UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OFFICE OF THE ASSISTANT DIRECTOR—
COAL MINE HEALTH AND SAFETY

OFFICIAL REPORT OF MAJOR MINE EXPLOSION DISASTER

ITMANN NO. 3 MINE (ID. 46-01576
ITMANN COAL COMPANY
ITMANN, WYOMING COUNTY, WEST VIRGINIA

December 16, 1972

By

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District Manager
Coal Mine Health and Safety District 4

Sylvester E. Gaspersich
Subdistrict Manager
Coal Mine Health and Safety District 4

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Federal Coal Mine Inspection Supervisor
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INTRODUCTION

This report is based on an investigation made pursuant to Section 103 of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).

A mine explosion occurred about 3:45 p.m., Saturday, December 16, 1972, along the combined haulage track and belt entry in the Cabin Creek 4 panel section. At the time of the explosion, all section crews were on duty and shift changeout operations were occurring; the day-shift crews were either enroute to the surface, on the surface, or performing miscellaneous work tasks throughout the mine. A total of 121 men worked in the mine on the 8 a.m. to 4 p.m. shift. The Cabin Creek 4 panel crew was in a portal bus enroute to the surface when the explosion occurred; five of the 8-man crew were killed and the other three men were burned severely and required hospitalization. None of the other shift employees were affected by the occurrence.

The explosion originated about 1,000 feet outby the section working faces and was confined to the Cabin Creek 4 panel section. An explosive methane-air mixture accumulated in No. 1 entry used for conveyor belt and track haulage and was ignited by the portal bus transporting the section crew to the surface.

The names of the victims, their Social Security numbers, ages, occupations, experience, and number of their dependents are listed in Appendix A of this report.

GENERAL INFORMATION

The Itmann No. 3 mine is located at Itmann, West Virginia. The Itmann Coal Company, operated under a management agreement with the Pocahontas Fuel Company, is jointly owned by the National Steel Corporation (33-1/3 percent), Consolidation Coal Company (32-2/3 percent), Bethlehem Steel Corporation (25 percent) and the Dominion Foundries and Steel Ltd. of Canada (9 percent). The Pocahontas Fuel Company is a division of the Consolidation Coal Company, a wholly owned subsidiary of the Continental Oil Company. The names, titles, and addresses of the operating officials of the Pocahontas Fuel Company are:

President	Joseph M. Richards	Pocahontas, Virginia
Vice President	William D. Starling	Itmann, West Virginia
Manager of Mines	C. W. McDonald	Itmann, West Virginia
Superintendent and Principal Officer		
Health and Safety	J. H. Johnson	Itmann, West Virginia
Chief Safety Inspector	Jerry Shaffer	Pocahontas, Virginia
Mine Foreman	Hampton Clark	Itmann, West Virginia

At the time of the accident, a total of 292 men was employed, 290 worked underground, 3 shifts a day, 5 and 6 days a week, and produced an average of 3,500 tons of coal a day. Production during the year of 1972 was 670,011 tons of coal. The mine is opened by 3 drifts and 2 concrete-lined double compartment shafts, 503 and 365 feet in depth, into the Pocahontas No. 3 coalbed, which ranges from 40 to 48 inches in thickness locally. The floor is shale ranging from soft to firm. The immediate roof is about 14 feet of firm shale overlain with sandstone ranging from 40 to 70 feet in thickness. The Itmann No. 4 mine is extracting coal from the Pocahontas No. 4 coalbed, which overlies active working areas of the Itmann No. 3 mine.

The analysis of a coal sample taken from the Pocahontas No. 3 coalbed at Itmann, as reported in Technical Paper No. 626, "Analysis of West Virginia Coals", published by the United States Bureau of Mines is as follows:

	Percent
Moisture	2.0
Volatile matter	18.8
Fixed carbon	73.8
Ash	5.4

Numerous tests by the Bureau of Mines have shown that coal dust having a volatile ratio of 0.12 and higher is explosive. The volatile ratio of the coal in this area indicates that the dust from this coal is explosive.

Federal safety inspections of the mine have been scheduled on a 5-day week basis since September 5, 1972, and a health inspection had been started of the entire mine prior to the explosion.

The mine experienced a coal-dust explosion on January 4, 1972, in which three men were injured. On June 19, 1972, methane was ignited at a working face when the cutting head of a continuous miner contacted sandstone roof. None of the face employees were injured by the ignition. During the year 1972 to the day of the explosion, the Bureau issued 4 Orders of Withdrawal and 89 Notices of Violation at the mine, and none of these entered into or contributed to the explosion.

MINING METHODS, CONDITIONS, AND EQUIPMENT

Mining Methods: The method of mining employed in the Cabin Creek mains (explosion area) consisted of longwall-type mining and the advancing of three entry sections to prepare longwall faces.

The longwall system of mining employed at the mine consisted of:

Panels in sets of three entries were advanced at 20-foot widths to depths in excess of 5,000 feet to provide longwall faces of 470 feet in width. These panels were advanced at centers of 55 feet between Nos. 1 and 2 entries and 100 feet between Nos. 2 and 3 entries, and staggered crosscuts were driven on 100-foot centers. These projections were utilized as roof-control measures for the longwall system, and continuous miners employing shuttle-car and belt-conveyor haulage systems, were used for advancing the longwall panels. The three panel entries were used as follows: No. 1 entry contained a supply and mantrip track-haulage system and a 36-inch belt conveyor for coal-haulage purposes; No. 2 entry was the intake air escapeway; and No. 3 entry was maintained as a return air escapeway. A shearer longwall machine was used for coal production from the longwall face.

Connector entries, in sets of two, were provided about 1,000 feet inby the mouth of the panels and at the inby ends of the panels. The connector entries were used for the setting up and moving of the longwall equipment, and the entries were used also for various ventilation purposes.

A roof-support plan for the mine has been approved with roof bolting as the primary method of roof support, except on the longwall unit in the Cabin Creek 3 panel section where hydraulic chocks are used.

Ventilation and Mine Gases: Ventilation was induced by four surface-installed axial-flow fans, exhausting continuously. The following air measurements and methane determinations were made at the fans following the explosion:

Location	Volume of Air CFM	Methane Percent	Cubic Feet of Methane in 24 Hours
Main Portal Fan	259,000	0.31	1,156,000
Cabin Creek Fan	78,000	0.10	112,000
No. 3 Mine Sugar Run Shaft (Two Fans in Parallel)	200,000	0.19	547,000
			1,815,000

Two drifts and the Sugar Run shaft were used for intake air openings. Overcasts and permanent stoppings were constructed of incombustible material. Metal stoppings had been used in some instances for the isolation of belt haulage and intake escapeway entries; however, the company had decided to discontinue using this type of stoppings and was in the process of replacing them with concrete-block stoppings. Temporary stoppings and line brattice of flame-resistant material were used to control the airflow in the face areas. Auxiliary ventilating equipment was not used underground.

Preshift examinations were made by certified examiners before the first operating shift following an idle period. The mine was operated on a basis of three coal-producing shifts a day and fire bosses examined the mine prior to the 8 a.m. shift, and preshift examinations for succeeding shifts were made by certified officials during their regular tour of duty. Results of the preshift examinations were telephoned to the surface by section foremen and examiners prior to leaving the respective sections and the reports were received by the appropriate oncoming foreman. On-shift examinations for methane and other hazards were made by certified on-shift examiners and these results were recorded.

Each continuous-mining unit and the longwall unit was ventilated with a separate split of air, and the longwall advance entries consisted of two intake airways and a single return. The approved ventilation plan required a minimum of 9,000 cubic feet of air a minute passing through the last open entry crosscuts and a minimum of 3,000 cubic feet of air a minute being delivered to within 10 feet of the working faces where mining operations were in progress. Line brattice was used to provide face ventilation and plastic and/or fire-resistant brattice cloth materials were used for check, fly, and baffle ventilation controls. The longwall unit was ventilated with a continuous current of air passing from the Cabin Creek 3 panel

entries across the longwall face to the Cabin Creek 2 panel. Special bleeder entries were developed and maintained to continuously move air-methane mixtures from the gobs and away from the working faces to the mine return air courses.

The initial and three supplemental ventilation plans were submitted and approved by the Bureau of Mines. Panel entries off Cabin Creek mains for longwall operations were developed in sets of three without unusual difficulties, except in the inby portion of the Cabin Creek 4 panel. These entries were projected in sets of three for roof-control purposes and for faster development of panels for the longwall operations.

Development of Cabin Creek 4 panel was begun during the summer of 1971; therefore, the provisions of Title 30 of the Code of Federal Regulations (C. F. R.) necessitated that the entries used as intake and return air courses be separated from belt-haulage entries and that the intake escapeway be separated from the belt and track-haulage entries. Pursuant to Section 75.326, "In any coal mine opened after March 30, 1970, the entries used as intake and return air courses shall be separated from belt haulage entries, and each operator of such mine shall limit the velocity of the air coursed through belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to insure that the air therein shall contain less than 1.0 volume per centum of methane, and such air shall not be used to ventilate active working places. Whenever an authorized representative of the Secretary finds, in the case of any coal mine opened on or prior to March 30, 1970, which has been developed with more than two entries, are such as to permit adequately the coursing of intake or return air through such entries, (a) the belt haulage entries shall not be used to ventilate, unless such entries are necessary to ventilate, active working places, and (b) when the belt haulage entries are not necessary to ventilate the active working places, the operator of such mine shall limit the velocity of the air coursed through the belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to insure that the air therein shall contain less than 1.0 volume per centum of methane."

Pursuant to Section 75.1707, "In the case of all coal mines opened on or after March 30, 1970, and in the case of all new working sections opened on or after such date in mines opened prior to such date, the escapeway required by this section to be ventilated with intake air shall be separated from the belt and trolley haulage entries of the mine for the entire length of such entries to the beginning of each working section, except that the Secretary or his authorized representative may permit such separation to be extended for a greater or lesser distance so long as such extension does not pose a hazard to the miners."

To comply with these requirements, the conveyor belt and track-haulage systems were installed in No. 1 entry; No. 2 entry was used for the isolated intake air escapeway; and No. 3 entry was used as the return airway. Until shortly before the explosion, Cabin Creek 4 panel was ventilated by the use of Nos. 2 and 3 entries as intake and return airways, respectively, and No. 1 entry (belt and track) was ventilated by returning a small split of intake air from the section loading point along the entry to an outby set of entries connecting Cabin Creek 3 and 4 panels (See Figures 3 and 4). Because of the difficulties in keeping the inby areas of No. 1 entry reasonably free of methane and in maintaining adequate ventilation in the entry, the Bureau of Mines, pursuant to Section 75.326 (Title 30, C. F. R.), about a month prior to the explosion, permitted mine management to course intake air along No. 1 entry and into the working places.

The ventilating system for the Cabin Creek 4 panel section on the day of the explosion was to use the Nos. 1 and 2 entries (haulage and intake escapeway) as intakes and the No. 3 entry as a return. These entries were separated with permanent stoppings constructed of concrete blocks, except that metal stoppings were used to separate the intake escapeway from the haulage entry from the entrance of the section to the connector entries between 3 and 4 panels, a distance of about 900 feet. A check curtain closing about 3/4 of the entry was installed in the No. 2 entry outby the section loading point to divert part of the intake air through the No. 1 entry. Three man doors were left open in stoppings inby the No. 2 belt drive to provide additional paths for the air current to flow from the escapeway entry to the haulage entry. Plastic line curtain and canvas-type fly pads were used to direct the air current into the working places. The exhaust system of ventilation was utilized in the working places. More than 3,000 cubic feet of air a minute was coursed to the working faces in Cabin Creek 4 panel, and sworn statements of the section crews taken by the Bureau of Mines during the investigation following the explosion affirmed the working faces were well ventilated. The section face employees also stated that the methane monitor on the continuous miner occasionally deenergized the machine but that the methane responsible for deenergizing the machine was diluted rapidly, generally in 2 or 3 minutes.

The installation of the belt conveyor and track-haulage system in the same entry (No. 1 entry) in addition to maintaining the No. 2 entry as an isolated intake air escapeway required the installation of stoppings between Nos. 1 and 2 entries and between Nos. 2 and 3 entries, as the Cabin Creek 4 panel entries were developed. This method of developing these panel entries permitted only one entry (No. 2 entry) to be used for the coursing of intake air to the working faces and required that shelter holes be provided along the track haulageway at 100-foot intervals in the solid rib in No. 1 entry. Although this set of panel entries was being developed with the fewest number of entries possible, no particular ventilation or other

problems were encountered in the developing of the first 3,000 lineal feet of the entries. However, in October 1972, company officials and employees and State and Federal inspectors became aware that methane liberations from the solid rib and shelter holes along No. 1 entry of Cabin Creek 4 panel and from freshly mined coal discharged from the shuttle cars into the belt feeder had increased substantially and required additional precautions and ventilation changes. These same officials and inspectors began detecting 0.5 to 1.0 percent methane in the shelter holes in No. 1 entry and 0.5 to 0.8 and 0.9 percent methane in the area adjacent to the conveyor belt feeder, and about 6 weeks prior to the explosion, about 1.5 percent methane was found by a State inspector in the atmosphere adjacent to the belt feeder in No. 1 entry. The company officials immediately acted in diluting the methane at this location by increasing the volume of intake air coursed over the feeder. About 2 weeks later, more than 1 percent methane was found at the same location, and company officials immediately arranged to have the area cleared of methane by increasing the volume of intake air coursed over the feeder.

On November 16 and 17, 1972, a Bureau of Mines ventilation engineer checked ventilation of the No. 1 entry, Cabin Creek 4 panel. The Bureau engineer observed that No. 1 entry was being ventilated with a split of intake air and this intake air was used to help ventilate the working faces. The Bureau engineer also found air leaking through the metal stoppings installed in the crosscuts between Nos. 1 and 2 entries from the entrance of the Cabin Creek 4 panel section to a location four crosscuts inby the connector entries. The Bureau engineer concluded that the elimination of the metal stoppings between Nos. 1 and 2 entries and the replacing of these stoppings with concrete-block stoppings would be necessary to increase the ventilation pressure differential from the connector entries to the belt feeder. He suggested several additional minor ventilation changes, and company officials agreed to replace the metal stoppings inby the connector entries with block stoppings, make the minor ventilation changes on the following weekend, and then determine the effectiveness of returning a split of intake air in No. 1 entry from the belt tailpiece through the connector entries to the Cabin Creek 3 panel return. The metal stoppings were replaced with concrete-block stoppings, and company officials on November 19, 1972, after making the necessary ventilation changes, attempted to course adequate volumes of intake air from No. 2 entry near the belt tailpiece outby in No. 1 entry to the connector entries between Nos. 3 and 4 panels. An adequate volume of air would not flow in No. 1 entry, and company officials thereafter requested that the mine ventilation plan be revised to permit coursing of intake air along the conveyor belt entry (No. 1 entry) and into the working faces.

To permit better ventilation and dilute methane liberated in No. 1 entry, Cabin Creek 4 panel, the requested change in the mine ventilation plan was approved by the Bureau of Mines.

Dust: The mine surfaces varied from dry to wet, and the Cabin Creek 4 panel surfaces were dry to wet. Water was used to allay dust at the belt feeder and discharge point of the No. 2 conveyor belt and at the working faces in Cabin Creek 4 panel. Coal dust produced during other mining operations was not considered excessive.

The 4 panel section was provided with a trickle rock-dusting machine for use in the return airway. Rock dust was applied by hand during the coal-producing shifts followed with generalized rock dusting of the face areas with a rock-dusting machine.

On December 14, 1972, a Federal inspector made a health inspection of the Cabin Creek 4 panel section and observed that coal dust and loose coal had not accumulated in dangerous quantities in the active working areas and all areas examined were rock dusted adequately. During the underground investigation of the explosion, it was evident that coal dust had entered into the explosion only to a minor degree. On December 18, 1972, a total of 61 regular mine dust samples was collected in the three entries of Cabin Creek 4 panel. Forty of the 61 samples contained more than the minimum incombustibles required by the Federal Coal Mine Health and Safety Act of 1969. Nineteen of the samples contained more than 50 percent incombustibles, and the incombustible contents of the other 2 samples were 45 and 49 percent. Nevertheless, the investigators believe that adequate rock dusting of the mine surfaces in Cabin Creek 4 panel section prevented propagation of the explosion by mine dusts and helped confine the explosion to the relatively small area disturbed (See Figure 2). Skim samples of the mine dust on the floor were collected as close to the regular samples as possible, and the incombustible contents of the skim samples were generally less than the incombustible content of regular adjacent samples collected in the disturbed area (See Figure 2).

Transportation: Shuttle cars, longwall conveyors, and belt conveyors were used to transport coal from the face areas to mine carloading stations. Trolley locomotives were used to haul the coal in mine cars to the surface.

Men were transported underground in closed- and/or open-type personnel carriers under the supervision of certified officials. The personnel carrier involved in the occurrence was examined carefully by electrical inspectors during the investigation and the electrical and mechanical components were found to be in satisfactory condition, except that the emergency brake was inoperable. Track-haulage traffic was controlled by a dispatcher and communications were provided with the use of stationary and/or trolley telephones installed on mobile track vehicles.

Electricity: Purchased electric power at 13,200 volts alternating current was reduced to selected ranges from 4,160 to 110 volts alternating current and rectified to 300 volts direct current for use on the surface and underground.

The 300-volt direct-current power used in the trolley wire and feeder circuits was provided by 150- to 500-kw. rectifiers. These circuits were not provided with overcurrent protection and on August 8, 1972, a Notice of Violation of Section 75.1001 (Title 30, C. F. R.) was issued at the mine requiring that suitable overcurrent protection be provided in the direct-current trolley circuits. Satisfactory progress was being made to effect the required protection throughout the mine with the installation of sectionalizing breakers and rectifiers at strategic locations to establish dead blocks. Cutout switches were installed at suitable intervals.

Electric face equipment was of the permissible type. The trailing cables were of the flame-resistant type and were provided with short-circuit protection. Suitable tests for methane were made by qualified persons before electrical equipment was taken into any working place, and regular methane tests were made while the electrical equipment was being operated in the working places.

Illumination and Smoking: Permissible electric cap lamps were used for portable illumination underground. Smoking was prohibited underground, and searches for smokers' articles were conducted.

Mine Rescue: A trained mine rescue team was maintained by the company and served the company's four mines located in the immediate area. The rescue station for the team's oxygen breathing and accessories is located at the Itmann No. 1 mine, about a mile from the Itmann No. 3 mine. Several different operating companies in the surrounding area maintained trained and fully equipped teams, and these teams were available.

Self-rescuers (W-65) were provided for all underground employees and each employee had been trained in the use and maintenance of the self-rescuer.

STORY OF EXPLOSION AND RECOVERY OPERATIONS

Participating Organizations: Employees and officials of the Itmann Coal Company and representatives of the Consolidation Coal Company, United Mine Workers of America, West Virginia Department of Mines, and the Bureau of Mines participated in the recovery operations and investigation of the explosion. Four mine rescue teams from the following companies were either utilized underground or on a standby basis: Itmann Coal Company, Allied Chemical Corporation, United States Steel Corporation, and Olga Coal Company.

Activities of Bureau of Mines Personnel: The Bureau of Mines was notified of the explosion at 4:55 p.m., Saturday, December 16, 1972, when Lawrence Snyder, company safety inspector, telephoned Sylvester Gaspersich, Princeton Subdistrict Manager. Gaspersich immediately notified the District 4 officials at Mount Hope, West Virginia, and Cloyd Blankenship, Mining Engineer, and Jules Gautier,

Federal Coal-Mine Inspector, were dispatched to the mine to confirm the reported explosion and secure available details. The occurrence was confirmed to the District 4 headquarters promptly and all available information was thereafter relayed to Bureau of Mines officials in Washington, D.C. An Imminent Danger Order, Form 104(a), was issued on December 16, 1972, requiring that all persons be withdrawn and prohibited from entering the mine, except those persons engaged in recovery operations. Before the Order was issued, management had withdrawn all men not connected with the recovery operations from the mine.

Blankenship and Gautier assisted in examining the mine fans, testing the return air from the mine, establishing a check-in and check-out system, and concurring with the initial recovery operations being performed in the Cabin Creek 4 panel section. Joseph Singleton and Morris Bragg, Coal-Mine Inspection Supervisors, and Gaspersich arrived at the mine about 7 p.m., and W. R. Park, District Manager, and John E. Weekly, Subdistrict Manager, arrived shortly thereafter. Bureau officials, upon arrival at the mine, were advised in detail of the occurrence, the recovery work, and other details of work in progress. Ranking representatives of the company, the United Mine Workers of America, West Virginia Department of Mines, and the Bureau of Mines conferred throughout the evening on recovery procedures and policies, were in constant telephone communications with the recovery crew, and maintained a log on all underground activities. Shortly after arrival at the mine, Inspection Supervisor Singleton and Inspector Gautier traveled underground and joined the recovery crews, thereafter assisting with and directing the recovery of the explosion victims and the establishment of temporary ventilation of the entire section. The Bureau's investigation of the occurrence was started at 1 p.m. on December 17, 1972.

Mining Conditions Immediately Prior to the Explosion: The weather was cold and partly cloudy with light snowfall on December 16, 1972. Records of barometric pressure recorded at the United States Weather Bureau at the Raleigh County Airport, Beckley, West Virginia, from 12 noon, December 15, to 6 p.m., December 16, 1972, are as follows:

12 noon	December 15, 1972	27.13
6 p.m.	December 15, 1972	27.18
1 a.m.	December 16, 1972	27.28
6 a.m.	December 16, 1972	27.34
12 noon	December 16, 1972	27.39
6 p.m.	December 16, 1972	27.49

It is the opinion of the Bureau investigators that the slight variation in atmospheric pressure had no bearing on the explosion.

Evidence of Activities and Story of Explosion: Management decided to produce coal on Saturday, December 16, 1972, and the day-shift crew (8 a.m. to 4 p.m.) consisting of 121 men, entered the mine about 8 a.m., and they were transported to their respective sections without incident.