FINAL REPORT, EXPLOSION, HITCHMAN MINE, HITCHMAN COAL AND COKE COMPANY, BENWOOD, MARSHALL COUNTY, WEST VIRGINIA MAY 18, 1942

By

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

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INTRODUCTION

A coal-dust explosion occurred in the Hitchman mine of the Hitchman Coal and Coke Company, Benwood, Marshall County, West Virginia, at about 1:52 a.m. May 18, 1942. Five men were killed as a result of this explosion, of which number, three were killed by burns and violence and two died one day later from burns and other injuries. A total of 13 men were in the mine at the time of the explosion. Eight men who were elsewhere in the mine, escaped unassisted without injury, and rescued two men who later died. These eight men were not aware that an explosion had occurred. The electric power and the normal ventilation in the mine had failed and the foreman of this group was unsuccessful in establishing a telephone connection with the outside and about 30 minutes later he, together with the seven others, started for the surface. The explosion was local in character and was confined to an area extending from the conveyor belt or haulage-entry portal a distance of about 1500 feet underground. Considerable property damage was sustained. It is believed that inert matter, such as disintegrated roof shale, sand, and rock dust, localized the explosion.

From evidence found following the disaster and from statements of the survivors and one man who had left the mine about 5 minutes before the explosion occurred, it appears certain that the explosion had its origin about 400 feet inby the mine portal where five timbermen were removing wooden and steel supports. During the course of this work, apparently some of these supports were dislodged, falling on power cables that paralleled the belt conveyor, causing an arc which ignited a coal-dust cloud that resulted when the falling material collided with large deposits of coal dust on the floor and steel framework of the belt conveyor.

Bureau of Mines senior coal mine inspector, O. V. Simpson, St. Clairsville, Ohio, was notified of the explosion. Mr. Simpson, together with Mr. J. J. Plasky, assistant coal mine inspector, arrived at the mine about 4:00 a.m. Mr. K. N. Maize, coal mine inspector, Wheeling, West Virginia, was notified and arrived at the mine at about 6:30 a.m. Mr. F. E. Griffith and Mr. E. E. Quenon from the Pittsburgh station of the United States Bureau of Mines arrived later in the day. Mr. N. P. Rhinehart, Chief of the West Virginia Department of Mines, Mr. Peter McLinden, West Virginia State inspector at large, and Messrs. G. R. Waddell, James Sharkey, and William Moore, district inspectors from the West Virginia Department of Mines,

were notified and assisted in the recovery work following the explosion. The recovery work was completed and all the injured men and bodies were brought out of the mine by 2:00 p.m., May 18, 1942.

GENERAL INFORMATION

Location and Operating Officials

The Hitchman mine is located on the main line of the Baltimore and Ohio Railroad in the town of Benwood, Marshall County, West Virginia, and is operated by the Hitchman Coal and Coke Company. This is the only mine operated by this company.

The officials of the Hitchman Coal and Coke Company are as follows:

L. J. Yaeger, President	Wheeling, West Virginia
P. G. Carroll, Gen. Superintendent	Glendale, West Virginia
Charles Bell, Mine Foreman	Moundsville, West Virginia
Smith Brothers, Engineers	Wheeling, West Virginia

Employees and Production

Approximately 210 men are employed underground and 40 men on the surface, working two shifts and producing an average of about 1,700 tons of coal per day.

Type of Mine

The mine is opened by two slopes and two shafts. The slopes are approximately 700 feet in length and are on a pitch of about 30 percent. A rubber-belt conveyor 36 inches wide, three large-size electrical conductors, and a track are installed on one slope and the other slope is used as a manway. These slopes are separated by about 50 feet of material. One shaft about 50 feet in depth is located approximately 800 feet from the mine portal. This shaft has not been used as a principal airway for a considerable length of time; however, preparations were being made to utilize it in connection with a change that was to be made in the ventilation system. The other shaft located about 3-1/2 miles from the mine portal is 671 feet in depth and is used as a downcast airshaft and escapeway.

Coal Bed

The mine is operated in the Pittsburgh No. 8 coal bed of the Allegheny series and averages 60 inches in thickness. With the exception of being slightly undulating, the bed is practically level; it has a well-defined cleavage and is fairly friable. Clay veins are frequently encountered and the pyritic bands, characteristic of the Pittsburgh bed, are present. The coal is

high-volatile bituminous, and a face sample which was analyzed by the United States Bureau of Mines in 1938 and furnished by the company showed the following:

Volatile matter	42.8 percent
Fixed carbon	48.7 percent
Ash	8.5 percent

This shows that the ratió of volatile to total combustible matter is 0.47. This ratio indicates that the coal dust is readily ignitable and will propagate an explosion.

SURFACE PLANT AND EQUIPMENT

Tipple

The tipple is constructed of wood and steel and is located about 200 feet from the slope portal. The coal is conveyed to the tipple by means of a rubber-belt conveyor from a crossover dump located at the bottom of the slope.

The electric wiring in the tipple is haphazardly installed. Square-D switch fuse boxes were installed on most branch circuits, but many of the switches were shunted with copper busses or wire which did not protect the electrical circuits. Moreover, several open-type switches were observed in use, some of which were not in good operating condition. In many cases the electrical conductors, where they passed through wooden partitions, were not protected with insulators. This condition presents a fire hazard. The moving parts of the machinery were inadequately guarded.

The walkway at the main shaker screen was not provided with handrails.

Illumination is provided by drop-cord incandescent lamps.

Accumulations of coal dust were observed throughout the tipple. It was stated by an official that no measures were taken to allay the dust. It was reported that the tipple is cleaned daily by means of compressed air, which obviously is an unsatisfactory precaution in preventing coal-dust accumulations.

Straw, used for patching small holes in railroad cars, is left in the open near the tipple. This material presents a definite fire hazard to the tipple and nearby frame buildings.

Refuse Disposal

Refuse is hoisted from the bottom of the slope to the tipple by an open-type electric hoist in trips of two cars. It is dumped into a storage bin at the end of the tipple and is trucked to the disposal dump located about 1500 feet from the tipple. The disposal dump is not burning and is not near the mine openings.

No derail or stop block has been provided on the slope or trestle incline extending into the tipple.

Electric conductors in the wooden-constructed hoist house are poorly installed and gears are not guarded.

Coal-Storage Bins

Coal-storage bins are constructed of steel and concrete with the exception of the domestic coal bins which are constructed of wood and are located about 300 feet from the mine portal.

UNDERGROUND MINING METHODS, CONDITIONS, AND EQUIPMENT

Method of Mining

The mine is laid out with reference to butts and faces. Main entries are driven in sets of three, 12 feet in width and on 52-foot centers. Face entries are driven triple at 1,000-foot intervals and butt entries are driven double at 325-foot intervals. Entry pillars are 40 feet in width and crosscuts are driven at 80-foot intervals. Rooms averaging 24 feet in width and 300 to 325 feet long are driven from one side of butt entries with 8-foot pillars and crosscuts at 80-foot intervals. Pillars are not recovered.

The coal is undercut with nonpermissible-type mining machines and is blasted with permissible explosives.

Wooden crossbars and steel rails set on wooden posts are used for timbering in entries. Timber sets are lagged with small-diameter posts. Posts with cap pieces and crossbars are used for timbering in rooms. The posts are set on about 4-foot centers and crossbars are on 3-foot centers.

There are no printed rules nor sketches portraying a method of timbering at this mine.

Ventilation and Gases

The mine is ventilated by a 4- by 6-foot Jeffrey centrifugal-type fan operating blowing. The fan delivers about 54,682 cubic feet of air per minute against a 3-inch water-gage pressure. The air enters the mine through a concrete-lined shaft 671 feet in depth. Two splits of air are used; one split ventilates all of the active workings and the other split ventilates parts of the abandoned areas. These splits join at 7 south and the total return passes for a distance of about 3,900 feet through the main haulage entry to the surface. Some of the abandoned workings are sealed. Arrangements were being made to reverse the air flow which would place intake air on the main haulage road.

The mine is rated as gassy by the West Virginia Department of Mines, and from the analyses of air samples collected at the mine entrances, which analyses are shown in table 1, a few hours after the explosion, showed that there was 0.35 percent of methane present in the air current. The measurements of this (return) air, taken at the mine portal and a short distance inby the entrance to the manway slope, showed a total of 54,682 cubic feet of air per minute. This indicates that the mine is liberating 11,483 cubic feet of methane per hour and 275,597 cubic feet in 24 hours.

The fire boss' report book shows that gas was detected in the mine and the working place "dangered off" on three different days during the month of May, 1942, as follows:

May 4, 1942
9-11 east - 10 south, dangered off. Gas.
signed Frank Vidic

May 5, 1942
9-11 east - 10 south, need breakthrough. Gas
signed Frank Vidic

May 12, 1942
10 south straight face. Gas
signed Frank Vidic

Several oil wells penetrate the coal bed in this mine. These are accurately located on the mine map and are protected by pillars of coal 200 by 200 feet in size.

TABLE 1. - Analyses of air samples collected in Hitchman mine, Hitchman Coal and Coke Company, Benwood, Marshall County, West Virginia, May 18, 1942.

Laboratory No.	Location in mine	Percent				Cu. ft. air per minute	Cu. ft. methane in 24 hours
		Carbon dioxide	Oxygen	Methane	Nitrogen		
71770	At coal slope portal	0.13	20.35	0.35	79.17	41,650	209,916
71771	do. (check sample)	.12	20.39	.35	79.14	41,650	
71772	At mine slope portal (manway)	.12	20.51	.35	79.02	13,032	65,681
71773	do.	.10	20.51	.35	79.04	13,032	
					Total methane in 24 hours		275,597

Haulage

All hauling is done by trolley and cable-reel types of locomotives operating on 275 volts direct current.

Track gage is 40 inches and the rails used are 60 pounds per yard on main entries and 40 pounds per yard on producing entries.

Clearance is provided on the side opposite the trolley lines while shelter holes are provided at 80-foot intervals.

All trolley conductors are located on return airways.

The belt conveyor that carries the coal from the Phillip's crossover dump to the tipple is about 700 feet long.

The dump which is located at the foot of the slope is of the crossover type. There is a bin under the dump with a capacity of about 6 tons.

Lighting

Direct-current, 275-volt, incandescent lamps are installed at the foot of the slope, at the dumping point, along the bottom, and at numerous points along the haulage.

Edison electric cap lamps are used by all underground employees.

Approved, magnetically-locked flame safety lamps are used by all officials for inspecting and testing for gas.

Machinery Underground

None of the machinery underground was of the permissible type.

Explosives

The explosives used in this mine are permissible "King" and are detonated with No. 6 electric detonators and single-shot nonpermissible blasting units.

Drainage

There are a few local "swamps" throughout the mine in which water collects and there are some parts where the floor is quite wet; however, the mine is generally dry and dusty throughout. Water is carried by ditches and small pumps to central points and forced to the surface by central pumping stations.

Dust

Some rock-dusting has been done in active entries and working faces by hand and a small portable (homemade) rock-dusting machine. Eleven samples of dust were collected during this investigation on the main slope and part of the haulage road inby the slope bottom.

According to a statement made by the mine foreman, the main or conveyor-belt slope was rock-dusted about 6 months ago.

A considerable quantity of dry, finely divided, coal dust was observed on the floor in the vicinity of the belt conveyor and on the ribs and timbers.

Table 2 lists the analyses of dust samples collected in the mine on May 18 and 19, 1942. Dust samples (Cans Nos. M-636, K-402, J-589, M-4, M-141, and F-301) collected at three locations outby the point of origin show that the rib and roof dust samples contained an average of 38.5 percent incombustible material and the road dust samples contained an average of 30.7 percent incombustible material. The average of all of these dust samples, rib, roof and road, was 34.7 percent incombustible. Dust samples were collected at 9 locations inby the point of origin. The rib and roof samples contained an average of 65.7 percent incombustible matter.

The nine road samples collected, contained an average of 60.8 percent incombustible. The average of all of these samples, rib, roof and floor, (inby fall) was 63.5 percent incombustible.

MINE CONDITIONS IMMEDIATELY PRIOR TO DISASTER

At the time of the explosion, 1:52 a.m., the weather was cool and cloudy.

The mine ventilating fan was operating normally. Eight men were working in a conveyor-loading section of the mine and five men were unloading and removing timbers from the main slope about 400 feet from the portal.

PREVIOUS EXPLOSIONS IN THIS OR NEARBY MINES

A relatively small gas and coal-dust explosion occurred in this mine in 1939. However, no one was injured and no property damage was sustained.

TABLE 2. - Analyses of dust samples collected in Hitchman mine Hitchman Coal and Coke Company, Benwood, Marshall County, West Virginia, May 18 and 19, 1942

Can No.	Location in mine	Kind of sample	Percent		
			Combustible V.M. + F.C.	Incomb., moisture + ash	Through 20-mesh
J-861	On 1 main 2 south first breakthrough	Rib and Roof	40.9	59.1	69.2
H-406	On 1 main 20 feet outby 2 south	Rib and Roof	42.6	57.4	65.1
M-97	do.	Road	40.3	59.7	64.2
M-347	2 main 20 feet inby 2 south chute	Rib and Roof	25.6	74.4	48.7
M-660	do.	Road	28.8	71.2	52.4
J-602	75 feet outby overcast on 1 main	Rib and Roof	49.0	51.0	61.5
M-218	do.	Road	59.7	40.3	61.1
M-179	75 feet outby overcast on 2 main	Rib and Roof	19.8	80.2	42.5
M-211	do.	Road	17.4	82.6	49.3
B-820	2 main at first chute	Rib and Roof	26.1	73.9	64.2
J-722	do.	Road	20.9	79.1	74.1
J-758	1 main at first chute	Rib and Roof	28.8	71.2	48.3
J-896	At bottom of slope	Rib and Roof	33.0	67.0	80.2
M-416	do.	Road	43.0	57.0	84.3
J-654	120 feet outby bottom of slope	Rib and Roof	42.9	57.1	92.2
M-762	do.	Road	63.7	36.3	86.2
M-636	60 feet outby fall (inby arches)	Rib and Roof	48.1	51.9	96.2
K-402	do.	Road	55.9	44.1	91.2
J-859	Outby end of double arches	Rib and Roof	73.3	26.7	97.5
F-301	do.	Road	77.7	22.3	83.2
M-4	In conveyorway 60 feet outby beginning of arches	Rib and Roof	62.1	37.9	99.6
M-141	In conveyorway 60 feet outby beginning of arches	Road	74.2	25.8	83.2

Two serious explosions and one mine fire occurred in nearby mines operating in the same coal bed and are as follows:

Company	Mine	Location	Year	No. killed
Wheeling Steel Company	Benwood	Benwood, W. Va.	1924	124
Hanna Coal Company	Willow Grove	Neffs, Ohio	1940	72
Powhatan Mining Co.(fire)	Powhatan	Powhatan Point, Ohio	1941	2

STORY OF THE EXPLOSION AND RECOVERY OPERATIONS

A hoisting engineer had come out of the mine and was operating the hoist which is located on the tipple about 250 feet from the mine portal. About 5 minutes after the hoisting engineer came out of the mine he heard the explosion and saw the flames envelope the front part of the tipple. When he left the hoist room he heard debris falling about him. He descended from the tipple by way of a central stairway and ran for assistance.

The sound of the explosion was heard for miles around; mine officials and other employees arrived at the mine shortly after the explosion. Eight men who were working in 5 east entry off 10 south, a distance of about 1-1/2 miles from the slope portal, were not in the affected area and these men were not aware that an explosion had occurred, although the electric power failed and the ventilation ceased. The foreman of this group was unable to establish a telephone connection with the outside to ascertain the trouble, and after waiting for approximately 30 minutes the men started for the surface. The first indication they had that an explosion had occurred was when they saw an automatic ventilation door located about 1,800 feet from the mine portal jammed in a closed position. This automatic door was a new installation and had recently been placed there for the purpose of deflecting air over the haulage in connection with a new ventilation system that was about to be established. This door had been locked open pending this ventilation change. The men continued toward the bottom of the slope, encountering several falls, dislodged timbers, and debris. At the bottom of the slope they heard the moans or cries of injured men. The foreman, together with one man, rescued two seriously burned men, who were a short distance up the slope, and assisted them to the surface, arriving there about one hour after the explosion.

Shortly after these men came out of the mine, a small rescue party of employees entered the mine through the manway slope and brought out two bodies, leaving one man unaccounted for. This party was not equipped with respiratory protection. These two bodies were recovered about 1-1/2 hours after the explosion.

When O. V. Simpson and J. J. Plasky, Federal coal mine inspectors, arrived at the mine from St. Clairsville, Ohio, about 4:00 a.m., smoke was observed coming out of the mine portal. A rescue party was organized

consisting of employees of the company, J. J. Plasky, and O. V. Simpson who led the group. This party, carrying all service gas masks, accompanied by an oxygen-breathing-apparatus crew from the Valley Camp Coal Company, Elm Grove, West Virginia, entered the manway slope and established a fresh-air base near the bottom of the slope. The gas-mask crew explored the affected area on the slope and discovered and extinguished several small fires. They went down the slope and explored an area inby the slope bottom for a distance of about 1,700 feet from the mine portal, and within this distance, one other fire was located and extinguished.

This party, together with the oxygen-breathing apparatus crew, returned to the surface. They did not locate the missing man during this exploration. After these rescue parties came out of the mine, repairs were made to power lines and the normal mine ventilation was reestablished at about 6:00 a.m.

The gas masks were furnished by the West Virginia Department of Mines and the Ohio Division of Mines who sent a rescue truck with equipment from Bellaire, Ohio. Mr. Richard McGee, State inspector of Ohio Division of Mines, accompanied the truck driver and offered his services.

Messrs. K. N. Maize, Federal coal mine inspector, and Peter McLinden, inspector at large of the West Virginia Department of Mines, arrived at the mine at about 6:30 a.m. They, together with Mr. Adolph Pacifico, vice president, District No. 6, United Mine Workers of America, and another man, entered the mine about 7:00 a.m. and explored the affected areas and inby 3,900 feet from the slope portal to the 7 south intersection. There was no violence beyond the steel ventilating door which was about 1,800 feet from the portal.

Shortly after this group entered the mine they were followed by a crew of men that was to try to locate the missing man under the debris along the belt-conveyor slope. The work of removing the debris continued until 2:00 p.m. when the body of the missing man was located and brought out of the mine.

Mr. N. P. Rhinehart, Chief, West Virginia Department of Mines, together with Messrs G. R. Waddell, James Sharkey, and William Moore, State mine inspectors, and Charles Bell, mine foreman, entered the mine shortly after Mr. McLinden and Mr. Maize.

Messrs. F. E. Griffith and E. E. Quenon reported to the mine later in the day and made an inspection of the affected area and returned to the surface.

INVESTIGATION OF CAUSE OF EXPLOSION

A joint investigation by the West Virginia Department of Mines and the United States Bureau of Mines was conducted by Mr. Peter McLinden, inspector at large; Messrs. G. R. Waddell, James Sharkey, and William Moore, district inspectors of the West Virginia Department of Mines; and Messrs. O. V. Simpson, senior coal mine inspector; K. N. Maize, coal mine inspector; F. E. Griffith, mining-electrical engineer; J. J. Plasky, assistant coal mine inspector, of the United States Bureau of Mines; and Mr. Peter Carroll, superintendent, Hitchman Coal and Coke Company.

CORONER'S HEARING AND INQUEST

A coroner's inquest and hearing by the coroner and prosecuting attorney of Marshall County was held in Benwood, West Virginia, on May 25, 26, and 27, 1942.

The gist of the verdict rendered by the coroner's jury was to the effect that these men met their death by a coal-dust explosion occurring in the Hitchman Coal and Coke Company's Hitchman mine, Benwood, West Virginia, at about 1:52 a.m. May 18, 1942, and the Hitchman Coal and Coke Company officials and the West Virginia State mine inspector are guilty of negligence.

Six Bureau of Mines employees (A. J. Nairn, V. D. Null, O. V. Simpson, J. J. Plasky, K. N. Maize, and F. E. Griffith) testified at these hearings.

FORCES

Forces of the explosion are indicated on the map covering the affected area of the mine, a copy of which is contained in the appendix of this report. Evidence indicates that the forces traveled outby the mine portal and covered a radius of several hundred feet, damaging several surface buildings. The tipple was set afire at several places. Forces of the explosion extended inby to the automatic ventilation door.

Much coke was observed in the vicinity of the crossover-dump, coal bin, and at the tail piece of the belt conveyor. Some coke was observed adhering to the outer walls of the tipple and on adjacent buildings on the surface.

From the analysis of a sample of dust collected from material that has impinged against steel-rail crossbars located about 400 feet inby the crossover dump (Can No. J-861), it was observed that disintegrated roof rock or shale, sand, and rock dust localized the explosion.

EXTENT OF FLAME AND VIOLENCE

From the evidence obtained, the force of the explosion died out approximately 1,800 feet inby the slope portal and within a radius of several hundred feet on the surface.

A small fire was found and extinguished on the main slope about 450 feet from the portal; another small fire was found about 700 feet from the mine portal and this fire was extinguished with rock dust.

All of the men involved in the explosion area were burned and had other injuries. Moreover, some of the pressure produced by the explosion was relieved to the outside through an old airshaft located about 400 feet from the slope bottom. This, together with the conveyor-belt slope portal acting as a relief outlet, reduced the pressure and was instrumental in confining the forces of the explosion to the relatively small area involved.

PROPERTY DAMAGE

The damage to the mine consisted of the blowing out of two overcasts; wrecking of a portion of the conveyor-belt structure and rollers; dislodgment of timbers and electric power and trolley conductors; mine portal wrecked; surface buildings damaged; the tipple set afire in several places; chimneys of two dwelling houses partially demolished; many window lights blown out or shattered in the lamp house, superintendent's office, and private dwellings; and the air duct over a shaft located several hundred feet from the origin of the explosion was damaged.

It required about one week to put the mine and surface plant in condition for normal operation.

SUMMARY OF EVIDENCE AS TO CAUSE, ORIGIN, AND PROPAGATION

From evidence found following the explosion and from statements of the survivors and one man who had left the mine about 5 minutes before the explosion occurred, it has been concluded by the investigators that the explosion had its origin about 400 feet from the mine portal where five timbermen were removing wooden and steel supports. During the course of this work, apparently some of these supports were dislodged, falling on the cotton-braid, jute-insulated, power conductors that parallel the belt conveyor, causing an arc which ignited a coal-dust cloud. The dust cloud presumably was formed by the falling material colliding with the belt conveyor, belt-conveyor supporting frame, and the mine floor. Apparently the arcing caused by the steel beams colliding with the electrical power conductors on the metal frame of the conveyor persisted for several seconds. This was brought out

in a statement (written statements of 3 men in the appendix to this report) made by one of the rescued men, who later died, to the man who rescued him, the statement being to the effect that a fire started when a steel beam dropped on the power conductors and he was attempting to put out the fire when the explosion occurred.

A cable at this point was damaged. The insulation of the cable had been broken and the stranded copper wires showed evidence of recent fusing.

From a statement by a company official, it was learned that the electrical conductors were energized by a motor-generator set on the surface, a distance of about 100 feet from the mine-slope portal. The conductors, two 500,000 circular mil and one about 250,000 circular mil cross section, had a potential of 250 volts direct current and were connected to the trolley wire and mine track at the slope bottom. It was stated that another motor-generator set located at 3 east off 7 south was operating at the time of the explosion. The two motor-generator sets were operating in parallel.

The flame and violence of the explosion were confined to an area of approximately 1,800 feet inby the slope portal and within a radius of several hundred feet on the surface. It is believed that the high incombustible content of dust inby the slope bottom localized the explosion. It is the opinion of the writers that the explosion was caused by an electric arc igniting coal dust put in suspension by dislodged timbers and a fall on the belt conveyor, and was propagated to the surface and bottom of the slope by coal dust that had accumulated along the belt conveyor.

LESSONS LEARNED FROM THE CONDITIONS AS THEY RELATE TO THE EXPLOSION

In the opinion of the writers, there are three outstanding lessons learned from the explosion which are as follows:

1. That all coal should be thoroughly wetted when dumped from mine cars; and it should be sprayed at intervals of not more than 100 feet when transported by a conveyor to the surface.

2. That accumulations of coal and coal dust from around the conveyor and conveyor entry should be loaded out of the mine daily.

3. That electric power conductors should not be installed on slopes paralleling conveyors that transport coal to the surface unless they be in conduit and recessed into the rib or floor.

RECOMMENDATIONS

The following recommendations bearing on conditions surrounding this disaster are made here with the view of preventing a recurrence of a similar type of accident. The recommendations made in the Federal mine inspection report of this mine and submitted in February, 1942, should be complied with.

1. The belt-conveyor slope should be thoroughly cleaned and rock-dusted.

2. All power cables except signal wires of a potential not higher than 24 volts should be removed from the belt-conveyor slope or they should be placed in conduit that is installed in recesses in the rib or floor.

3. Water sprays should be installed at the crossover dump and at not more than 100-foot intervals along the conveyor-belt line to wet the coal and allay the coal dust.

4. All loose roof should be taken down or timbered, and consideration should be given to guniting the slope entry.

ACKNOWLEDGMENT

The writers wish to acknowledge the courtesies extended and the helpful assistance given by the officials of the Hitchman Coal and Coke Company. The cooperation of the West Virginia Department of Mines, the Ohio Department of Mines, and the officials of the United Mine Workers of America (especially Adolph Pacifico) is also gratefully acknowledged.

Respectfully submitted,

O. V. Simpson
Senior Coal Mine Inspector

K. N. Maize
Coal Mine Inspector

F. E. Griffith
Mining-Electrical Engineer

APPROVED:

_____

J. J. Forbes, Chief
Coal Mine Inspection Division

_____

D. Harrington, Chief
Health and Safety Branch

APPENDIX

AFFIDAVIT OF STEVE SADALY

When I got hold of Dan and asked him how he was, he said he was all right and started talking to me. I didn't even ask him what happened, and he started telling me, and said fall came, and rail fell on cable and he said it caused a little fire, but it got the best of him, and he started to put it out. His face was very badly burned, but he said he could see a little bit. When walking him out, he said he could see, and I told him to step over the timber, which he did. His trousers were burned off up to the waist. His left hip was burned badly. I held him by having an arm around his shoulder. We walked 100 feet back through the mine, then through a break-through, and then walked 800 feet out to the surface.

Benwood, W. Va.,

May 19, 1942.

AFFADAVIT OF LORELL PATTERSON

Well I went down to see what the trouble was. Dan said the car wouldn't go back in. He said there was stone on the rail, and he wanted me to pull the car back up. He said to pull it up about a foot, and then he said to drop it back in. Then I saw there was one man up on the timbers, above the car, and I turned around and came on back out to the slope, and went up into the hoist room, and I pulled the car up, and then they belled me to let it go back in, and I let the car back in, and Hardy belled me to pull the empty back up. I had about four raps on the drum. I then heard the crack and saw the flame.

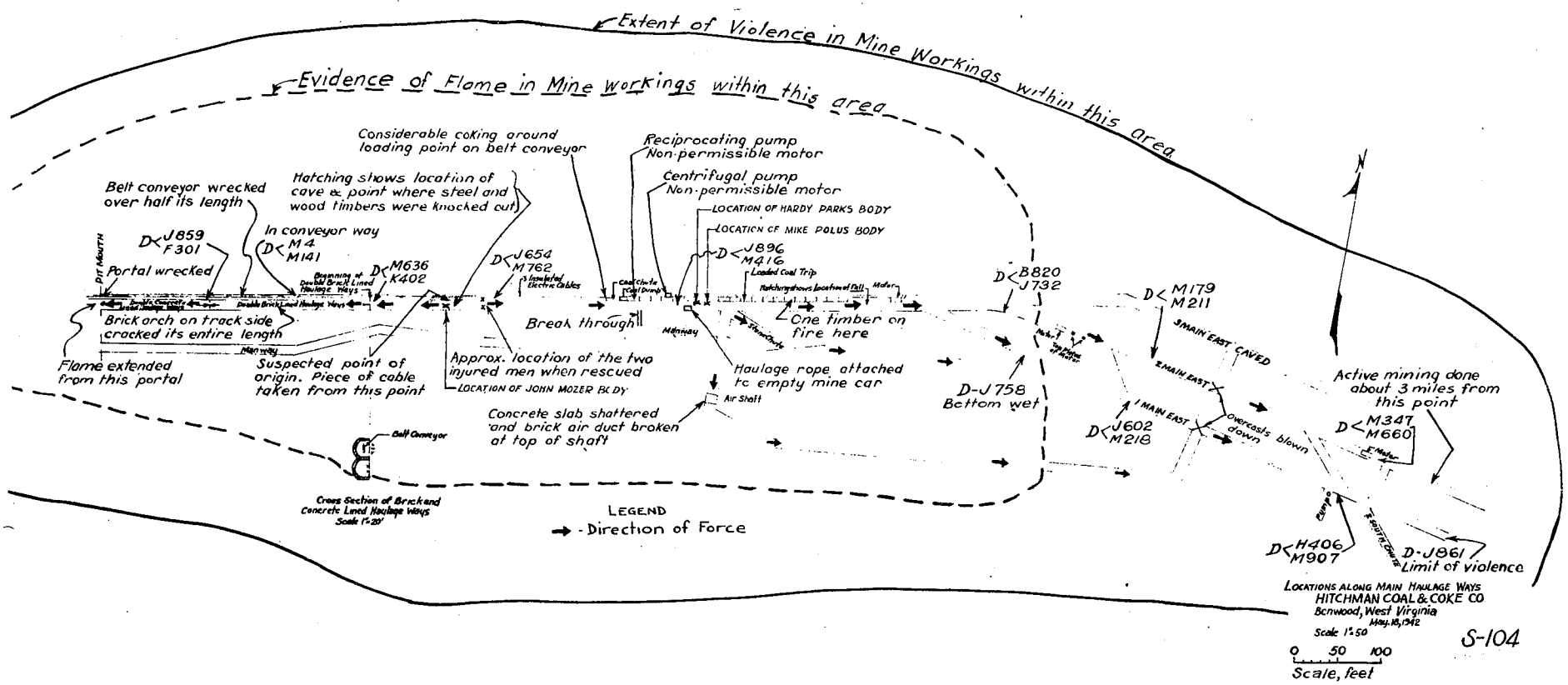
Benwood, W. Va.,

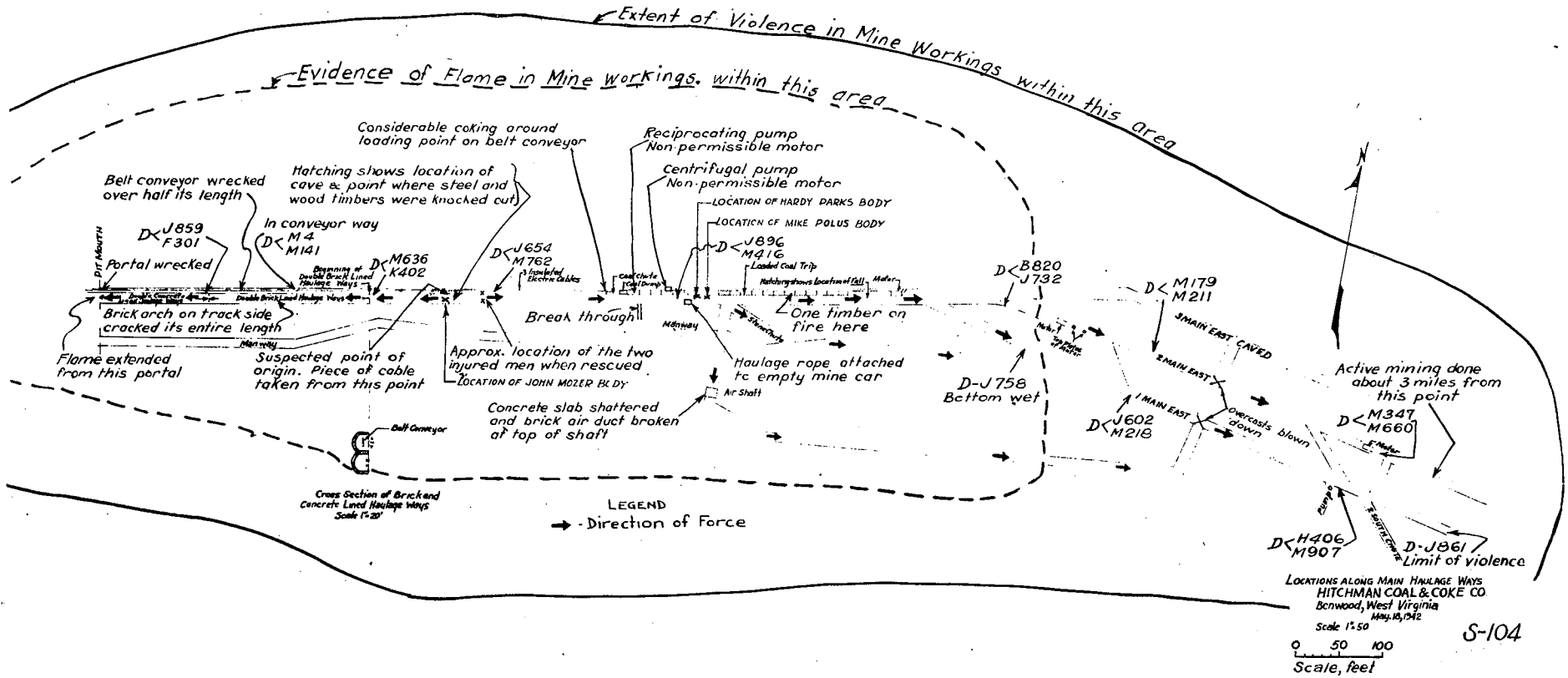
May 19, 1942.

As I got to the bottom I heard someone moaning, and I called to Steve Sadaly to come back with me and help me with these men. So Steve comes up, and we see "Dutch" is pretty well burned and all his clothes torn off. The first thing when I picked him up and asked what happened, he said rail fell down on cable, causing fire. I helped him out of the mine, holding him up by his one arm. He walked pretty good, but wanted to take a rest once in a while, which we did. We walked 100 feet back through mine, through the break-through and 800 feet out to the surface.

Benwood, W. Va.,

May 19, 1942.


Extent of Violence in Mine Workings within this area
Evidence of Flame in Mine workings within this area
Considerable coking around loading point on belt conveyor
Reciprocating pump Non-permissible motor
Centrifugal pump Non-permissible motor
Belt conveyor wrecked over half its length
Hatching shows location of cave & point where steel and wood timbers were knocked out
In conveyor way D< M4 M141
D< J859 F301
Portal wrecked
Pit Mouth
D< M636 K402
D< J654 M762
3 Insulated Electric Cables
LOCATION OF HARDY PARKS BODY
LOCATION OF MIKE POLUS BODY
D< J896 M416
Loaded Coal Trip
Hatching shows Location of Fall
D< B820 J732
D< M179 M211
3 MAIN EAST CAVED
2 MAIN EAST
1 MAIN EAST
Brick arch on track side cracked its entire length
Break through
One timber on fire here
Flame extended from this portal
Suspected point of origin. Piece of cable taken from this point
Approx. location of the two injured men when rescued
LOCATION OF JOHN MOZER BODY
Haulage rope attached to empty mine car
Air Shaft
D-J 758 Bottom wet
D< J602 M218
overcasts blown down
Active mining done about 3 miles from this point
D< M347 M660
Concrete slab shattered and brick air duct broken at top of shaft
Belt Conveyor
Cross Section of Brick and Concrete Lined Haulage Ways Scale 1"=20'
LEGEND
→ - Direction of Force
D< H406 M907
D-J861 Limit of violence
LOCATIONS ALONG MAIN HAULAGE WAYS
HITCHMAN COAL & COKE CO
Benwood, West Virginia
May 18, 1942
Scale 1"=50
0 50 100
Scale, feet
S-104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D-J758 Bottom wet
D< J602 M218
1 MAIN EAST
2 MAIN EAST
3 MAIN EAST CAVED
Overcasts blown
Active mining done about 3 miles from this point
D< M347 M660
D< H406 M907
D-J861 Limit of violence
Cross Section of Brick and Concrete Lined Haulage Ways Scale 1"=20'
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LOCATIONS ALONG MAIN HAULAGE WAYS
HITCHMAN COAL & COKE CO.
Benwood, West Virginia
May 18, 1942
Scale 1"=50
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Scale, feet
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THE WHEELING INTELLIGENCER.

TUESDAY, MAY 19, 1942.

ATE MONDAY

FEDERAL BUREAU OF MINES HAD FORSEEN BLAST DANGER

MINE OFFICIALS ADVISED LAST FEBRUARY TO TAKE PRECAUTIONS

The federal Bureau of Mines issued a statement from Washington last night, in which it was asserted that its coal mine inspectors had advised the management of the Hitchman mine to take steps to prevent just such an accident as took place yesterday morning.

Dr. R. R. Sayers, director of the bureau, said the inspectors of February 7 advised the management that measures should be taken to improve the ventilation and to control combustible coal dust by rock dusting the mine and by using water to allay coal dust at points where it was created underground.

(A spokesman for the Hitchman company declared "we have been raking every precaution. We have been complying with the recommendations of the federal mine inspectors as rapidly as possible.")

(This source indicated that already a system had been devised for changing the ventilation, and said that recently a water condition had developed in the blast area that would seem to have settled any coal dust.)

("Nobody," declared the spokesman, "ventured an opinion as to what caused the explosion.")

The statement said that engineers who hastened to the scene of the accident reported that a cloud of coal dust was thrown into the air by falling timbers or rock on the main coveyor slope 500 feet from the mine portal, and that the explosive dust probably was ignited by a spark from a fallen electric wire.

Warned of Dust

The statement asserted that after visiting the mine last February, the inspectors posted a preliminary report at the mine mouth suggesting the management act to neutralize coal dust in the mine.

They reported that extensive accumulations of coal dust were observed also on the frame of the main slope rubber belt conveyer and on the floor in the immediate vicinity.

The bureau said samples of dust showed it contained insufficient rock dust to prevent it from being explosive. The inspectors recommended that a sprinkling system should be installed at the bottom of the main slope where the coal is dumped onto the conveyor belt.

The bureau said the inspectors also advised that the mine's ventilating system be improved to dilute nethane gas, an explosive natural gas.

Theq also recommended substandard electrical installations and the surface plant should be made safe, better illuminations and the surface plant should be made safe, better illumination should be provided in surface shops and all exposed machinery and belts should be guarded. They recommended that proper fire protection be provided above and below ground and that the men be searched frequently for smoking articles.

HITCHMAN MINE EXPLOSION REPORT IS MADE PUBLIC

THE WHEELING INTELLIGENCER. MONDAY, JULY 13, 1942.

BUREAU OF MINES STATES STEPS TAKEN TO LOWER DANGER

A report, just released by the Bureau of Mines of the Department of Interior, Washington, on the explosion in the Benwood mine of the Hitchman Coal & Coke Company when five miners were killed on May 18, states the company has adopted several recommendations for controlling combustible coal dust and eliminating the ignition hazards, Dr. R. R. Sayers, director of the Bureau of Mines, added that the mine's ventilating system has been improved and other changes made to increase safety.

A careful study of evidence by the federal inspectors, supplemented by statements made by two of the victims, resulted in the following conclusions by the Bureau of Mines men regarding the explosion. Secretary of the Interior Harold L. Ickes disclosed in making public the results of the bureau's investigation into the causes of the disaster:

That a cloud of combustible coal dust was thrown into suspension when timbers and steel supports in the main conveyor slope of the mine became dislodged; that this dust was ignited by an electric arc which resulted when one of the steel supports struck the 250-volt power lines on the metal frame of the conveyor and that the explosion traveled to the surface and also toward the interior of the mine by igniting other coal dust which had accumulated along the belt conveyor.

After studying the disaster report, the management wrote Dr. Sayers that although they do not concur with the theories advanced by the bureau investigators "as to the cause of the explosion and the various comments ((in the report) we are in full accord that every precaution should be taken for safety of operation, and improvements are being made as rapidly as possible."

Sprinkler System

The management notified Dr. Sayers that, in compliance with the Federal investigators' suggestions, the mine has installed a sprinkling system at the bottom of the slope to allay coal dust where the coal is dumped on the conveyor; the coal dust has been loaded out and the slope has been rock dusted thoroughly; power lines have been removed both from the main slope and the manway slope; the ventilating system has been improved; motors on the tipple have been equipped with suitable fuses and guarded; additional rock-dusting equipment has been purchased for rock dusting the mine.

The Hitchman mine is rated "gassy" by the West Virginia Department of Mines and the mine liberates considerable quantities of the natural gas methane, analyses of air samples revealed. However, there is no statement in the report that methane participated in the May 18 explosion.

In the February inspection report, it was recommended that the mine's ventilating system be improved to dilute methane so it will be rendered harmless. Haulage in the mine at that time was on return air and the disaster report notes that arrangements were being made by the management to improve ventilation and to place haulage on intake air which would lessen ignition dangers and assist in the fighting of possible fires in the mine. Several fires were discovered in the mine by recovery crews after the disaster.

None of the electrical equipment used underground in the Hitchman mine at the times of the disaster was of the permissible type. The February report had advised that all coal-cutting equipment be permissible and that no electric power lines should be on the return air current.

Blast Sessions

Under the heading "Lessons Learned from the Conditions as They Relate to the Explosion," the inspectors listed the following points, some of which reiterate recommendations they made in another portion of their transcript:

"1. All coal should be thoroughly wetted when dumped from mine cars and sprayed at intervals of not more than 100 feet when transported by a conveyor to the surface; 2. Accumulations of coal and coal dust from around the conveyor and conveyor entry should be loaded out of the mine daily; 3. Electric power conductors should not be installed paralleling conveyors that transport coal to the surface unless they be in conduit and recessed into the rib or floor."

Among those who assisted in the recovery work after the explosion were N. P. Rhinehart, chief of the West Virginia Department of Mines; Peter McLinden, West Virginia State inspector at large, and G. R. Waddell, James Sharkey and William Moore, district inspectors for the West Virginia Department of Mines. Gas masks used by some of the recovery crews were furnished by the West Virginia Department of Mines. The Ohio Division of Mines sent a rescue truck with equipment from Bellaire, O. Richard McGee, state inspector of the Ohio Division of Mines, accompanied the truck.

The disaster report was prepared by O. W. Simpson, K. N. Maize and F. E. Griffith, all of the Coal Mine Inspection Division, Health and Safety Service Bureau of Mines.

WHEELING NEWS-REGISTER

THURSDAY EVENING, MAY 28, 1942

Inspector, Mine Cited by Jury

The coroner's jury investigating the deaths of three miners, Michael Polis, John Mojzer and Hardy Parks, Sr., in the Hitchman mine explosion at Benwood on May 18, returned their verdict last evening after a three-day investigation, holding the Hitchman Coal and Coke company officials and the state mine inspector, jointly guilty of negligence in the accidental explosion which instantly killed the three.

The verdict signed by acting coroner, Squire Chester A. Burke, and Daniel J. Hanley, foreman, and the following members of the coroner's jury: George Greathouse, Steve Holly, Othel Butts, Frank Kralovic, Jr., and Harold Burkett reads as follows:

"The three came to accidental death through an explosion at the Hitchman Coal & Coke company mine at Benwood, W. Va., on the 18th day of May, 1942, the said accident being due to neglect on the part of the state mine inspector and the officials of the Hitchman Coal & Coke company, a corporation."

State and federal mine inspectors were called before the jury, as were eight miners who escaped from the blast-shattered mine mouth unharmed. The jury's verdict recognized recommendations by the federal mine department for safeguards to render the mine more safe.