire mine. A surface control center was established near the mine office to record all recovery operation activities. James Krese arrived at the mine at 11:30 a.m. and assumed direction of MSHA activities.

MSHA's Mine Emergency Operations (MEO) personnel departed from Pittsburgh, Pennsylvania, at approximately 12:20 p.m. and traveled to the mine site where they arrived at 4:15 p.m., November 7, 1980. At 9 p.m., the MEO mobile gas analysis van, the communications van, and the supply van arrived at the mine site. These facilities were used throughout the recovery and sealing operations.

Rescue and Recovery Operations

Six mine rescue teams of the Westmoreland Coal Company and 13 teams from other mining operations participated in the recovery work. The names of the teams and their members are listed in Appendix C.

Westmoreland Coal Company's Hampton No. 3 mine rescue team entered the mine at 8:45 a.m. The team traveled via mine jitneys to about the No. 40 crosscut in the 1 east at which point the trolley wire circuit extending inby had been deenergized. They parked their mine jitneys and proceeded, open-faced, in the No. 3 entry (track entry) to the No. 67 crosscut of 1 east. Tests to determine the constituents of the mine air was made as they proceeded. The tests at the No. 67 crosscut revealed 0.5 percent methane and traces of carbon monoxide. The trolley wire was then energized to the No. 67 crosscut and the mine jitneys were taken to that point. Trolley phones were provided on the mine jitneys and were the only means available to relay information to the surface. This was accomplished by transmitting the information over the trolley phones to a person on the slope bottom, who relayed the information by telephone to persons on the surface. Portions of the telephone line had been removed from 2 south and 1 east.

The team found that a concrete block stopping originally located in the No. 67 crosscut to separate the No. 5 intake air entry from the No. 4 belt conveyor entry had been removed and that a check curtain had been partially installed. The partially installed check curtain permitted air to travel through the No. 67 crosscut and return down the belt conveyor and track haulage entries. Air measurements were not taken at this location.

After the check curtain in the No. 67 crosscut was repaired, the team proceeded, open-faced, in No. 5 entry to the No. 9 crosscut of 2 south, ascertaining that the stopping line between entry Nos. 4 and 5 was intact to the No. 8 crosscut. A concrete block stopping originally installed across the No. 5 entry between crosscut Nos. 8 and 9 was missing. The stopping in the No. 9 crosscut between entry Nos. 5 and 6 was still intact, but the mandoor in the stopping was damaged. Smoke was observed inby the No. 9 crosscut which appeared to be moving towards the No. 9 crosscut and to the return airway. When tested, the air in the intake entries (Nos. 5, 6, and 7) outby the No. 9 crosscut contained traces of carbon monoxide and negligible amounts of methane. The team then returned to the No. 67 crosscut of 1 east to await the arrival of another mine rescue team.

The mine rescue team from the Robin Hood Division of Armco Steel Corporation arrived at the mine at approximately 9:20 a.m. They entered the mine at about 10:15 a.m., and arrived at the No. 67 crosscut of 1 east about 30 minutes later. Upon arrival, the team installed check curtains across Nos. 5 and 6 entries between crosscut Nos. 65 and 66 in 1 east, directing all of the intake air through the No. 64 crosscut into the No. 7 entry of 1 east. An air measurement taken at this location indicated the quantity of air to be 14,000 cfm.

The Hampton No. 3 mine rescue team and the Robin Hood mine rescue team, along with representatives from Westmoreland Coal Company, West Virginia Department of Mines and MSHA, then traveled in the No. 5 entry to the No. 9 crosscut of 2 south. It was decided that no further travel would be permitted inby the No. 9 crosscut, except by mine rescue team members under oxygen.

A joint decision, by representatives present at the No. 9 crosscut, was made to make initial explorations of the explosion area up to the No. 17 crosscut in 2 south. Four members from each of the rescue teams proceeded under oxygen inby the No. 9 crosscut. The remaining team members served as a back-up team.

The Hampton No. 3 team explored the Nos. 2, 3, and 4 entries, while the Robin Hood mine rescue team simultaneously explored the Nos. 4, 5, and 6 entries. Lifelines or communication cables were not used by the teams during the initial explorations; however, the team members had agreed not to proceed inby the next line of crosscuts until it had been ascertained that everyone had advanced to that point. The teams explored up to and including the No. 17 crosscut and then returned to the No. 9 crosscut.

The exploration revealed that the concrete block stoppings were completely blown out between the Nos. 2 and 3 entries inby the No. 12 crosscut and between Nos. 5 and 6 entries inby the No. 9 crosscut. The stoppings were blown from left to right, i.e., from No. 2 entry toward No. 6 entry. Accumulations of water extending a distance of approximately 350 feet were observed in No. 2 entry between the Nos. 7 and 11 crosscuts. The water was within about 12 inches of the mine roof at the deepest point. Light smoke was encountered at the No. 11 crosscut and became progressively more dense inby that point. Visibility at the No. 17 crosscut was about 5 feet. The atmospheric conditions at the No. 17 crosscut consisted of 3 percent carbon monoxide, 18 percent oxygen, and in excess of 5 percent methane. The findings were reported to officials on the surface at approximately 1 p.m.

A meeting between representatives of Westmoreland Coal Company, United Mine Workers of America, West Virginia Department of Mines and MSHA was held at about 1:10 p.m., on November 7, 1980, to outline further rescue and recovery procedures. During the meeting, it was decided that a fresh-air base would be established in the No. 5 entry of 2 south between the Nos. 8 and 9 crosscuts, but that no further explorations would be made until telephone communication had been established between the fresh-air base and the surface. Also, it was decided that temporary stoppings would be installed across the Nos. 3 and 4 entries of 2 south between the Nos. 6 and 7 crosscuts and that a portion of the concrete block stopping in the No. 7 crosscut between the Nos. 2 and 3 entries would be removed so that the return air could by-pass the water restriction in the No. 2 entry. A mine rescue team wearing oxygen-breathing

apparatus would explore all entries and crosscuts for varying distances up to 1,000 feet, erecting temporary stoppings across all the entries at the inby point of exploration and in the crosscuts between the Nos. 5 and 6 entries, except the last crosscut explored. The team would then return to the fresh-air base. One or more fully-equipped rescue teams would be kept in readiness at the fresh-air base, should an emergency arise while exploratory work was in progress. The area thus explored would be ventilated until all gases had been removed and fresh air extended to the furthest area explored. A new fresh-air base would then be established and the procedure repeated until the entire area had been explored.

Following this meeting, mine rescue teams erected temporary stoppings across all of the entries, except No. 2 entry and the Nos. 9 and 10 crosscuts. A temporary stopping could not be erected in the No. 2 entry because of the accumulation of water. An opening, about 36 inches by 36 inches, was made in the concrete block stopping at the No. 7 crosscut between the Nos. 2 and 3 entries, and temporary stoppings were erected across the Nos. 3 and 4 entries between the Nos. 6 and 7 crosscuts to divert the air into the return airway, thus by-passing the water restriction. The quantity of air, in the No. 9 crosscut between the Nos. 5 and 6 entries was 23,766 cfm. Telephone communications were extended up to the No. 8 crosscut in the No. 5 entry at approximately 4:15 p.m., on November 7.

At that time, explorations were made in the areas to just inby the No. 19 crosscut where temporary stoppings were erected across all of the entries. The area was then ventilated. At approximately 8:30 p.m., the second fresh-air base was established in the No. 6 entry between the Nos. 18 and 19 crosscuts. The quantity of air, as measured in the No. 18 crosscut between the Nos. 5 and 6 entries, was 20,610 cfm.

The mine rescue teams began exploring the areas inby the No. 19 crosscut. While explorations were continuing inby the No. 19 crosscut, efforts were made to disconnect the track, pipeline, and belt conveyor structure that extended inby the fresh-air base. However, this was not accomplished because the hand tools available were inadequate. The track, pipeline, and belt conveyor structure were later disconnected near the entrance of 2 south, sometime between 10:30 p.m. and midnight on November 7.

At approximately 10 p.m., an air measurement was taken in the No. 18 crosscut between the Nos. 5 and 6 entries which revealed that the quantity of air had decreased to 15,345 cfm. An open-faced crew began tightening and strengthening the temporary stoppings between Nos. 5 and 6 entries which had previously been installed by the rescue teams. The quantity of air being delivered to the second fresh-air base was increased to about 17,000 cfm.

At approximately 11 p.m., Dana Napier, Federal Coal Mine Inspector, who was assisting the open-faced crew in repairing the temporary stoppings outby the fresh-air base, traveled to the No. 67 crosscut of 1 east to check for additional supplies. Upon arrival, a member of the supply crew who had been working in the area for some time complained to Napier that he and the other miners had severe headaches. Napier made a test for methane and found 0.5 percent. Neither Napier nor the miners were equipped with a carbon monoxide detector.

Napier walked to the No. 68 crosscut in the No. 3 entry where a transformer was located between the No. 2 and No. 3 entries. About four concrete blocks had been removed from the stopping so that the air used to ventilate the transformer could be coursed directly into the return. By the use of a smoke tube, Napier determined the air was traveling toward the return entry. Napier removed about 12 additional blocks from the stopping to increase the size of the opening. He then traveled to the second fresh-air base in 2 south. Napier returned to the No. 67 crosscut of 1 east at approximately 12:15 a.m. (November 8) and found the methane was still present.

Napier notified officials on the surface of these conditions, at about 12:40 a.m. After consultations were held between the company, UMWA, State and MSHA, a decision was made to install temporary stoppings across the Nos. 3 and 4 entries between the Nos. 67 and 68 crosscuts of 1 east. These stoppings were erected at approximately 1 a.m. Rescue personnel at the fresh-air base were not notified that stoppings were being installed.

Explorations progressed to the No. 24 crosscut in 2 south. Smoke, extending 12 to 15 inches from the roof line, limited the visibility to about 20 feet. The atmospheric conditions consisted of 2 percent carbon monoxide, 13 percent oxygen, and in excess of 5 percent methane.

On November 8, at approximately 12:30 a.m., the Stonega Division No. 2 mine rescue team, Westmoreland Coal Company, traveled inby the second fresh-air base and began exploring inby the No. 24 crosscut. At approximately 1:15 a.m., they found the bodies of two miners in the vicinity of No. 26 crosscut in No. 4 entry. The team returned to the fresh-air base to report their findings. At approximately 2:20 a.m., the bodies of three more miners were located by the Stonega Division No. 1 mine rescue team in the No. 4 entry. Two bodies were between Nos. 26 and 27 crosscuts, and one body was at the No. 27 crosscut. All five bodies were in the vicinity of the locomotive and rail car (Appendix D). The team returned to the fresh-air base and reported their findings.

A decision was made to ventilate the area and advance the fresh-air base before the bodies would be removed. Temporary stoppings were erected across the entries between the Nos. 26 and 27 crosscuts and in the crosscuts between the Nos. 5 and 6 entries to and including the No. 25 crosscut. The area was ventilated and the third fresh-air base was established in the No. 6 entry between the Nos. 25 and 26 crosscuts at approximately 4:40 a.m. The quantity of air, as measured in the No. 26 crosscut between the Nos. 5 and 6 entries, was 17,264 cfm. At this time, it was decided to erect temporary stoppings across all of the entries between the Nos. 27 and 28 crosscuts so that the No. 27 crosscut could be ventilated and all the bodies removed by open-faced crews on fresh air. Installation of these stoppings was completed at approximately 6:20 a.m.

The team was ready to start ventilating the No. 27 crosscut when they received a telephone call from Ronald H. Hamrick, Health and Safety Director, Stonega Division, Westmoreland Coal Company, instructing everyone to retreat immediately to the entrance of 2 south because methane and carbon monoxide were building up in the No. 3 entry of 1 east at the No. 67 crosscut. The call was received at the fresh-air base at about 6:30 a.m. Everyone left the fresh-air base at that time and traveled to the air lock that had been built in the No. 67 crosscut in 1 east between the Nos. 4 and 5 entries.

The methane and carbon monoxide content in the No. 3 entry at the No. 67 crosscut were 1.25 percent and 0.4 percent, respectively. At approximately 7 a.m., the senior person underground for Westmoreland Coal Company ordered everyone to evacuate the mine. He instructed the rescue team members to proceed outby, under oxygen, in the No. 3 (track) entry to determine the extent of the problem with carbon monoxide and methane. All other personnel evacuated the mine via the No. 6 (intake air) entry. The rescue teams that traveled the No. 3 entry during the evacuation of the mine found that accumulations of carbon monoxide and methane extended to the No. 40 crosscut in 1 east, a distance of approximately 2,150 feet. By about 10:15 a.m., all persons had been evacuated from the mine.

While Napier was preparing to leave the air lock, he collapsed from apparent exposure to carbon monoxide. Oxygen was immediately administered by members of the rescue team. Napier remained conscious, but had to be assisted from the mine; oxygen was administered several times while traveling to the surface. Napier was taken by ambulance to a local hospital where he was treated for exposure to carbon monoxide. He remained at the hospital for approximately three hours.

At approximately 10:15 a.m., on November 8, 1980, representatives of the company, UMWA, State and MSHA met to establish a plan for removing gases from the No. 3 entry of 1 east so recovery work could continue. It was decided that a mine rescue team would start at the slope bottom and examine each crosscut while proceeding into 1 east. Beginning at the No. 22 crosscut, the manddoors would be opened in the stoppings between the Nos. 4 and 5 entries to flush the methane and carbon monoxide from the No. 3 entry.

Mine rescue teams reentered the mine at approximately 11:15 a.m. and proceeded open-faced up to the No. 67 crosscut of 1 east. They tested for carbon monoxide and methane at each intersection and opened a total of five manddoors in the stoppings between the Nos. 4 and 5 entries while advancing. The rescue teams arrived at the No. 67 crosscut at about 1 p.m. Upon arrival, they made tests for carbon monoxide and methane and found that neither was present. The trolley wire was energized to the No. 67 crosscut at approximately 1:16 p.m.

The rescue teams then proceeded to the third fresh-air base in 2 south where they arrived at approximately 4 p.m. The quantity of air being delivered to the third fresh-air base was about 7,000 cfm. Testing of the mine atmosphere at this location revealed 0.2 percent methane, 21 percent oxygen, and 0.0 percent carbon monoxide. Preparations were then started to ventilate the No. 27 crosscut so that the bodies of the miners could be removed on intake air.

At approximately 6:23 p.m., the temporary stoppings in the Nos. 2 and 7 entries between the Nos. 26 and 27 crosscuts were removed to course the air through the No. 27 crosscut. However, the quantity of air had decreased to about 5,200 cfm which was insufficient to ventilate this area. It was then decided that the bodies would be removed by mine rescue teams under oxygen.

The bodies of the five miners were brought to the surface at approximately 10:25 p.m., on November 8, 1980, and transported by ambulance to the Boone County Memorial Hospital in Madison, Boone County, West Virginia, for examination by the county coroner. The Chief Medical Examiner for the State

of West Virginia performed autopsies. The examiner determined that Kinder, Dent, and Williamson died of carbon monoxide poisoning. Pridemore and Gillenwater died of thermal burns. The Medical Examiner noted that five unopened self-rescuers were received with the bodies.

After the bodies were removed from the mine, the recovery operations were directed primarily towards improving the ventilation in 2 south. Explorations made in the Nos. 1 and 2 (return airways) entries of 1 east revealed that excessive accumulations of water in the vicinity of the No. 40 cross-cut were restricting the flow of air. Efforts to remove the water and increase the quantity of air continued until about 11:30 a.m., on November 11, 1980, when a decision was made to seal the 2 south area of the mine.

Sealing Operations

Westmoreland Coal Company developed a plan for sealing the 2 south area. Seals were to be constructed in all entries of 1 east between the Nos. 64 and 65 crosscuts. At the time of the explosion, the Nos. 1 and 2 entries were return airways, the Nos. 3 and 4 entries were track haulage and belt conveyor haulage entries, respectively, and Nos. 5, 6, and 7 entries were intake airways. The seals were 6 inches thick and constructed of 6-inch by 8-inch by 16-inch concrete blocks hitched into the ribs and floor with a concrete footer laid on the mine floor. The concrete blocks were staggered for maximum strength and the perimeter of the seals was sprayed with foam. Sampling lines, 2 inches in diameter by 21 feet, with valves were placed in Nos. 1 and 5 seals. A 4-inch diameter steel pipe, incorporating a water trap and valve was installed in seal No. 7. The water trap was filled with water. Two rows of posts on 4-foot centers were installed in the area immediately inby each seal.

The seals in the Nos. 1, 3, 4, 5, and 7 entries were completed first. The seals in the Nos. 2 and 6 entries were erected simultaneously and were completed at approximately 5 p.m., on Thursday, November 13, 1980. The mine was then evacuated., and all power wires extending underground were deenergized and locked out. Guards were posted at all entrances to the mine, and no persons were permitted to enter for a period of 72 hours.

On Monday, November 17, 1980, at approximately 7:30 a.m., representatives of the company, UMWA, State and MSHA entered the mine to inspect the seals and to take air samples of the atmosphere in the sealed area. The results of analysis of these samples indicated that additional time would be needed for the atmosphere within the sealed area to accumulate sufficient methane to prevent an explosion.

The analysis of air samples collected from the sealed area on December 10, 1980, indicated that the atmosphere within the sealed area was no longer explosive. Orders issued under sections 103(j) and 107(a) of the Act were modified, prohibiting removal of the seals.

PART III

CONCLUSION

Enforcement Actions

On December 3, 1981, Westmoreland Coal Company informed MSHA that recovery of the 2 south section was anticipated in July 1983. In view of this information, MSHA determined that appropriate enforcement action would be undertaken based upon the preliminary record.

On July 15, 1982, MSHA cited Westmoreland Coal Company for 13 violations under section 104 of the Federal Mine Safety and Health Act of 1977. Additional violations may be cited at the completion of the investigation. The text of the 13 cited violations follow below.

1. Section 75.322

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that a change in ventilation which materially affected the main air current was made on October 27, 1980, between 12 p.m. and 1:30 p.m. during a production shift, while persons other than those involved in the change, were underground. The No. 1 fan blade settings were changed and the No. 2 fan was stopped. The No. 1 fan was then started, which decreased the ventilation being delivered underground by approximately 38,000 cubic feet per minute.

2. Section 75.316

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that from approximately September 1, 1980, to November 7, 1980, a revision of the ventilation plan, approved on August 18, 1980, was not being complied with in 2 south and 1 east in that four permanent stoppings, three in 2 south and one in 1 east, that were used to separate the belt haulage entries from the intake entries were removed without approval of a revised plan by the District Manager. Plastic brattice cloth was used to replace these stoppings but were not maintained in that they were taken or torn down. The plastic brattice cloth that was used to replace the permanent stopping in 1 east (67 crosscut between entry Nos. 4 and 5) was partially down which may have permitted the air current to short circuit the 2 south area of the mine.

3. Section 75.316

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that the approved supplemental ventilation plan approved on August 18, 1980, was not being complied with in the 2 south section in that crosscuts were not provided at or near the faces of each entry before they were abandoned. The approved ventilation plan required that crosscuts be provided at or near the faces of each entry before they are abandoned. There is no evidence to indicate that it was unsafe to develop crosscuts because of natural conditions.

4. Section 75.316

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that on numerous occasions during the course of the last year, the ventilation plan, approved on August 18, 1980, was not being complied with in that the ventilation doors installed in 1 south between 1 east and 1 west were, in many cases, left in the open position. The approved plan shows these doors in the closed position.

5. Section 75.305

A sworn statement taken from Jolly Fowler, section foreman, on December 12, 1980, during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that on September 28, 1980, he did not examine at least one entry of each intake and return aircourses of 1 east and 2 south in its entirety during the weekly examination for hazardous conditions. Fowler stated that when making such examinations, he would travel in the track entry (neutral entry) and go into the intake and return entries at different locations and then return to the track entry.

6. Section 75.303

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that preshift examinations were not made each shift prior to miners entering the 2 south area for the purpose of removing mining equipment. The equipment was removed during a 2-week period in late August and early September 1980.

7. Section 75.314

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that it was a common practice at this mine not to make the required examinations in idle and/or abandoned areas of the mine for methane and oxygen deficiency and other dangerous conditions by a certified person not more than 3 hours before the pumpmen were permitted to enter or work in such areas. The pumpmen who were required to enter such areas were not equipped with methane detectors or flame safety lamps.

8. Section 75.303

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that it was a common practice not to make the required preshift examinations of the haulageways and travelways within 3 hours preceding the oncoming shift. Three foremen, who regularly conduct preshift examinations at this mine, stated that the haulageways and travelways were examined at the start of the shift while enroute to the respective sections.

9. Section 75.314

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that the idle 2 south off 1 east main area was not inspected for methane and for oxygen deficiencies and other hazardous conditions by a certified person not more than 3 hours before 5 miners were permitted to enter these areas at approximately 2:30 a.m. on November 7, 1980. Gary Neil, third shift Mine Foreman, assigned these 5 miners to go to 2 south off 1 east main and retrieve track rails at about 1:55 a.m. on November 7, 1980. The 5 miners were killed at approximately 3:30 a.m. on November 7, 1980, as a result of an explosion that occurred in 2 south off 1 east main portion of the mine.

10. Section 75.303

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that a preshift examination was not made in 3 east off 2 north within 3 hours of 5 miners entering such areas at approximately 1 a.m. on November 7, 1980. These 5 miners were assigned to go to 3 east off 2 north and retrieve track rails by their supervisor, John Workman, general labor foreman, on the surface prior to entering the mine on the 12:01 a.m. to 8 a.m. shift for November 7, 1980.

11. Section 75.303

Sworn statements taken during the investigation of a mine explosion that occurred at the Ferrell No. 17 Mine on November 7, 1980, revealed that a preshift examination was not conducted in 1 east prior to miners recovering belt structure from that area on or about October 24, 1980.

12. Section 75.301

The volume and velocity of the current of air being delivered to 2 south on November 7, 1980, was not sufficient to dilute, render harmless, and to carry away flammable and explosive gas. An explosion occurred in the 2 south area of the mine at approximately 3:30 a.m. on November 7, 1980. The explosion resulted in the deaths of 5 miners. During rescue and recovery operations following the explosion, water approximately 12 inches from the mine roof at the deepest point, was encountered by the rescue teams in the No. 2 entry, return airway of 2 south for a distance of about 400 linear feet, which probably contributed to the inadequate ventilation. Additionally, a partially torn down temporary stopping (brattice cloth) at the No. 67 crosscut in 1 east between entry Nos. 4 and 5, where a permanent stopping had been removed, could have possibly contributed to the inadequate ventilation in 2 south.

13. Section 75.1106


A sworn statement given in connection with the investigation of the mine explosion which occurred at the Ferrell No. 17 Mine on November 7, 1980, indicates that James Clifford Chandler used a cutting torch to

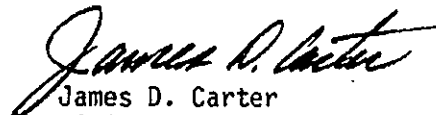
cut down belt conveyor hangers in the 1 east belt entry near the mouth of 2 south on the midnight shift on November 6, 1980. The sworn statement indicates that the cutting operations were not performed in a fireproof enclosure nor did a qualified person continuously test for methane immediately before and during such operations.

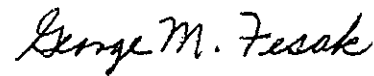
Completion of Investigation


The investigation will be completed when the sealed area is recovered.

Respectfully submitted,

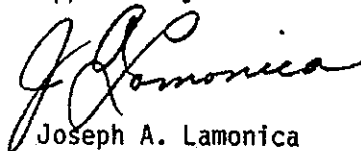

Herschel H. Potter
Chief, Division of Safety


James D. Carter
Mining Engineer


George M. Fesak
Electrical Engineer


Earnest C. Teaster, Jr.
Mine Safety and Health Specialist

Approved by:


Joseph A. Lamonica
Administrator
for Coal Mine Safety and Health

APPENDIX A

Victims of Explosion
 Ferrell No. 17 Mine
 ID No. 46-02493
 Westmoreland Coal Company
 November 7, 1980

Name	Age	Job Classification	Experience at the Mine	Total Mining Experience
Carlos Lee Dent	39	General Laborer	1 year 2 months	4 years 3 months
Howard Gillenwater	28	General Laborer	1 year 5 months	5 years 9 months
Herbert E. Kinder III	22	General Laborer	1 year 2 months	3 years 10 months
Freddie W. Pridemore	26	General Laborer	2 months	1 year 10 months
Howard Williamson	39	General Laborer	1 month	5 years 5 months

APPENDIX B

Mine Organizatin at Time of Accident

President: Howard H. Frey

Vice-President - Eastern Operations: C. E. Brinley II

Vice-President - Production: Hershiel H. Hayden

General Manager - Winding Gulf Division: Clarence Justice

Health and Safety Manager: Paul Meek, Jr.

Mine Manager: Kyle Jones

Mine Foreman: Mark McClure

Principal Officer - Health and Safety: Kyle Jones

Labor Organization: United Mine Workers of America, Local 1889

APPENDIX C

Mine rescue teams that participated in the recovery operations following the mine explosion at Westmoreland Coal Company's Ferrell No. 17 Mine on November 7, 1980

ARMCO, INCORPORATED

Big Mountain Team

Jerry Toney - Captain
Keith Williams
Steve Cox
James White
James Garretson
Lary Morgan
Dave Banks
Steve Cox - Trainer

Robinhood Team

Danny Spratt - Captain
Frank Rhodes
Kenny Ferrell
Jim Byus
Charles Sosebee
David Calicerto
Rick Boggs
Steve Richards - Trainer

Harewood Team

Joe Atha - Captain
Michael Thompson
Gary Johnson
Dean Stiltner
Watson Terry
Benny Clark
Robert Graham
Robert Thomas
Bob Senter - Trainer

Walhonde Team

Ivan Accord - Captain
Nick Reeves
Roger Browning
Bob Persinger
Terry Hudson
James Massey
Jeff Crutchfield - Trainer

BECKLEY COAL MINING COMPANY

Mine Rescue Team

Roger Law - Captain
Delmer Webb
David Fitzpatrick
Billy Wilson
Robert Webber
Scott Vargo - Trainer

BETHLEHEM MINES CORPORATION

"A" Team

Charles Aleshire - Captain
Wayne Ashby
David Vance
Darrell Sigmon
Chuck Ballard
Jim Smoot
Ron Lorrison - Trainer

"B" Team

Tony Agosti - Captain
Donnie Roberts
Tom Price
Jack McGraw
Sam Dingess
Ron Garrison
Russell Thompson
Ron Lorrison - Trainer

EASTERN ASSOCIATED COAL CORPORATION

Keystone No. 1 Team

Milton Smallwood - Captain
Aubie Burnett
Robert Cox
David Norris
Mike Matthews
Dale Suiter - Trainer

Well's Complex Team

Robert Knipp - Captain
Ivan Puckett
Ronnie Elam
Emil McDorman
Jeff Ball
Randy Moore
Mike Lucas
Bill Miller - Trainer

Wharton No. 2 Team

Doug Eversole - Captain
Jerry Weaver
Barry Pennington
Fred Newson
Stanley Adams
Frank Brown
Larry Rash
Sam Dillon - Trainer

SHARPLES COAL COMPANY

Mine Rescue Team

Frank Stover - Captain
Mike Stover
Henry Bishop
Vernon Williams
Larry Ball
Clarence Marcum
Frank Adkins
Rick Dillon - Trainer

YOUNGSTOWN MINES CORPORATION

Dehue Team

Larry Bledsoe - Captain
Bernard Evans
Harold Gullett
H. P. Patrick
Clarence Evans
Arlie Bush
David Lynsford
Larry Bledsoe - Trainer

W & P COAL COMPANY

Mine Rescue Team

Roger Hooker - Captain
Raymond Chafin
Cliff Adkins
Gary Oliver
Charles Mounts
Greg Robinette
Ray Herndon
James Hawkins - Trainer

WESTMORELAND COAL COMPANY

Hampton Team

Tom Mullens - Captain
Bill Wolford
Don Miller
Vic Gore
Eric Pauley
Sam Litteral
Bob Damron - Trainer

Stonega No. 1 Team

Herbert Kimberling, Jr. - Captain
Robert Bell
H. E. Barnett
Gary Crisp
Gerald Mays
Gerald Tate
Louis Henegar - Trainer

Winding Gulf No. 1 Team

Lewis Vannatter - Captain
Bucky Trail
Bill Blevins
Joe Reynolds
Randy Hansford
Keith Trent
Allen Vanhorne - Trainer

Imperial Team

Lawrence Pomeroy
Richard Bragg
Tom Scarles
W. D. Smith
Steven Shoulders
Jerry Donohue
Terry Golden
Damon Donohue - Trainer

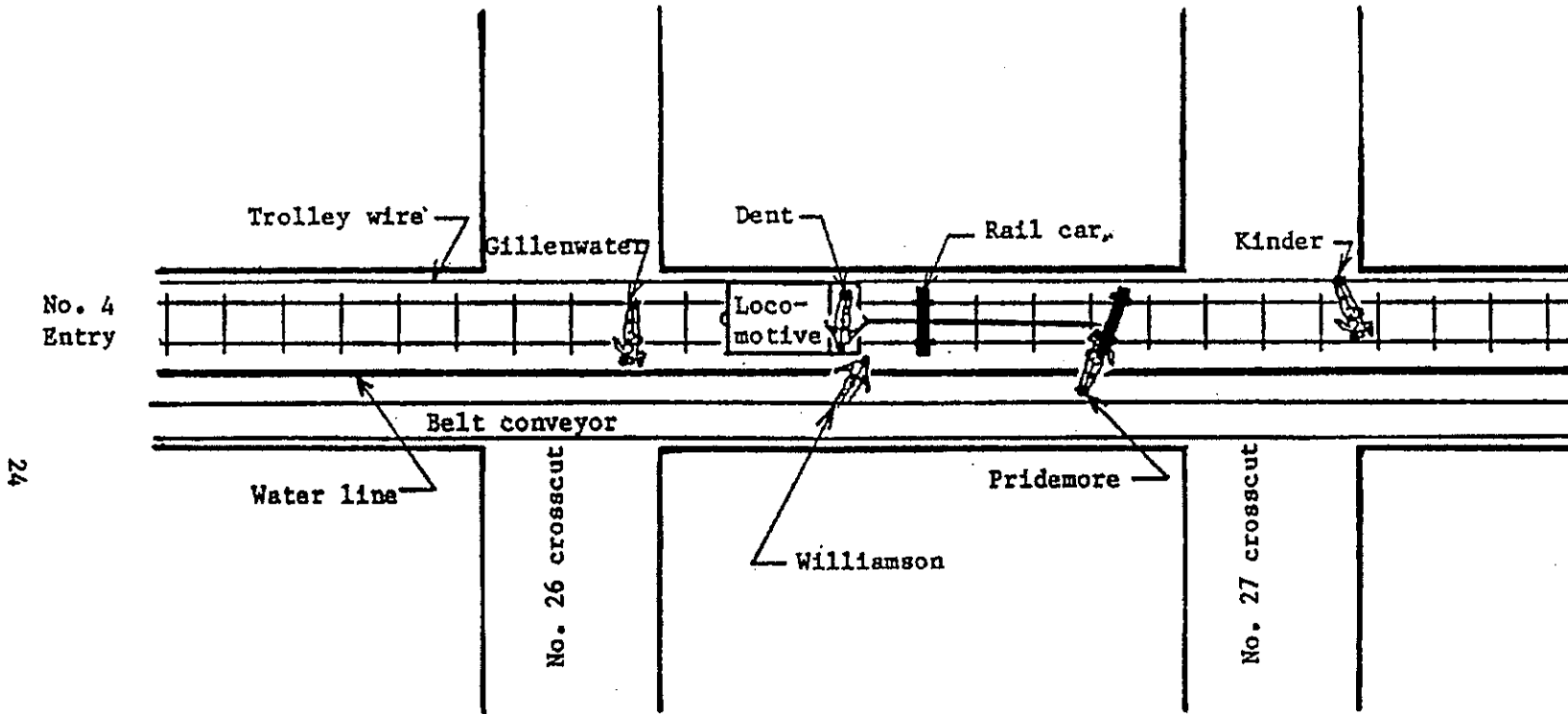
Stonega No. 2 Team

Bill Person - Captain
Gale Francis
Keith Hargrove
Jim Garrison
Jim Burke
Cotton Gardner
Frank Jervis
Louis Henegar - Trainer

Winding Gulf No. 2 Team

Paul Prince - Captain
Harold Teaster
Allan Smith
Joe Owens
Larry Stanley
Richie Henderson
Ron Williams
James Scott - Trainer

APPENDIX D



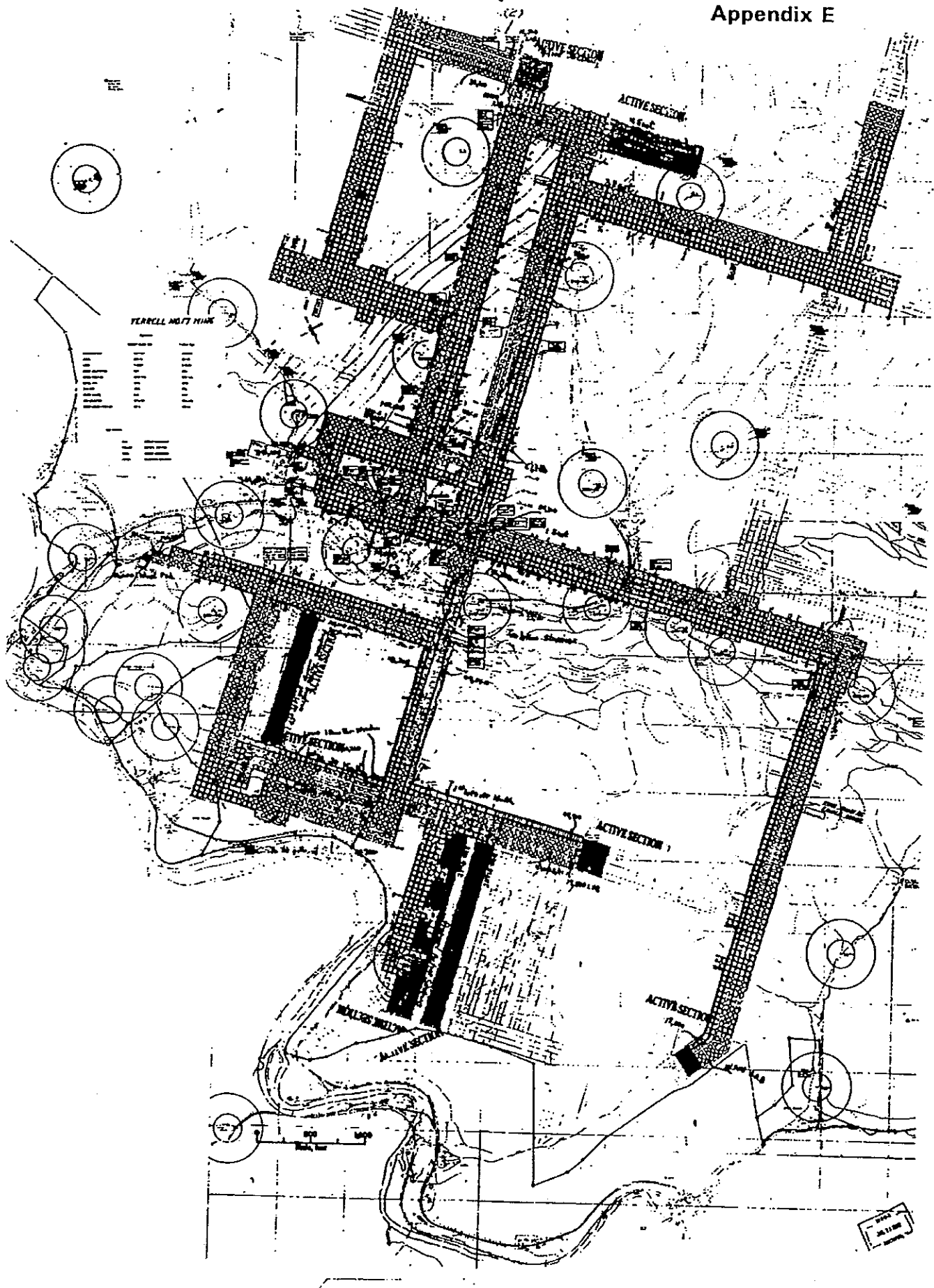
Preliminary Sketch of Accident Scene

Ferrell No. 17 Mine

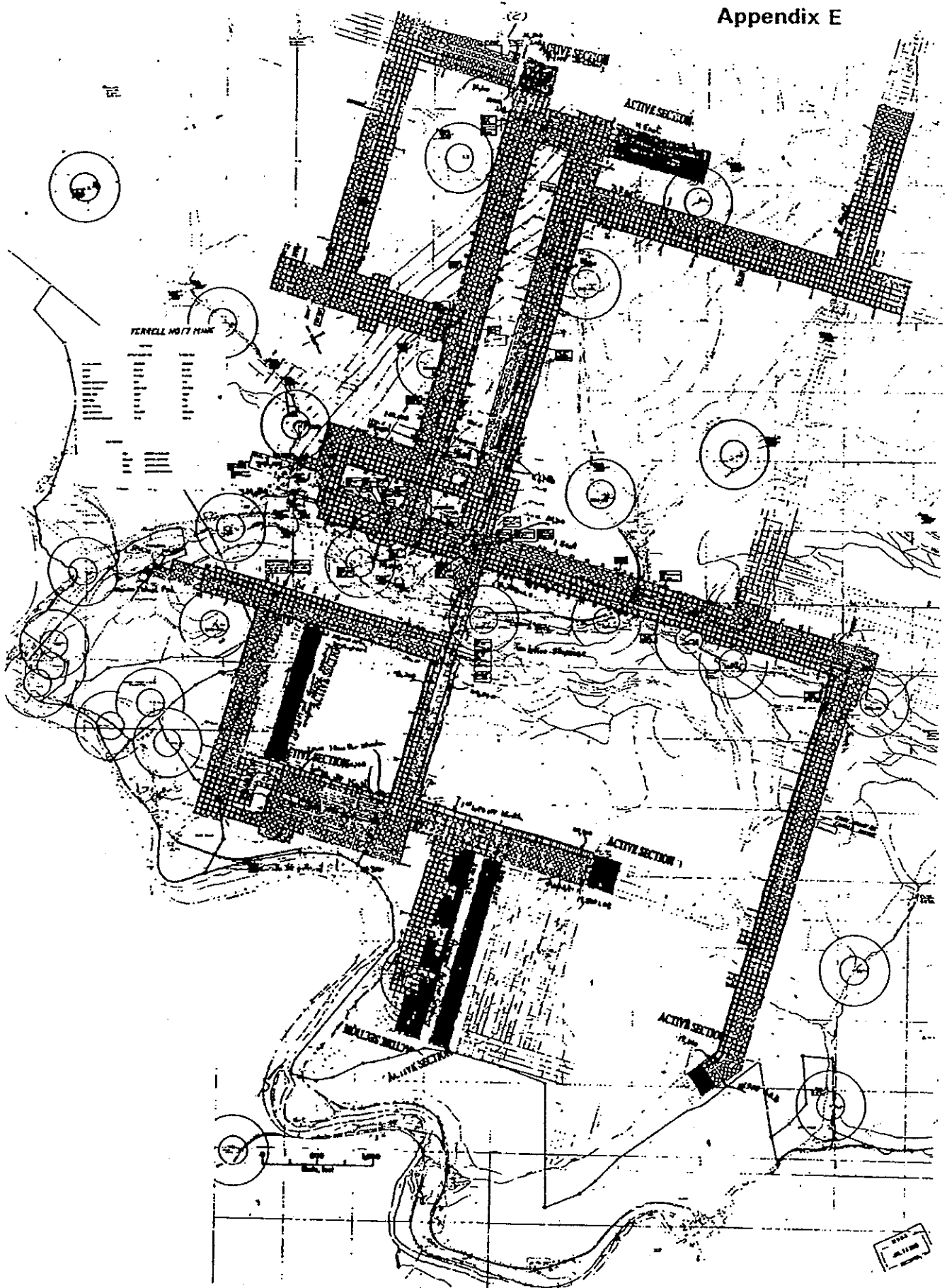
November 7, 1980

No scale

Appendix E



Appendix E



Appendix E

