UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINE EXPLOSION

File No. 2556

Mine Katherine No. 4 Location Lumberport, Harrison County, W. Va.

Company Katherine Coal Mining Company Mailing address same

Date March 25, 1944 Time of day 1:03 a.m. ~~p.m.~~ p.m. Mine working or idle

Total employment 125 Underground 115 Shifts worked ____ Daily production (tons) 1200

Number men killed 16 Injured ____ In mine ____

Number men escaped unassisted 0 Rescued ____ Barricaded ____

Type (gas or dust) gas Ignition source arcing Rock-dusted yes but insufficient

Was breathing apparatus used yes Gas masks ____ Self-rescuers ____

Time required to reach explosion area Rescue party located at 11 AM Mar. 3. 1944

Classification (gassy or nongassy) nongassy Methane exhausted (24 hours) ____

Number of main fans 1 Quantity air per minute 77,000

Ventilation (continuous or split) split Face (line brattice or fans) ____

Mine openings 3 drifts Principal drift

Coalbed Pittsburgh Thickness 7 1/2' Volatile ratio .46 Roof shale Floor clay

Mining system room and pillar Pillars extracted n/a

Room support: Main entries ____ Intermediate ____ Section ____

Transportation: Main trolley locomotives Intermediate none Section cable and locomotive

Electricity (voltage ac or dc) ____ Face 250 D.C. Portable lights permissible cap lamps

Principal mining machinery (continuous miners, conventional, etc.) conventional

Was machinery permissible type not Was it permissible ____

Blasting and explosives: Coal Coal Grading or special use permissibles

Cause of explosion fire ignited methane air mixture

Did explosion result in fire or were fires found ____

Point of origin No. 22 crosscut and No. 2 room

Area affected entire mine and damaged the surface

Was Bureau report made yes Author(s) D. K. Grove, M. C. McCall, W. Dan Wilkes, Jr.

If no Bureau report, what and by whom ____

Remarks ____

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PRELIMINARY REPORT OF EXPLOSION
KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY
LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA
MARCH 25, 1944

By

M. C. McCall
Mining Engineer

and

E. E. Quenon
Mining Engineer

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Cancelled 4/1/47

PRELIMINARY REPORT OF EXPLOSION
KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY
LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA
MARCH 25, 1944

By M. C. McCall and E. B. Quenon

Nature of Disaster

Gas and dust explosion.

Name of Mine

Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, Harrison County, West Virginia.

Time of Explosion

About 1:05 a.m., March 25, 1944, with 16 men in the mine, all of whom were killed when the explosion occurred.

Kind of Mine

The mine is opened by three drifts in the Pittsburgh coal bed, a high-volatile bituminous coal with pronounced cleavage planes, and which averages about 84 inches in thickness in this vicinity. The bed dips slightly to the southeast.

Method of Mining

Mining, to date, consists of entry development. The three drift openings are increased to 5 entries about 75 feet inby the portals. The mine consists of 3 main entries driven northwest for 3,100 feet; 5 No. 1 right dip entries driven east for 2,000 feet; and 5 No. 1 left headings, off the No. 1 right dip entries, driven 800 feet. The No. 1 right dip entries are narrowed to two entries where they pass under a creek about 1,500 feet from the main entries, and again are increased to 5 entries. The room-and-pillar system of mining will be followed. Coal is loaded into mine cars by Joy loading machines. This mine is an extension of the No. 3 mine, although they are not connected underground.

Number of Employees

Seventy-five men are employed underground, divided into two shifts.

Production

The daily average production is 1,200 tons of coal.

Gassy or Nongassy

The mine is rated gassy by the West Virginia Department of Mines.

Lighting

Permissible electric cap lamps are used for portable illumination underground. Officials carry permissible flame safety lamps.

Coal Dust

The coal dust in this mine is explosive. A large quantity of dust was blown from the mine by the explosion.

Coal Cutting

Coal is top cut and sheared by mining machines which are in the mine and could not be examined. The writers do not know whether or not the underground electrical equipment is permissible.

Haulage

Haulage is by trolley and cable-reel locomotives.

Explosives

Cardox is used for blasting.

Rock-Dusting

The mine was rock-dusted, but apparently, as results show, the rock dust was applied in insufficient quantity.

Watering

Water or wetting agents were not used to allay coal dust.

Ventilation

The mine is ventilated by two splits with air induced by a 6-foot Aerodyne fan. The superintendent said that 41,000 cubic feet of air a minute was used to ventilate the main entries, and 36,000 cubic feet of air a minute circulated through the No. 1 right dip entries. The fire-boss books were not made available to the writers. It was reported that these books were locked up by orders from representatives of the West Virginia Department of Mines.

Extent and Violence

It is believed that the explosion traversed the entire mine. It was so violent that the concrete slabs which formed the roofs of the mine portals,

and which were reinforced with 80-pound steel rails, were demolished, as were the concrete-block walls of the portals. The blacksmith shop and the repair shop that were about 190 feet from the portals were badly damaged. The fan, slightly offset from the line of the right drift opening and protected by a weak-wall air duct, was blown about 30 feet from its base and badly damaged. Trees about 300 feet from and in front of the portals were charred, and some debris was blown about 1,200 feet from the portals. Two automobiles in front of the portals, about 300 feet distant, were badly damaged by violence, and the flames from the explosion set them afire. The surface over the No. 1 right dip entries where they were reduced to 2 entries was broken by the blast. The cover at this point was 12 feet thick.

Probable Origin

According to the superintendent, a night-shift mining-machine crew cut and sheared two places in the main entries on March 24 and then moved the machine into No. 5 main entry inby the second crosscut from the face. They left the machine shortly before 11 p.m. to eat lunch. Return to the machine at 11 p.m. was impossible because of a fire in that location. Several attempts to approach the fire by various routes failed, and the section foreman removed all the men, 49 in number, from the mine. The general mine foreman, the superintendent, and the district State mine inspector were notified.

The general mine foreman, when he arrived at the mine, organized a crew of 12 men to combat the fire and accompanied them into the mine.

The superintendent entered the mine following his arrival and met the general foreman with six men and a locomotive returning to the surface for additional supplies. The mine foreman returned to the scene of the fire, and the superintendent accompanied the men going for supplies. The supply crew was augmented by two men while the supplies were being loaded into cars. The telephone in the mine office rang just as the supply trip was loaded, and the superintendent answered it. The trip had gone into the mine when he returned, and one man was walking into the mine entrance. The superintendent searched for and found his cane, which had been misplaced while the supplies were being loaded. He started toward the mine and was in front of the repair-shop doors when the explosion occurred. The pioneer wave blew him into the shop were two men were working. The blast threw them under a loading machine in the shop, and this protected them from flying debris.

State Inspectors and Bureau Employees Present

The West Virginia Department of Mines was represented by: Jesse Redyard, Chief, and Messrs. E. Y. McVey, Jos. Bierer, Peter McLinden, Alex Bryce, P. J. McGraw, M. G. Dobbie, Geo. McIntyre, C. I. Bennett, Kenneth Williams, and C. F. Pride.

The U. S. Bureau of Mines was represented by:

T. J. McDonald who arrived at the mine at 8:30 a.m., March 25.
A. Metcalfe who arrived at the mine at 8:30 a.m., March 25.
A. K. Bloom who arrived at the mine at 9:30 a.m., March 25.
W. D. Walker, Jr. who arrived at the mine at 11:00 a.m., March 25.
E. E. Quenon who arrived at the mine at 12:15 p.m., March 25.
M. C. McCall who arrived at the mine at 12:15 p.m., March 25.
H. B. McNary who arrived at the mine at 9 a.m., March 27.

Story of Recovery Operations

A rescue crew wearing oxygen breathing apparatus entered the mine at 7:30 p.m., March 25, to determine the condition of the No. 2 main entry, and to examine locations for seals inby the No. 1 right dip entries. This crew advanced about 600 feet in the No. 2 main entry and crossed to the No. 1 main entry. Several members of the party at the fresh-air base about 50 feet outside of the mine were overcome by carbon monoxide during this exploration. The team came out of the mine at 8:00 p.m. and assisted in caring for members of the fresh-air-base crew, several of whom were hospitalized.

Plans to erect seals in the main entries inby 1 right dip entries were abandoned, and temporary brattice-cloth stoppings were erected in the three drifts about 20 feet inby the portals. These were completed at 2:15 a.m., March 26. A second explosion at 4:00 a.m., March 26, destroyed the temporary seals, and flame extended about 50 feet outside of the mine.

Erection of temporary seals was again started by four employees of the company and Quenon, McDonald, and McCall of the Bureau of Mines, about 1:00 p.m., March 26. A third explosion, at 1:35 p.m., damaged the frames for these seals which had not yet been covered with brattice cloth. Flame from this explosion did not reach the surface, but the forces blew six of the men working on the seals about without injuring them. Dust and fine coal were blown for a distance of 300 feet outside the mine.

Following this explosion, the above seven men and A. K. Bloom of the Bureau of Mines returned and completed the temporary seals at 2:50 p.m.

Construction of permanent cinder-block stoppings, equipped with doors and sampling pipes, was started immediately outby the three temporary seals at 7:30 a.m., March 28. These were completed at 5:00 p.m. of the same day.

Recovery of the bodies and investigation of the explosion will be done when conditions permit.

Conclusions and recommendations cannot be made because of a lack of sufficient information.

Acknowledgment

The writers are appreciative of the willingness of the company officials to cooperate and the courtesy shown by them. Acknowledgment is also made of the cooperation extended by the West Virginia Department of Mines.

Respectfully submitted,

M. C. McCALL
Mining Engineer

E. E. QUENON
Mining Engineer

Approved:

E. H. DENNY, Chief
Coal Mine Inspection Division

D. HARRINGTON, Chief
Health and Safety Service

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FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By

G. W. Grove
Supervising Engineer
District A

M. C. McCall
Mining Engineer

W. Dan Walker, Jr.
Coal-Mine Inspector

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By G. W. Grove, M. C. McCall, and W. Dan Walker, Jr.

INTRODUCTION

Two mine fires occurred near the faces of the main entries in the Katherine No. 4 mine of the Katherine Coal Mining Company, Lumberport, Harrison County, West Virginia, about 11 p.m., March 24, 1944. One of these fires, a minor one, occurred at the nip of a mining machine in the No. 5 entry, inby the third crosscut from the face. The other fire, which was the major one, occurred at the second crosscut from the face in the No. 2 entry. The fire apparently resulted from a short circuit between the trolley wire and the return cable, which were suspended on hangers about 12 inches apart; the cause may have been a fall of roof-coal and rock on the wires or the nips of a cable-reel locomotive attached at this point.

A crew was organized to fight the fires, and the men in this crew were killed by an explosion which occurred about 1:03 a.m., March 25, 1944. This explosion traversed the entire mine and did extensive damage on the surface.

The mine officials stated that the mine was rock-dusted throughout.

The Bureau of Mines at Pittsburgh, Pennsylvania, learned of the fire and explosion through a radio-news broadcast about 7 a.m., and notified representatives at Fairmont, West Virginia, of the disaster about 7:30 a.m., March 25, 1944.

Bureau of Mines personnel arrived at the mine as follows:

T. J. McDonald	8:30 a.m., March 25, 1944
A. Metcalfe	8:30 a.m., March 25, 1944
A. K. Bloom	9:30 a.m., March 25, 1944
W. D. Walker, Jr.	11:00 a.m., March 25, 1944
E. E. Quenon	12:15 p.m., March 25, 1944
M. C. McCall	12:15 p.m., March 25, 1944
H. B. McNary	9:00 a.m., March 27, 1944

Plans were made to seal the fire, and the representatives of the various participating agencies were assigned to each of the three shifts.

GENERAL INFORMATION

Katherine No. 4 mine is near Lumberport, Harrison County, West Virginia, and is served by the Baltimore and Ohio Railroad. It is owned by the Katherine Coal Mining Company of Lumberport, West Virginia. The operating officials are as follows:

The preliminary report of this disaster stated that the mine was rated gassy by the West Virginia Department of Mines. This erroneous statement was based on information obtained at the mine during the time the mine was being sealed. The State inspector's report of his last inspection, prior to the fire and explosion, rates the mine nongassy.

The mine was fire-bossed by the section foremen, and the superintendent said they marked their initials and the date of the inspection near the faces of the places examined.

Blowers or booster fans were not used underground.

Two gas wells penetrate the coal bed on the tract to be mined in the No. 4 mine. One of these is plugged and will be protected by a coal pillar 200 feet square. The other well is active and will be protected by a coal pillar 150 feet square.

Air samples had never been collected by the Bureau of Mines in the No. 4 mine prior to the fire. Air samples were collected on August 3, 1944, after the investigation of the source of the fire had been completed and before normal ventilation had been established, and the analyses are listed in table 1.

TABLE 1. - Analyses of air samples collected in Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, Harrison County, W. Va., August 3, 1944. Analyzed August 5, 1944, in Bureau of Mines gas laboratory, Pittsburgh, Pa., collector P. P. Senio

Bot. No.	Location in mine	Percent				Cu. ft. air a minute
		CO_2	O_2	CH_4	N_2	
916	Crosscut face of No. 1 main	0.05	20.72	0.34	78.89	-
915	Face No. 2 main	.06	20.87	.00	79.07	-
927	Face No. 3 main	.10	20.90	.07	78.93	-
906	Face No. 4 main	.05	20.61	.09	79.25	-
928	Face No. 5 main	.15	20.82	.10	78.93	-
905	Return at fan	.06	20.78	.02	79.14	77,000

Five of the six air samples collected contained methane in small quantities and establish the fact that methane is liberated at the faces of the main entries, but because of the ventilating conditions at the time the samples were collected, definite conclusions regarding the quality of the air prior to the fire cannot be made.

Information in this report, which relates to conditions in the mine prior to the explosion, was gained by observations made during the investigation and from officials at the mine.

This mine is dry, except for a local depression between the 17th and 19th crosscuts on the main entries and in the No. 1 dip entries to the 3d crosscut where water and a fall of roof prevented further exploration. All

All of the 20 samples contained coked dust.

The analyses of the dust samples indicate that the mine was inadequately rock-dusted and the mixed rock dust and coal dust did not contain 65 percent incombustible matter.

Main-line haulage was done with a 10-ton trolley locomotive. Secondary and gathering haulage was done with three 8-ton and one 6-ton cable-reel locomotives.

Haulage in the main entries and the No. 1 left entries off the No. 1 right dip entries was in intake air. Haulage in the No. 1 right dip entries was in return air from the No. 1 left entries to the face.

Permissible electric cap lamps were used for portable illumination underground. All switches and doors were illuminated by incandescent electric lights, as were various other places in the mine.

Six permissible flame safety lamps were maintained at this mine for use by the supervising officials.

The local operating officials and the superintendent said that methane had been detected with flame safety lamps used by the foremen acting as fire bosses and that the findings had been recorded in a fire-boss book, which was not made available and is in the possession of the district State mine inspector.

Smoking was permitted and practiced underground.

Electrical equipment used underground, in addition to the locomotives previously mentioned, included 2 Jeffrey 29 U, 1 Jeffrey 29 C, and 1 Jeffrey 29 B mining machines, 2 portable pumps, 3 hand-held electric drills, 3 Joy loading machines, 1 air compressor, and 1 low-pressure rock-dusting machine. All of this equipment, except the Jeffrey 29 U mining machines and two of the Joy loaders, are of the nonpermissible type.

Electricity is transmitted into the mine by a "6/0" trolley wire and an insulated cable as 250 volts direct current. A bare cable and the track rails are used for the return circuit. Power wires are confined to intake air, except that positive and negative cables are extended from the main haulage entry across Nos. 3 and 4 main entries near the faces, and the power wires near the faces of the No. 1 right dip entries are in return air from the No. 1 left entries off the No. 1 right dip entries. Cut-out switches for the main and the dip entries are located about 300 feet inby the mine portal.

Electrical equipment is kept in good repair.

Electric cables are spliced underground by the operators of the equipment.

There are no telephones or permanent electrical stations underground.

March 23, 1944	1:00 p.m.	Br. 29.6
March 24, 1944	1:00 p.m.	Br. 29.6
March 25, 1944	1:00 a.m.	Br. 29.66, initial explosion 1:05 a.m.
March 25, 1944	1:00 p.m.	Br. 29.67
March 26, 1944	1:00 a.m.	Br. 29.78
March 26, 1944	4:00 a.m.	Br. 29.85, second explosion
March 26, 1944	1:00 p.m.	Br. 29.90
March 27, 1944	1:35 p.m.	Br. 29.65, third explosion
March 27, 1944	1:00 p.m.	Br. 29.7
March 28, 1944	1:00 a.m.	Br. 30.05
March 28, 1944	1:00 p.m.	Br. 30.15
March 29, 1944	1:00 a.m.	Br. 30.0

It is believed that changes in barometric pressure had no bearing on the causes of these explosions.

STORY OF FIRE, EXPLOSIONS, AND RECOVERY OPERATIONS

Inspection of this mine had been impossible at the time the preliminary report was written, and the information included in that report was obtained from various officials and employees at the mine. In the preliminary report it was stated that a night-shift mining-machine crew had cut and sheared two places in the main entries on March 24, 1944, and then moved the mining machine into the No. 5 main entry inby the second crosscut from the face. They left the machine shortly before 11 p.m. to eat lunch. Return to the machine about 11 p.m. was impossible because of a fire in that location. Several attempts to approach the fire failed, and all of the 49 men in the mine were removed.

The superintendent, general mine foreman, and the district State mine inspector were notified.

The night-shift foreman organized a crew of 12 men to combat the fire and accompanied them into the mine. The general mine foreman entered the mine immediately after his arrival.

The superintendent entering the mine met the mine foreman with a locomotive and six men returning to the surface for supplies to build stoppings. The mine foreman stated that a large fire was burning in the mine, but he did not indicate its location. He asked the superintendent to accompany the men from the mine and supervise the loading of the supplies. The mine foreman then returned to the fire.

The superintendent assisted with and supervised the loading of the supplies, and his office telephone rang as the trip was ready to enter the mine. The men with the supply crew were joined by two more men during the loading of the supplies. When the superintendent returned to enter the mine, the supply trip had gone, and while he was looking for his cane an explosion occurred in the mine. This explosion blew the superintendent into the repair shop and under a Joy loading machine.

the main entries. Fourteen bodies were located while the ventilation was being restored. The other two bodies were located about 11 a.m., August 3, 1944.

Representatives of the Bureau of Mines, the West Virginia Department of Mines, and the United Mine Workers of America participated in an investigation of the disaster on August 2, 1944. The same group of men, State-maintained mine rescue teams, Katherine Coal Mining Company officials, and workmen explored and ventilated the mine.

INVESTIGATION OF CAUSE OF EXPLOSION

On August 2, 1944, the origin and cause of the fire were investigated by Messrs. G. W. Grove, M. C. McCall, W. D. Walker, Jr., T. J. McDonald, P. P. Senio, and B. B. Udy of the Bureau of Mines; Jesse Redyard, P. J. McGraw, M. G. Dobbie, C. I. Bennet, T. B. Hornor, and K. Williams of the West Virginia Department of Mines; and Paul K. Reed and C. Fremont Davis of the United Mine Workers of America.

The first and second explosions traversed the entire mine and flame extended for at least 300 feet and 60 feet, respectively, outside of the mine. Flame from the first explosion set fire to two automobiles 300 feet in front of the mine portals. Forces of the first explosion destroyed the masonry of the mine portals and the fan duct. They damaged and moved the fan, and damaged the repair shop, the blacksmith shop, the sand house, and the mine office. Debris, including door hinges, a 1-quart fire extinguisher, and some concrete blocks, was blown about 1/4 mile from the mine portals.

Bent track rails, bent trolley-wire hangers, dislodged timbers, and coke deposits indicate that the explosions traveled the left-hand entry of the 5 main north entries and expanded across the other 4 entries and toward the mine portals.

The investigators, advancing in the mine on the main haulageway or the No. 2 entry of the 5 main entries, encountered water at the No. 17 crosscut between Nos. 2 and 3 entries. This water extended almost to the No. 19 crosscut. The supply locomotive with one car and another locomotive with one car were found on the main haulageway inby the No. 18 crosscut between Nos. 2 and 3 entries and opposite a crosscut to No. 1 entry. Five bodies were located near the supply locomotive, with two of them under the locomotive and one of them partly under it. The locomotive controller was in the "on" position, and this locomotive had knocked the car attached to the other locomotive off the track. It is evident that the supply locomotive was in motion when the first explosion occurred, that the men were blown off, and two of them were run over. Two bodies were later found in the crosscut near the No. 1 entry and two others were found in the No. 18 crosscut. The mine foreman's and the night-shift foreman's bodies were found at the No. 19 crosscut. One body was found on No. 3 entry inby No. 20 crosscut, and four bodies were found in the No. 19 crosscut between Nos. 3 and 4 entries.

The men attempting to erect temporary seals near the fire had placed a brattice-cloth seal in the No. 1 entry inby the No. 20 crosscut; a canvas door opposite this temporary seal and in the No. 2 entry served as a

The greatest evidence of fire was near the point where the fall was on the trolley wire, and the fire appeared to radiate from this point. It extended from a point just inby No. 21 crosscut to a point just inby No. 23 crosscut on the No. 2 entry. It extended through the line of crosscuts No. 22 across entries Nos. 3 and 4 almost to No. 5 entry. The fire burned for short distances on either side of the crosscuts into the Nos. 3 and 4 entries and into two crosscuts from No. 2 entry to No. 1 entry. It also burned for a short distance from entry No. 2 into the No. 23 crosscut toward No. 3 entry.

The investigators decided that this fire originated at the point where the fall of coal and rock covered the trolley wire and return cable at No. 22 crosscut and No. 2 entry. This decision is based on several factors: (1) The greatest evidence of fire is in the vicinity of this fall; (2) the fire extended in the three openings leading from this point; and (3) the trolley wire and return cable showed much evidence of electrical burns. The return cable was severed by an electric arc, and the trolley wire had burned apart at several points under the fall.

It is believed that either (1) a fall of a small amount of roof coal dislodged the power wires or (2) that the trolley wire was pulled from a hanger by the strain on the locomotive cable and caused the trolley wire to contact the return cable. These two power wires were suspended from the roof and supported on parallel hangers.

Evidence found under the fall of roof and rock, after the fall was cleaned up, showed that the combustible debris on the floor was consumed but that large pieces of coal which fell with the rock were not burned.

The second theory is substantiated by the fact that the transfer switch on the locomotive was in position to reel the cable, and the car at the loading machine was loaded. The reverse lever on the controller was in the position to move outby from the machine.

The evidence underground substantiates the fact that the major fire originated on No. 2 entry at crosscut No. 22. The testimonies given at the coroner's inquest do not agree with preponderance of evidence found underground.

A canvas door in No. 21 crosscut between Nos. 2 and 3 entries was found latched open. This open door would have short-circuited the ventilation away from the faces of the entries and would have permitted methane and fire fumes to accumulate. It is believed that fumes from the fire and gas from a clay vein near the face of No. 1 entry accumulated and extended to the fire, causing the initial explosion. A flame safety lamp was used and gas was detected in the crosscut turned near the face of No. 1 entry during exploration of the area. An air sample collected in this crosscut during the investigation contained 0.34 percent methane.

It is assumed from the work which was being done, that the mine foreman believed the ventilation of the main north entry faces to be normal and was attempting to seal the fire under this assumption.

ACKNOWLEDGMENT

The writers express their appreciation of the courtesies shown and the cooperation extended by the officials of the company and representatives of the West Virginia Department of Mines.

Respectfully submitted,

G. W. GROVE
Supervising Engineer
District A

M. C. McCALL
Mining Engineer

W. DAN WALKER, JR.
Coal-Mine Inspector

APPENDIX

List of Persons Killed

Name	Address (W. Va.)	Age	Dependent children
John Spiker	Lumberport	51	-
Glen Ashcraft	Lumberport	29	2
Roy Barnett	Gypsy	32	1
Hartsel Cutlip	Lumberport	32	4
John Comer	Shinnston	62	3*
Dan Drummond	Lumberport	27	1
Junior Stort	Lumberport	29	3
John Senchina	Shinnston	24	1
Charles M. Wagner	Enterprise	45	-
Oscar Felix	Shinnston	37	1
Noel Helms	Fairmont	43	11
Charles Miller	Lumberport	54	1
Harold McCormick	Brown	29	2
Grayson Schoolcraft	Dola	39	3
George Shawhan	Lumberport	38	2
John Payne	Wallace	30	4

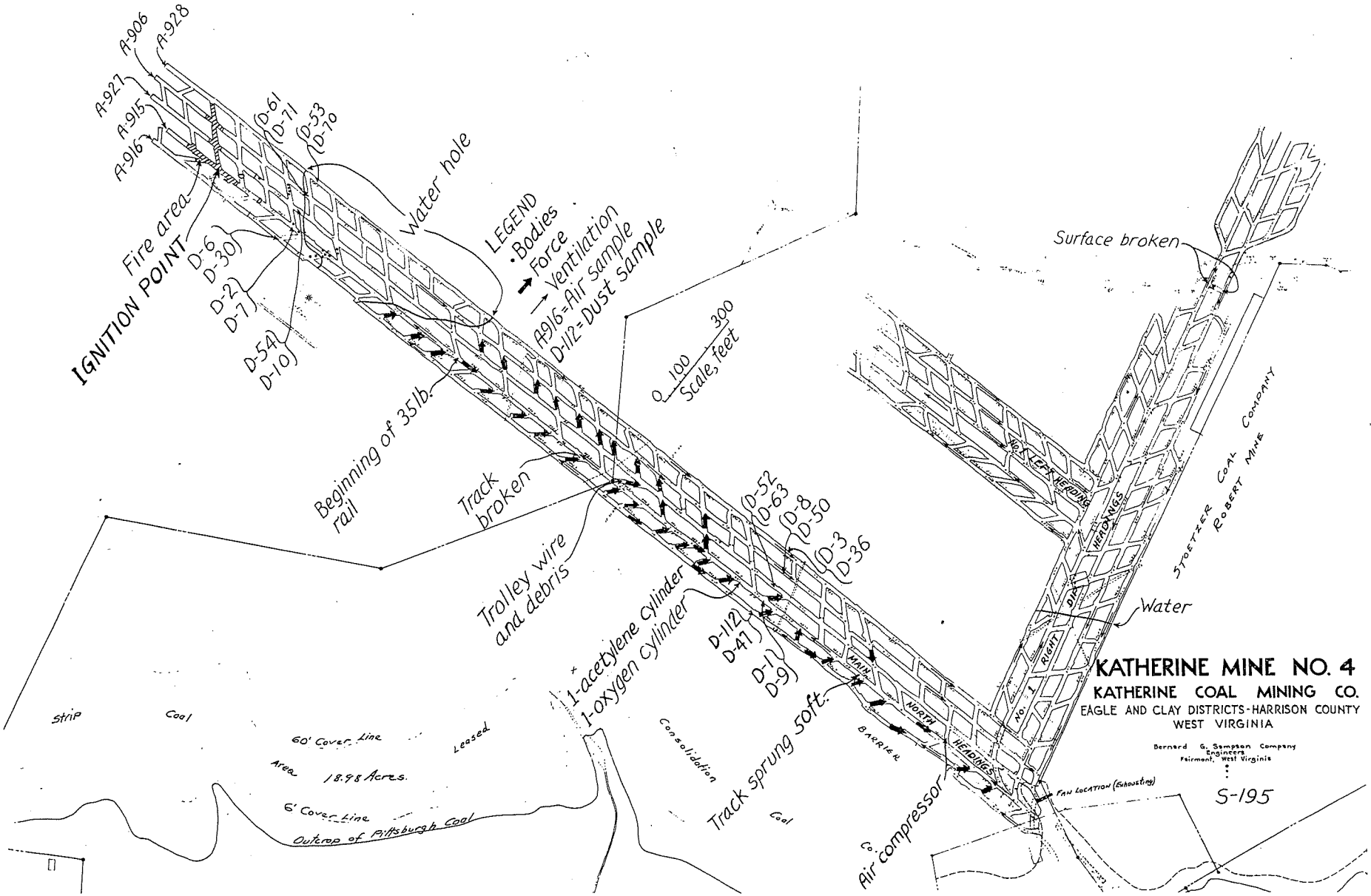
*Grandchildren

Analyses of air samples from sealed Katherine No. 4 mine,
Katherine Coal Mining Company,
Lumberport, West Virginia

Date	Time	Bot. No.	Seal No.	Percent					
				CO_2	O_2	H_2	CO	CH_4	N_2
3/28/44	7:40 a.m.	180	1	1.60	16.03	0.50	1.30	1.58	78.99
	7:40 a.m	179	2	1.00	17.80	.40	.85	1.01	78.94
	7:40 a.m.	531	3	1.05	17.44	.51	1.05	1.10	78.85
	4:15 p.m.	519	1	1.49	16.10	.58	1.41	1.40	79.02
	4:20 p.m.	520	2	.09	20.81	.00	.02	.05	79.03
	5:00 p.m.	389	3	1.32	16.72	.41	1.16	1.41	78.98
3/29/44	12:15 p.m.	604	1	1.88	15.05	.42	1.27	2.08	79.30
	11:45 a.m.	505	2	1.91	14.95	.44	1.31	2.20	79.19
	noon	603	3	1.75	15.16	.59	1.35	1.93	79.22
3/30/44	10:55 a.m.	716	1	2.40	13.55	.52	1.30	2.73	79.50
	10:30 a.m.	506	2	2.28	14.00	.57	1.36	2.44	79.35
	10:45 a.m.	717	3	2.27	13.77	.48	1.42	2.64	79.42
3/31/44	1:35 p.m.	729	2	.13	20.75	.00	.02	.05	79.05
	1:45 p.m.	728	3	2.78	12.68	.56	1.38	3.12	79.48
4/2/44	9:15 a.m.	514	2	3.78	10.34	.45	1.48	4.31	79.64
	9:25 a.m.	513	3	3.50	10.85	.60	1.48	4.05	79.52
4/3/44	1:40 p.m.	512	2	4.20	9.30	-	1.50	5.10	79.90
	1:50 p.m.	511	3	2.56	13.66	.25	.92	3.07	79.54
4/5/44	1:50 p.m.	159	2	4.9	7.3	-	1.5	6.5	79.8
	2:00 p.m.	160	3	4.6	8.1	-	1.5	6.3	79.5
4/10/44	9:45 a.m.	151	2	5.0	5.0	-	1.6	9.2	79.2
	10:00 a.m.	152	3	4.9	5.4	-	1.4	8.9	79.4
4/12/44	11:10 a.m.	173	2	4.9	4.7	-	1.5	10.2	78.7
4/14/44	2:10 p.m.	391	2	4.8	3.9	-	1.5	11.7	78.1
4/20/44	1:45 p.m.	393	2	4.4	3.5	-	1.4	14.5	76.2
	2:00 p.m.	394	1	3.8	5.7	-	1.2	12.7	76.6
4/24/44	9:45 a.m.	195	1	3.8	4.5	-	1.2	14.8	75.7
	9:35 a.m.	196	2	3.7	4.9	-	1.1	14.9	75.4
4/27/44	noon	670	1	3.7	4.3	-	1.1	16.1	74.8
	11:55 a.m.	671	2	4.0	2.8	-	1.4	17.3	74.5
4/29/44	4:00 p.m.	697	1	3.9	2.6	-	1.1	18.2	74.2
	4:00 p.m.	696	2	3.9	2.6	-	1.1	18.3	74.1
5/3/44	3:00 p.m.	688	1	3.8	2.4	-	1.1	19.8	72.9
	2:55 p.m.	689	2	3.8	2.5	-	1.1	19.8	72.8
5/5/44	6:00 p.m.	477	1	3.6	3.3	-	1.0	19.4	72.7
	6:05 p.m.	478	2	3.8	2.0	-	1.0	20.8	72.4
5/8/44	3:40 p.m.	678	1	3.7	2.2	-	.96	21.5	71.64
	3:30 p.m.	679	2	3.6	2.4	-	.99	21.1	71.91
5/11/44	5:30 p.m.	686	1	3.7	1.7	-	.91	22.7	70.99
	5:25 p.m.	687	2	3.6	1.8	-	.85	22.9	70.85
5/14/44	2:20 p.m.	471	1	3.5	2.4	-	.72	22.7	70.68
	2:15 p.m.	472	2	3.5	1.9	-	.80	23.3	70.50

Analyses of air samples from sealed Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia (Cont'd.)

Date	Time	Bot. No.	Seal No.	Percent					
				CO_2	O_2	H_2	CO	CH_4	N_2
5/16/44	4:03 p.m.	475	1	3.3	2.8	-	0.71	22.8	70.39
	4:00 p.m.	476	2	3.5	1.6	-	.71	24.0	70.19
5/19/44	8:00 p.m.	790	1	3.5	1.1	-	.70	25.6	69.10
	8:03 p.m.	791	2	3.2	2.9	-	.61	23.3	69.99
5/23/44	8:38 p.m.	798	1	3.0	3.3	-	.52	24.1	69.08
	8:35 p.m.	799	2	3.3	1.9	-	.56	25.3	68.94
5/26/44	2:55 p.m.	709	1	3.3	1.3	-	.53	26.9	67.97
	2:53 p.m.	710	2	3.4	1.1	-	.57	27.3	67.63
5/30/44	3:40 p.m.	696	1	3.3	1.2	-	.43	28.3	66.77
	3:38 p.m.	742	2	3.3	.9	-	.54	28.3	66.96
6/2/44	3:52 p.m.	187	1	3.1	2.1	-	.48	27.4	66.92
	3:46 p.m.	188	2	3.1	1.8	-	.48	27.7	66.92
6/8/44	5:55 p.m.	404 S	1	3.2	.8	-	.35	30.1	65.55
	5:58 p.m.	405 I	2	3.1	1.5	-	.45	29.0	65.95
6/10/44	3:35 p.m.	155	1	3.1	.7	-	.32	29.8	66.08
	3:30 p.m.	156	2	3.0	2.1	-	.33	27.9	66.67
6/14/44	5:03 p.m.	171	1	3.1	.9	-	.24	30.3	65.46
	5:00 p.m.	172	2	3.2	.5	-	.24	30.8	62.26
6/19/44	2:20 p.m.	569	1	2.6	4.2	-	.20	25.4	67.60
	2:15 p.m.	570	2	3.1	.2	-	.23	31.9	64.57
6/21/44	7:38 p.m.	384 M	1	3.1	.6	-	.22	32.3	63.78
	7:35 p.m.	385 D	2	3.0	.9	-	.22	31.9	63.98
6/24/44	5:48 a.m.	370 N	1	2.9	1.2	-	.19	31.6	64.11
	5:45 a.m.	371 S	2	3.0	.4	-	.19	32.9	63.51
6/28/44	3:20 p.m.	432 D	1	2.9	.9	-	.15	33.1	62.95
	3:15 p.m.	467 I	2	2.9	1.8	-	.14	31.1	64.06
7/1/44	4:25 p.m.	389	1	2.8	1.2	-	.13	33.2	62.67
	4:20 p.m.	390	2	3.0	.2	-	.12	34.3	62.38
7/5/44	4:45 p.m.	912	1	3.0	.3	-	.11	35.1	61.49
	4:48 p.m.	919	2	2.8	.6	-	.12	34.9	61.58
7/9/44	8:05 p.m.	163	1	2.9	.6	-	.08	35.0	61.42
	8:08 p.m.	164	2	2.6	2.2	-	.07	32.0	63.13
7/12/44	9:15 p.m.	422	1	2.8	.5	-	.09	35.8	60.81
	9:13 p.m.	423 I	2	2.7	1.1	-	.09	34.6	61.51
7/15/44	2:35 p.m.	193	1	2.5	2.6	-	.07	32.4	62.43
	2:34 p.m.	194	2	2.8	1.0	-	.07	35.5	60.63
7/19/44	3:00 p.m.	406 D	1	2.8	.1	-	.05	38.6	58.45
	3:15 p.m.	407 I	2	2.8	.1	-	.06	38.7	58.34
7/22/44	3:30 p.m.	951	1	2.7	.4	-	.06	38.8	58.04
	3:35 p.m.	952	2	2.7	.4	-	.06	38.9	57.94
7/26/44	3:20 p.m.	547	1	2.4	3.0	-	.02	34.1	60.48
7/29/44	2:48 p.m.	424 N	1	2.7	.4	-	.02	40.1	56.78
	2:45 p.m.	425 D	2	2.7	.5	-	.02	40.5	56.28


A-906
A-928
A-927
A-915
A-916
D-61
D-71
D-53
D-70
Water hole
Fire area
IGNITION POINT
D-6
D-30
D-2
D-7
D-54
D-10
LEGEND
• Bodies
→ Force
→ Ventilation
A916=Air sample
D-112=Dust sample
0 100 300
Scale, feet
Beginning of 35lb. rail
Track broken
Trolley wire and debris
D-52
D-63
D-8
D-50
D-3
D-36
1-acetylene Cylinder
1-oxygen Cylinder
D-112
D-47
D-1
D-9
Track sprung 50ft.
Air compressor
Surface broken
Water
KATHERINE MINE NO. 4
KATHERINE COAL MINING CO.
EAGLE AND CLAY DISTRICTS-HARRISON COUNTY
WEST VIRGINIA
Bernard G. Sampson Company
Engineers
Fairmont, West Virginia
S-195
Strip Coal
60' Cover Line
Leased
Area 18.98 Acres.
6' Cover Line
Outcrop of Pittsburgh Coal
Consolidation Coal
MAIN
NORTH
BARRIER
HEADINGS
No. 1 RIGHT
No. 1 LEFT HEADING
HEADINGS
DIP
FAN LOCATION (Exhausting)
STOETZER COAL COMPANY
ROBERT MINE

FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By

G. W. Grove
Supervising Engineer
District A

M. C. McCall
Mining Engineer

W. Dan Walker, Jr.
Coal-Mine Inspector

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CONTENTS

FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By G. W. Grove, M. C. McCall, and W. Dan Walker, Jr.

INTRODUCTION

Two mine fires occurred near the faces of the main entries in the Katherine No. 4 mine of the Katherine Coal Mining Company, Lumberport, Harrison County, West Virginia, about 11 p.m., March 24, 1944. One of these fires, a minor one, occurred at the nip of a mining machine in the No. 5 entry, inby the third crosscut from the face. The other fire, which was the major one, occurred at the second crosscut from the face in the No. 2 entry. The fire apparently resulted from a short circuit between the trolley wire and the return cable, which were suspended on hangers about 12 inches apart; the cause may have been a fall of roof-coal and rock on the wires or the nips of a cable-reel locomotive attached at this point.

A crew was organized to fight the fires, and the men in this crew were killed by an explosion which occurred about 1:03 a.m., March 25, 1944. This explosion traversed the entire mine and did extensive damage on the surface.

The mine officials stated that the mine was rock-dusted throughout.

The Bureau of Mines at Pittsburgh, Pennsylvania, learned of the fire and explosion through a radio-news broadcast about 7 a.m., and notified representatives at Fairmont, West Virginia, of the disaster about 7:30 a.m., March 25, 1944.

Bureau of Mines personnel arrived at the mine as follows:

T. J. McDonald	8:30 a.m., March 25, 1944
A. Metcalfe	8:30 a.m., March 25, 1944
A. K. Bloom	9:30 a.m., March 25, 1944
W. D. Walker, Jr.	11:00 a.m., March 25, 1944
E. E. Quenon	12:15 p.m., March 25, 1944
M. C. McCall	12:15 p.m., March 25, 1944
H. B. McNary	9:00 a.m., March 27, 1944

Plans were made to seal the fire, and the representatives of the various participating agencies were assigned to each of the three shifts.

GENERAL INFORMATION

Katherine No. 4 mine is near Lumberport, Harrison County, West Virginia, and is served by the Baltimore and Ohio Railroad. It is owned by the Katherine Coal Mining Company of Lumberport, West Virginia. The operating officials are as follows:

The preliminary report of this disaster stated that the mine was rated gassy by the West Virginia Department of Mines. This erroneous statement was based on information obtained at the mine during the time the mine was being sealed. The State inspector's report of his last inspection, prior to the fire and explosion, rates the mine nongassy.

The mine was fire-bossed by the section foremen, and the superintendent said they marked their initials and the date of the inspection near the faces of the places examined.

Blowers or booster fans were not used underground.

Two gas wells penetrate the coal bed on the tract to be mined in the No. 4 mine. One of these is plugged and will be protected by a coal pillar 200 feet square. The other well is active and will be protected by a coal pillar 150 feet square.

Air samples had never been collected by the Bureau of Mines in the No. 4 mine prior to the fire. Air samples were collected on August 3, 1944, after the investigation of the source of the fire had been completed and before normal ventilation had been established, and the analyses are listed in table 1.

TABLE 1. - Analyses of air samples collected in Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, Harrison County, W. Va., August 3, 1944. Analyzed August 5, 1944, in Bureau of Mines gas laboratory, Pittsburgh, Pa., collector P. P. Senio

Bot. No.	Location in mine	Percent				Cu. ft. air a minute
		CO_2	O_2	CH_4	N_2	
916	Crosscut face of No. 1 main	0.05	20.72	0.34	78.89	-
915	Face No. 2 main	.06	20.87	.00	79.07	-
927	Face No. 3 main	.10	20.90	.07	78.93	-
906	Face No. 4 main	.05	20.61	.09	79.25	-
928	Face No. 5 main	.15	20.82	.10	78.93	-
905	Return at fan	.06	20.78	.02	79.14	77,000

Five of the six air samples collected contained methane in small quantities and establish the fact that methane is liberated at the faces of the main entries, but because of the ventilating conditions at the time the samples were collected, definite conclusions regarding the quality of the air prior to the fire cannot be made.

Information in this report, which relates to conditions in the mine prior to the explosion, was gained by observations made during the investigation and from officials at the mine.

This mine is dry, except for a local depression between the 17th and 19th crosscuts on the main entries and in the No. 1 dip entries to the 3d crosscut where water and a fall of roof prevented further exploration. All

All of the 20 samples contained coked dust.

The analyses of the dust samples indicate that the mine was inadequately rock-dusted and the mixed rock dust and coal dust did not contain 65 percent incombustible matter.

Main-line haulage was done with a 10-ton trolley locomotive. Secondary and gathering haulage was done with three 8-ton and one 6-ton cable-reel locomotives.

Haulage in the main entries and the No. 1 left entries off the No. 1 right dip entries was in intake air. Haulage in the No. 1 right dip entries was in return air from the No. 1 left entries to the face.

Permissible electric cap lamps were used for portable illumination underground. All switches and doors were illuminated by incandescent electric lights, as were various other places in the mine.

Six permissible flame safety lamps were maintained at this mine for use by the supervising officials.

The local operating officials and the superintendent said that methane had been detected with flame safety lamps used by the foremen acting as fire bosses and that the findings had been recorded in a fire-boss book, which was not made available and is in the possession of the district State mine inspector.

Smoking was permitted and practiced underground.

Electrical equipment used underground, in addition to the locomotives previously mentioned, included 2 Jeffrey 29 U, 1 Jeffrey 29 C, and 1 Jeffrey 29 B mining machines, 2 portable pumps, 3 hand-held electric drills, 3 Joy loading machines, 1 air compressor, and 1 low-pressure rock-dusting machine. All of this equipment, except the Jeffrey 29 U mining machines and two of the Joy loaders, are of the nonpermissible type.

Electricity is transmitted into the mine by a "6/0" trolley wire and an insulated cable as 250 volts direct current. A bare cable and the track rails are used for the return circuit. Power wires are confined to intake air, except that positive and negative cables are extended from the main haulage entry across Nos. 3 and 4 main entries near the faces, and the power wires near the faces of the No. 1 right dip entries are in return air from the No. 1 left entries off the No. 1 right dip entries. Cut-out switches for the main and the dip entries are located about 300 feet inby the mine portal.

Electrical equipment is kept in good repair.

Electric cables are spliced underground by the operators of the equipment.

There are no telephones or permanent electrical stations underground.

March 23, 1944	1:00 p.m.	Br. 29.6
March 24, 1944	1:00 p.m.	Br. 29.6
March 25, 1944	1:00 a.m.	Br. 29.66, initial explosion 1:05 a.m.
March 25, 1944	1:00 p.m.	Br. 29.67
March 26, 1944	1:00 a.m.	Br. 29.78
March 26, 1944	4:00 a.m.	Br. 29.85, second explosion
March 26, 1944	1:00 p.m.	Br. 29.90
March 27, 1944	1:35 p.m.	Br. 29.65, third explosion
March 27, 1944	1:00 p.m.	Br. 29.7
March 28, 1944	1:00 a.m.	Br. 30.05
March 28, 1944	1:00 p.m.	Br. 30.15
March 29, 1944	1:00 a.m.	Br. 30.0

It is believed that changes in barometric pressure had no bearing on the causes of these explosions.

STORY OF FIRE, EXPLOSIONS, AND RECOVERY OPERATIONS

Inspection of this mine had been impossible at the time the preliminary report was written, and the information included in that report was obtained from various officials and employees at the mine. In the preliminary report it was stated that a night-shift mining-machine crew had cut and sheared two places in the main entries on March 24, 1944, and then moved the mining machine into the No. 5 main entry inby the second crosscut from the face. They left the machine shortly before 11 p.m. to eat lunch. Return to the machine about 11 p.m. was impossible because of a fire in that location. Several attempts to approach the fire failed, and all of the 49 men in the mine were removed.

The superintendent, general mine foreman, and the district State mine inspector were notified.

The night-shift foreman organized a crew of 12 men to combat the fire and accompanied them into the mine. The general mine foreman entered the mine immediately after his arrival.

The superintendent entering the mine met the mine foreman with a locomotive and six men returning to the surface for supplies to build stoppings. The mine foreman stated that a large fire was burning in the mine, but he did not indicate its location. He asked the superintendent to accompany the men from the mine and supervise the loading of the supplies. The mine foreman then returned to the fire.

The superintendent assisted with and supervised the loading of the supplies, and his office telephone rang as the trip was ready to enter the mine. The men with the supply crew were joined by two more men during the loading of the supplies. When the superintendent returned to enter the mine, the supply trip had gone, and while he was looking for his cane an explosion occurred in the mine. This explosion blew the superintendent into the repair shop and under a Joy loading machine.

the main entries. Fourteen bodies were located while the ventilation was being restored. The other two bodies were located about 11 a.m., August 3, 1944.

Representatives of the Bureau of Mines, the West Virginia Department of Mines, and the United Mine Workers of America participated in an investigation of the disaster on August 2, 1944. The same group of men, State-maintained mine rescue teams, Katherine Coal Mining Company officials, and workmen explored and ventilated the mine.

INVESTIGATION OF CAUSE OF EXPLOSION

On August 2, 1944, the origin and cause of the fire were investigated by Messrs. G. W. Grove, M. C. McCall, W. D. Walker, Jr., T. J. McDonald, P. P. Senio, and B. B. Udy of the Bureau of Mines; Jesse Redyard, P. J. McGraw, M. G. Dobbie, C. I. Bennet, T. B. Hornor, and K. Williams of the West Virginia Department of Mines; and Paul K. Reed and C. Fremont Davis of the United Mine Workers of America.

The first and second explosions traversed the entire mine and flame extended for at least 300 feet and 60 feet, respectively, outside of the mine. Flame from the first explosion set fire to two automobiles 300 feet in front of the mine portals. Forces of the first explosion destroyed the masonry of the mine portals and the fan duct. They damaged and moved the fan, and damaged the repair shop, the blacksmith shop, the sand house, and the mine office. Debris, including door hinges, a 1-quart fire extinguisher, and some concrete blocks, was blown about 1/4 mile from the mine portals.

Bent track rails, bent trolley-wire hangers, dislodged timbers, and coke deposits indicate that the explosions traveled the left-hand entry of the 5 main north entries and expanded across the other 4 entries and toward the mine portals.

The investigators, advancing in the mine on the main haulageway or the No. 2 entry of the 5 main entries, encountered water at the No. 17 crosscut between Nos. 2 and 3 entries. This water extended almost to the No. 19 crosscut. The supply locomotive with one car and another locomotive with one car were found on the main haulageway inby the No. 18 crosscut between Nos. 2 and 3 entries and opposite a crosscut to No. 1 entry. Five bodies were located near the supply locomotive, with two of them under the locomotive and one of them partly under it. The locomotive controller was in the "on" position, and this locomotive had knocked the car attached to the other locomotive off the track. It is evident that the supply locomotive was in motion when the first explosion occurred, that the men were blown off, and two of them were run over. Two bodies were later found in the crosscut near the No. 1 entry and two others were found in the No. 18 crosscut. The mine foreman's and the night-shift foreman's bodies were found at the No. 19 crosscut. One body was found on No. 3 entry inby No. 20 crosscut, and four bodies were found in the No. 19 crosscut between Nos. 3 and 4 entries.

The men attempting to erect temporary seals near the fire had placed a brattice-cloth seal in the No. 1 entry inby the No. 20 crosscut; a canvas door opposite this temporary seal and in the No. 2 entry served as a

The greatest evidence of fire was near the point where the fall was on the trolley wire, and the fire appeared to radiate from this point. It extended from a point just inby No. 21 crosscut to a point just inby No. 23 crosscut on the No. 2 entry. It extended through the line of crosscuts No. 22 across entries Nos. 3 and 4 almost to No. 5 entry. The fire burned for short distances on either side of the crosscuts into the Nos. 3 and 4 entries and into two crosscuts from No. 2 entry to No. 1 entry. It also burned for a short distance from entry No. 2 into the No. 23 crosscut toward No. 3 entry.

The investigators decided that this fire originated at the point where the fall of coal and rock covered the trolley wire and return cable at No. 22 crosscut and No. 2 entry. This decision is based on several factors: (1) The greatest evidence of fire is in the vicinity of this fall; (2) the fire extended in the three openings leading from this point; and (3) the trolley wire and return cable showed much evidence of electrical burns. The return cable was severed by an electric arc, and the trolley wire had burned apart at several points under the fall.

It is believed that either (1) a fall of a small amount of roof coal dislodged the power wires or (2) that the trolley wire was pulled from a hanger by the strain on the locomotive cable and caused the trolley wire to contact the return cable. These two power wires were suspended from the roof and supported on parallel hangers.

Evidence found under the fall of roof and rock, after the fall was cleaned up, showed that the combustible debris on the floor was consumed but that large pieces of coal which fell with the rock were not burned.

The second theory is substantiated by the fact that the transfer switch on the locomotive was in position to reel the cable, and the car at the loading machine was loaded. The reverse lever on the controller was in the position to move outby from the machine.

The evidence underground substantiates the fact that the major fire originated on No. 2 entry at crosscut No. 22. The testimonies given at the coroner's inquest do not agree with preponderance of evidence found underground.

A canvas door in No. 21 crosscut between Nos. 2 and 3 entries was found latched open. This open door would have short-circuited the ventilation away from the faces of the entries and would have permitted methane and fire fumes to accumulate. It is believed that fumes from the fire and gas from a clay vein near the face of No. 1 entry accumulated and extended to the fire, causing the initial explosion. A flame safety lamp was used and gas was detected in the crosscut turned near the face of No. 1 entry during exploration of the area. An air sample collected in this crosscut during the investigation contained 0.34 percent methane.

It is assumed from the work which was being done, that the mine foreman believed the ventilation of the main north entry faces to be normal and was attempting to seal the fire under this assumption.

APPENDIX

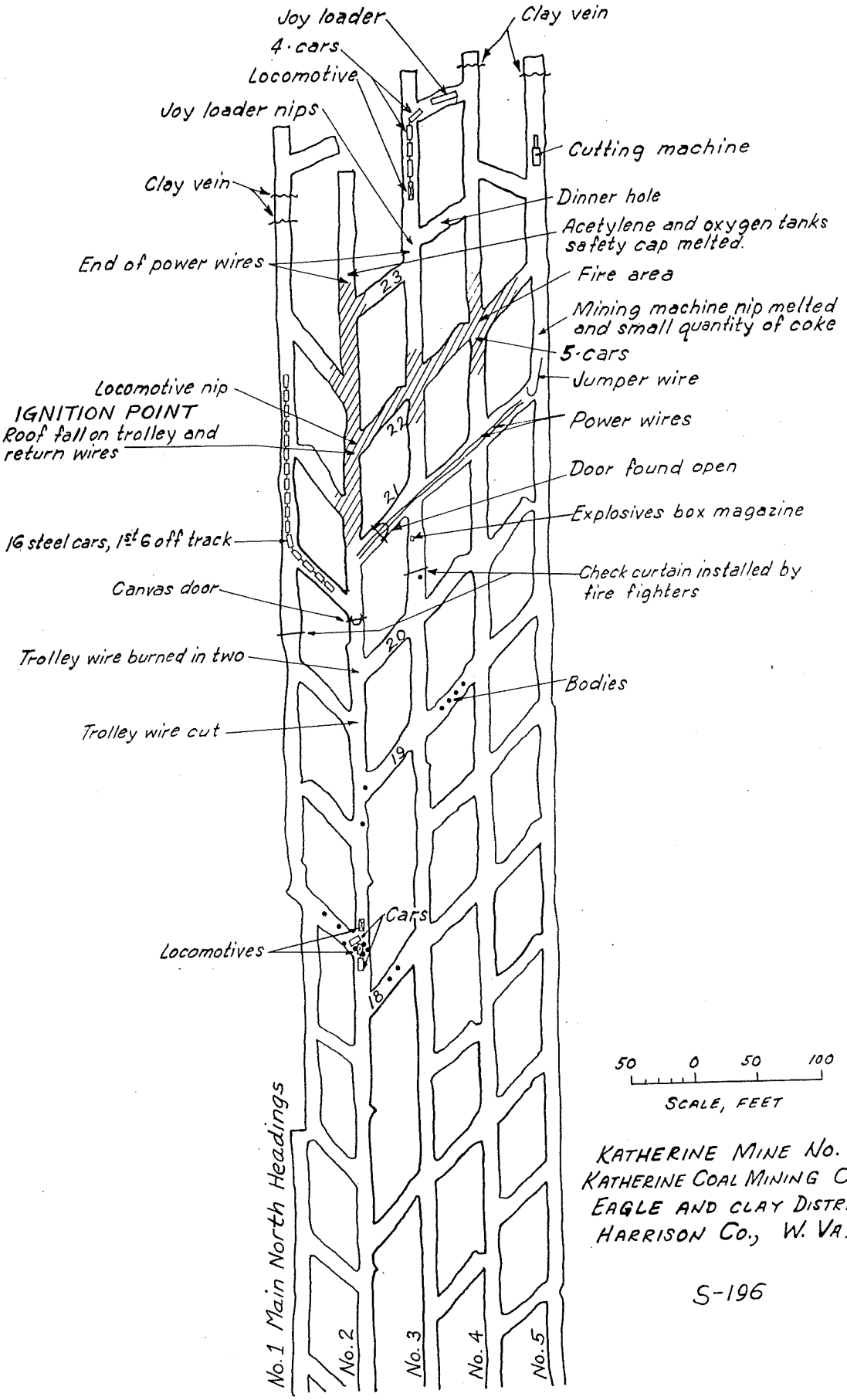
List of Persons Killed

Name	Address (W. Va.)	Age	Dependent children
John Spiker	Lumberport	51	-
Glen Ashcraft	Lumberport	29	2
Roy Barnett	Gypsy	32	1
Hartsel Cutlip	Lumberport	32	4
John Comer	Shinnston	62	3*
Dan Drummond	Lumberport	27	1
Junior Stort	Lumberport	29	3
John Senchina	Shinnston	24	1
Charles M. Wagner	Enterprise	45	-
Oscar Felix	Shinnston	37	1
Noel Helms	Fairmont	43	11
Charles Miller	Lumberport	54	1
Harold McCormick	Brown	29	2
Grayson Schoolcraft	Dola	39	3
George Shawhan	Lumberport	38	2
John Payne	Wallace	30	4

*Grandchildren

Analyses of air samples from sealed Katherine No. 4 mine,
Katherine Coal Mining Company,
Lumberport, West Virginia

Date	Time	Bot. No.	Seal No.	Percent					
				CO_2	O_2	H_2	CO	CH_4	N_2
3/28/44	7:40 a.m.	180	1	1.60	16.03	0.50	1.30	1.58	78.99
	7:40 a.m	179	2	1.00	17.80	.40	.85	1.01	78.94
	7:40 a.m.	531	3	1.05	17.44	.51	1.05	1.10	78.85
	4:15 p.m.	519	1	1.49	16.10	.58	1.41	1.40	79.02
	4:20 p.m.	520	2	.09	20.81	.00	.02	.05	79.03
	5:00 p.m.	389	3	1.32	16.72	.41	1.16	1.41	78.98
3/29/44	12:15 p.m.	604	1	1.88	15.05	.42	1.27	2.08	79.30
	11:45 a.m.	505	2	1.91	14.95	.44	1.31	2.20	79.19
	noon	603	3	1.75	15.16	.59	1.35	1.93	79.22
3/30/44	10:55 a.m.	716	1	2.40	13.55	.52	1.30	2.73	79.50
	10:30 a.m.	506	2	2.28	14.00	.57	1.36	2.44	79.35
	10:45 a.m.	717	3	2.27	13.77	.48	1.42	2.64	79.42
3/31/44	1:35 p.m.	729	2	.13	20.75	.00	.02	.05	79.05
	1:45 p.m.	728	3	2.78	12.68	.56	1.38	3.12	79.48
4/2/44	9:15 a.m.	514	2	3.78	10.34	.45	1.48	4.31	79.64
	9:25 a.m.	513	3	3.50	10.85	.60	1.48	4.05	79.52
4/3/44	1:40 p.m.	512	2	4.20	9.30	-	1.50	5.10	79.90
	1:50 p.m.	511	3	2.56	13.66	.25	.92	3.07	79.54
4/5/44	1:50 p.m.	159	2	4.9	7.3	-	1.5	6.5	79.8
	2:00 p.m.	160	3	4.6	8.1	-	1.5	6.3	79.5
4/10/44	9:45 a.m.	151	2	5.0	5.0	-	1.6	9.2	79.2
	10:00 a.m.	152	3	4.9	5.4	-	1.4	8.9	79.4
4/12/44	11:10 a.m.	173	2	4.9	4.7	-	1.5	10.2	78.7
4/14/44	2:10 p.m.	391	2	4.8	3.9	-	1.5	11.7	78.1
4/20/44	1:45 p.m.	393	2	4.4	3.5	-	1.4	14.5	76.2
	2:00 p.m.	394	1	3.8	5.7	-	1.2	12.7	76.6
4/24/44	9:45 a.m.	195	1	3.8	4.5	-	1.2	14.8	75.7
	9:35 a.m.	196	2	3.7	4.9	-	1.1	14.9	75.4
4/27/44	noon	670	1	3.7	4.3	-	1.1	16.1	74.8
	11:55 a.m.	671	2	4.0	2.8	-	1.4	17.3	74.5
4/29/44	4:00 p.m.	697	1	3.9	2.6	-	1.1	18.2	74.2
	4:00 p.m.	696	2	3.9	2.6	-	1.1	18.3	74.1
5/3/44	3:00 p.m.	688	1	3.8	2.4	-	1.1	19.8	72.9
	2:55 p.m.	689	2	3.8	2.5	-	1.1	19.8	72.8
5/5/44	6:00 p.m.	477	1	3.6	3.3	-	1.0	19.4	72.7
	6:05 p.m.	478	2	3.8	2.0	-	1.0	20.8	72.4
5/8/44	3:40 p.m.	678	1	3.7	2.2	-	.96	21.5	71.64
	3:30 p.m.	679	2	3.6	2.4	-	.99	21.1	71.91
5/11/44	5:30 p.m.	686	1	3.7	1.7	-	.91	22.7	70.99
	5:25 p.m.	687	2	3.6	1.8	-	.85	22.9	70.85
5/14/44	2:20 p.m.	471	1	3.5	2.4	-	.72	22.7	70.68
	2:15 p.m.	472	2	3.5	1.9	-	.80	23.3	70.50



KATHERINE MINE No. 4
KATHERINE COAL MINING CO.
EAGLE AND CLAY DISTRICTS
HARRISON CO., W. VA.

S-196

Mr. G. W. Grove

FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By

G. W. Grove
Supervising Engineer
District A

M. C. McCall
Mining Engineer

W. Dan Walker, Jr.
Coal-Mine Inspector

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CONTENTS

FINAL REPORT OF THE MINE FIRES AND EXPLOSIONS KATHERINE NO. 4 MINE, KATHERINE COAL MINING COMPANY LUMBERPORT, HARRISON COUNTY, WEST VIRGINIA MARCH 24 and 25, 1944

By G. W. Grove, M. C. McCall, and W. Dan Walker, Jr.

INTRODUCTION

Two mine fires occurred near the faces of the main entries in the Katherine No. 4 mine of the Katherine Coal Mining Company, Lumberport, Harrison County, West Virginia, about 11 p.m., March 24, 1944. One of these fires, a minor one, occurred at the nip of a mining machine in the No. 5 entry, inby the third crosscut from the face. The other fire, which was the major one, occurred at the second crosscut from the face in the No. 2 entry. The fire apparently resulted from a short circuit between the trolley wire and the return cable, which were suspended on hangers about 12 inches apart; the cause may have been a fall of roof-coal and rock on the wires or the nips of a cable-reel locomotive attached at this point.

A crew was organized to fight the fires, and the men in this crew were killed by an explosion which occurred about 1:03 a.m., March 25, 1944. This explosion traversed the entire mine and did extensive damage on the surface.

The mine officials stated that the mine was rock-dusted throughout.

The Bureau of Mines at Pittsburgh, Pennsylvania, learned of the fire and explosion through a radio-news broadcast about 7 a.m., and notified representatives at Fairmont, West Virginia, of the disaster about 7:30 a.m., March 25, 1944.

Bureau of Mines personnel arrived at the mine as follows:

T. J. McDonald	8:30 a.m., March 25, 1944
A. Metcalfe	8:30 a.m., March 25, 1944
A. K. Bloom	9:30 a.m., March 25, 1944
W. D. Walker, Jr.	11:00 a.m., March 25, 1944
E. E. Quenon	12:15 p.m., March 25, 1944
M. C. McCall	12:15 p.m., March 25, 1944
H. B. McNary	9:00 a.m., March 27, 1944

Plans were made to seal the fire, and the representatives of the various participating agencies were assigned to each of the three shifts.

GENERAL INFORMATION

Katherine No. 4 mine is near Lumberport, Harrison County, West Virginia, and is served by the Baltimore and Ohio Railroad. It is owned by the Katherine Coal Mining Company of Lumberport, West Virginia. The operating officials are as follows:

The preliminary report of this disaster stated that the mine was rated gassy by the West Virginia Department of Mines. This erroneous statement was based on information obtained at the mine during the time the mine was being sealed. The State inspector's report of his last inspection, prior to the fire and explosion, rates the mine nongassy.

The mine was fire-bossed by the section foremen, and the superintendent said they marked their initials and the date of the inspection near the faces of the places examined.

Blowers or booster fans were not used underground.

Two gas wells penetrate the coal bed on the tract to be mined in the No. 4 mine. One of these is plugged and will be protected by a coal pillar 200 feet square. The other well is active and will be protected by a coal pillar 150 feet square.

Air samples had never been collected by the Bureau of Mines in the No. 4 mine prior to the fire. Air samples were oollected on August 3, 1944, after the investigation of the source of the fire had been completed and before normal ventilation had been established, and the analyses are listed in table 1.

TABLE 1. - Analyses of air samples collected in Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, Harrison County, W. Va., August 3, 1944. Analyzed August 5, 1944, in Bureau of Mines gas laboratory, Pittsburgh, Pa., collector P. P. Senio

Bot. No.	Location in mine	Percent				Cu. ft. air a minute
		CO_2	O_2	CH_4	N_2	
916	Crosscut face of No. 1 main	0.05	20.72	0.34	78.89	-
915	Face No. 2 main	.06	20.87	.00	79.07	-
927	Face No. 3 main	.10	20.90	.07	78.93	-
906	Face No. 4 main	.05	20.61	.09	79.25	-
928	Face No. 5 main	.15	20.82	.10	78.93	-
905	Return at fan	.06	20.78	.02	79.14	77,000

Five of the six air samples collected contained methane in small quantities and establish the fact that methane is liberated at the faces of the main entries, but because of the ventilating conditions at the time the samples were collected, definite conclusions regarding the quality of the air prior to the fire cannot be made.

Information in this report, which relates to conditions in the mine prior to the explosion, was gained by observations made during the investigation and from officials at the mine.

This mine is dry, except for a local depression between the 17th and 19th crosscuts on the main entries and in the No. 1 dip entries to the 3d crosscut where water and a fall of roof prevented further exploration. All

All of the 20 samples contained coked dust.

The analyses of the dust samples indicate that the mine was inadequately rock-dusted and the mixed rock dust and coal dust did not contain 65 percent incombustible matter.

Main-line haulage was done with a 10-ton trolley locomotive. Secondary and gathering haulage was done with three 8-ton and one 6-ton cable-reel locomotives.

Haulage in the main entries and the No. 1 left entries off the No. 1 right dip entries was in intake air. Haulage in the No. 1 right dip entries was in return air from the No. 1 left entries to the face.

Permissible electric cap lamps were used for portable illumination underground. All switches and doors were illuminated by incandescent electric lights, as were various other places in the mine.

Six permissible flame safety lamps were maintained at this mine for use by the supervising officials.

The local operating officials and the superintendent said that methane had been detected with flame safety lamps used by the foremen acting as fire bosses and that the findings had been recorded in a fire-boss book, which was not made available and is in the possession of the district State mine inspector.

Smoking was permitted and practiced underground.

Electrical equipment used underground, in addition to the locomotives previously mentioned, included 2 Jeffrey 29 U, 1 Jeffrey 29 C, and 1 Jeffrey 29 B mining machines, 2 portable pumps, 3 hand-held electric drills, 3 Joy loading machines, 1 air compressor, and 1 low-pressure rock-dusting machine. All of this equipment, except the Jeffrey 29 U mining machines and two of the Joy loaders, are of the nonpermissible type.

Electricity is transmitted into the mine by a "6/0" trolley wire and an insulated cable as 250 volts direct current. A bare cable and the track rails are used for the return circuit. Power wires are confined to intake air, except that positive and negative cables are extended from the main haulage entry across Nos. 3 and 4 main entries near the faces, and the power wires near the faces of the No. 1 right dip entries are in return air from the No. 1 left entries off the No. 1 right dip entries. Cut-out switches for the main and the dip entries are located about 300 feet inby the mine portal.

Electrical equipment is kept in good repair.

Electric cables are spliced underground by the operators of the equipment.

There are no telephones or permanent electrical stations underground.

March 23, 1944	1:00 p.m.	Br. 29.6
March 24, 1944	1:00 p.m.	Br. 29.6
March 25, 1944	1:00 a.m.	Br. 29.66, initial explosion 1:05 a.m.
March 25, 1944	1:00 p.m.	Br. 29.67
March 26, 1944	1:00 a.m.	Br. 29.78
March 26, 1944	4:00 a.m.	Br. 29.85, second explosion
March 26, 1944	1:00 p.m.	Br. 29.90
March 27, 1944	1:35 p.m.	Br. 29.65, third explosion
March 27, 1944	1:00 p.m.	Br. 29.7
March 28, 1944	1:00 a.m.	Br. 30.05
March 28, 1944	1:00 p.m.	Br. 30.15
March 29, 1944	1:00 a.m.	Br. 30.0

It is believed that changes in barometric pressure had no bearing on the causes of these explosions.

STORY OF FIRE, EXPLOSIONS, AND RECOVERY OPERATIONS

Inspection of this mine had been impossible at the time the preliminary report was written, and the information included in that report was obtained from various officials and employees at the mine. In the preliminary report it was stated that a night-shift mining-machine crew had cut and sheared two places in the main entries on March 24, 1944, and then moved the mining machine into the No. 5 main entry inby the second crosscut from the face. They left the machine shortly before 11 p.m. to eat lunch. Return to the machine about 11 p.m. was impossible because of a fire in that location. Several attempts to approach the fire failed, and all of the 49 men in the mine were removed.

The superintendent, general mine foreman, and the district State mine inspector were notified.

The night-shift foreman organized a crew of 12 men to combat the fire and accompanied them into the mine. The general mine foreman entered the mine immediately after his arrival.

The superintendent entering the mine met the mine foreman with a locomotive and six men returning to the surface for supplies to build stoppings. The mine foreman stated that a large fire was burning in the mine, but he did not indicate its location. He asked the superintendent to accompany the men from the mine and supervise the loading of the supplies. The mine foreman then returned to the fire.

The superintendent assisted with and supervised the loading of the supplies, and his office telephone rang as the trip was ready to enter the mine. The men with the supply crew were joined by two more men during the loading of the supplies. When the superintendent returned to enter the mine, the supply trip had gone, and while he was looking for his cane an explosion occurred in the mine. This explosion blew the superintendent into the repair shop and under a Joy loading machine.

the main entries. Fourteen bodies were located while the ventilation was being restored. The other two bodies were located about 11 a.m., August 3, 1944.

Representatives of the Bureau of Mines, the West Virginia Department of Mines, and the United Mine Workers of America participated in an investigation of the disaster on August 2, 1944. The same group of men, State-maintained mine rescue teams, Katherine Coal Mining Company officials, and workmen explored and ventilated the mine.

INVESTIGATION OF CAUSE OF EXPLOSION

On August 2, 1944, the origin and cause of the fire were investigated by Messrs. G. W. Grove, M. C. McCall, W. D. Walker, Jr., T. J. McDonald, P. P. Senio, and B. B. Udy of the Bureau of Mines; Jesse Redyard, P. J. McGraw, M. G. Dobbie, C. I. Bennet, T. B. Hornor, and K. Williams of the West Virginia Department of Mines; and Paul K. Reed and C. Fremont Davis of the United Mine Workers of America.

The first and second explosions traversed the entire mine and flame extended for at least 300 feet and 60 feet, respectively, outside of the mine. Flame from the first explosion set fire to two automobiles 300 feet in front of the mine portals. Forces of the first explosion destroyed the masonry of the mine portals and the fan duct. They damaged and moved the fan, and damaged the repair shop, the blacksmith shop, the sand house, and the mine office. Debris, including door hinges, a 1-quart fire extinguisher, and some concrete blocks, was blown about 1/4 mile from the mine portals.

Bent track rails, bent trolley-wire hangers, dislodged timbers, and coke deposits indicate that the explosions traveled the left-hand entry of the 5 main north entries and expanded across the other 4 entries and toward the mine portals.

The investigators, advancing in the mine on the main haulageway or the No. 2 entry of the 5 main entries, encountered water at the No. 17 crosscut between Nos. 2 and 3 entries. This water extended almost to the No. 19 crosscut. The supply locomotive with one car and another locomotive with one car were found on the main haulageway inby the No. 18 crosscut between Nos. 2 and 3 entries and opposite a crosscut to No. 1 entry. Five bodies were located near the supply locomotive, with two of them under the locomotive and one of them partly under it. The locomotive controller was in the "on" position, and this locomotive had knocked the car attached to the other locomotive off the track. It is evident that the supply locomotive was in motion when the first explosion occurred, that the men were blown off, and two of them were run over. Two bodies were later found in the crosscut near the No. 1 entry and two others were found in the No. 18 crosscut. The mine foreman's and the night-shift foreman's bodies were found at the No. 19 crosscut. One body was found on No. 3 entry inby No. 20 crosscut, and four bodies were found in the No. 19 crosscut between Nos. 3 and 4 entries.

The men attempting to erect temporary seals near the fire had placed a brattice-cloth seal in the No. 1 entry inby the No. 20 crosscut; a canvas door opposite this temporary seal and in the No. 2 entry served as a

The greatest evidence of fire was near the point where the fall was on the trolley wire, and the fire appeared to radiate from this point. It extended from a point just inby No. 21 crosscut to a point just inby No. 23 crosscut on the No. 2 entry. It extended through the line of crosscuts No. 22 across entries Nos. 3 and 4 almost to No. 5 entry. The fire burned for short distances on either side of the crosscuts into the Nos. 3 and 4 entries and into two crosscuts from No. 2 entry to No. 1 entry. It also burned for a short distance from entry No. 2 into the No. 23 crosscut toward No. 3 entry.

The investigators decided that this fire originated at the point where the fall of coal and rock covered the trolley wire and return cable at No. 22 crosscut and No. 2 entry. This decision is based on several factors: (1) The greatest evidence of fire is in the vicinity of this fall; (2) the fire extended in the three openings leading from this point; and (3) the trolley wire and return cable showed much evidence of electrical burns. The return cable was severed by an electric arc, and the trolley wire had burned apart at several points under the fall.

It is believed that either (1) a fall of a small amount of roof coal dislodged the power wires or (2) that the trolley wire was pulled from a hanger by the strain on the locomotive cable and caused the trolley wire to contact the return cable. These two power wires were suspended from the roof and supported on parallel hangers.

Evidence found under the fall of roof and rock, after the fall was cleaned up, showed that the combustible debris on the floor was consumed but that large pieces of coal which fell with the rock were not burned.

The second theory is substantiated by the fact that the transfer switch on the locomotive was in position to reel the cable, and the car at the loading machine was loaded. The reverse lever on the controller was in the position to move outby from the machine.

The evidence underground substantiates the fact that the major fire originated on No. 2 entry at crosscut No. 22. The testimonies given at the coroner's inquest do not agree with preponderance of evidence found underground.

A canvas door in No. 21 crosscut between Nos. 2 and 3 entries was found latched open. This open door would have short-circuited the ventilation away from the faces of the entries and would have permitted methane and fire fumes to accumulate. It is believed that fumes from the fire and gas from a clay vein near the face of No. 1 entry accumulated and extended to the fire, causing the initial explosion. A flame safety lamp was used and gas was detected in the crosscut turned near the face of No. 1 entry during exploration of the area. An air sample collected in this crosscut during the investigation contained 0.34 percent methane.

It is assumed from the work which was being done, that the mine foreman believed the ventilation of the main north entry faces to be normal and was attempting to seal the fire under this assumption.

ACKNOWLEDGMENT

The writers express their appreciation of the courtesies shown and the cooperation extended by the officials of the company and representatives of the West Virginia Department of Mines.

Respectfully submitted,

G. W. GROVE
Supervising Engineer
District A

M. C. McCALL
Mining Engineer

W. DAN WALKER, JR.
Coal-Mine Inspector

APPENDIX

List of Persons Killed

Name	Address (W. Va.)	Age	Dependent children
John Spiker	Lumberport	51	-
Glen Ashcraft	Lumberport	29	2
Roy Barnett	Gypsy	32	1
Hartsel Cutlip	Lumberport	32	4
John Comer	Shinnston	62	3*
Dan Drummond	Lumberport	27	1
Junior Stort	Lumberport	29	3
John Senchina	Shinnston	24	1
Charles M. Wagner	Enterprise	45	-
Oscar Felix	Shinnston	37	1
Noel Helms	Fairmont	43	11
Charles Miller	Lumberport	54	1
Harold McCormick	Brown	29	2
Grayson Schoolcraft	Dola	39	3
George Shawhan	Lumberport	38	2
John Payne	Wallace	30	4

*Grandchildren

Analyses of air samples from sealed Katherine No. 4 mine,
Katherine Coal Mining Company,
Lumberport, West Virginia

Date	Time	Bot. No.	Seal No.	Percent					
				CO_2	O_2	H_2	CO	CH_4	N_2
3/28/44	7:40 a.m.	180	1	1.60	16.03	0.50	1.30	1.58	78.99
	7:40 a.m	179	2	1.00	17.80	.40	.85	1.01	78.94
	7:40 a.m.	531	3	1.05	17.44	.51	1.05	1.10	78.85
	4:15 p.m.	519	1	1.49	16.10	.58	1.41	1.40	79.02
	4:20 p.m.	520	2	.09	20.81	.00	.02	.05	79.03
	5:00 p.m.	389	3	1.32	16.72	.41	1.16	1.41	78.98
3/29/44	12:15 p.m.	604	1	1.88	15.05	.42	1.27	2.08	79.30
	11:45 a.m.	505	2	1.91	14.95	.44	1.31	2.20	79.19
	noon	603	3	1.75	15.16	.59	1.35	1.93	79.22
3/30/44	10:55 a.m.	716	1	2.40	13.55	.52	1.30	2.73	79.50
	10:30 a.m.	506	2	2.28	14.00	.57	1.36	2.44	79.35
	10:45 a.m.	717	3	2.27	13.77	.48	1.42	2.64	79.42
3/31/44	1:35 p.m.	729	2	.13	20.75	.00	.02	.05	79.05
	1:45 p.m.	728	3	2.78	12.68	.56	1.38	3.12	79.48
4/2/44	9:15 a.m.	514	2	3.78	10.34	.45	1.48	4.31	79.64
	9:25 a.m.	513	3	3.50	10.85	.60	1.48	4.05	79.52
4/3/44	1:40 p.m.	512	2	4.20	9.30	-	1.50	5.10	79.90
	1:50 p.m.	511	3	2.56	13.66	.25	.92	3.07	79.54
4/5/44	1:50 p.m.	159	2	4.9	7.3	-	1.5	6.5	79.8
	2:00 p.m.	160	3	4.6	8.1	-	1.5	6.3	79.5
4/10/44	9:45 a.m.	151	2	5.0	5.0	-	1.6	9.2	79.2
	10:00 a.m.	152	3	4.9	5.4	-	1.4	8.9	79.4
4/12/44	11:10 a.m.	173	2	4.9	4.7	-	1.5	10.2	78.7
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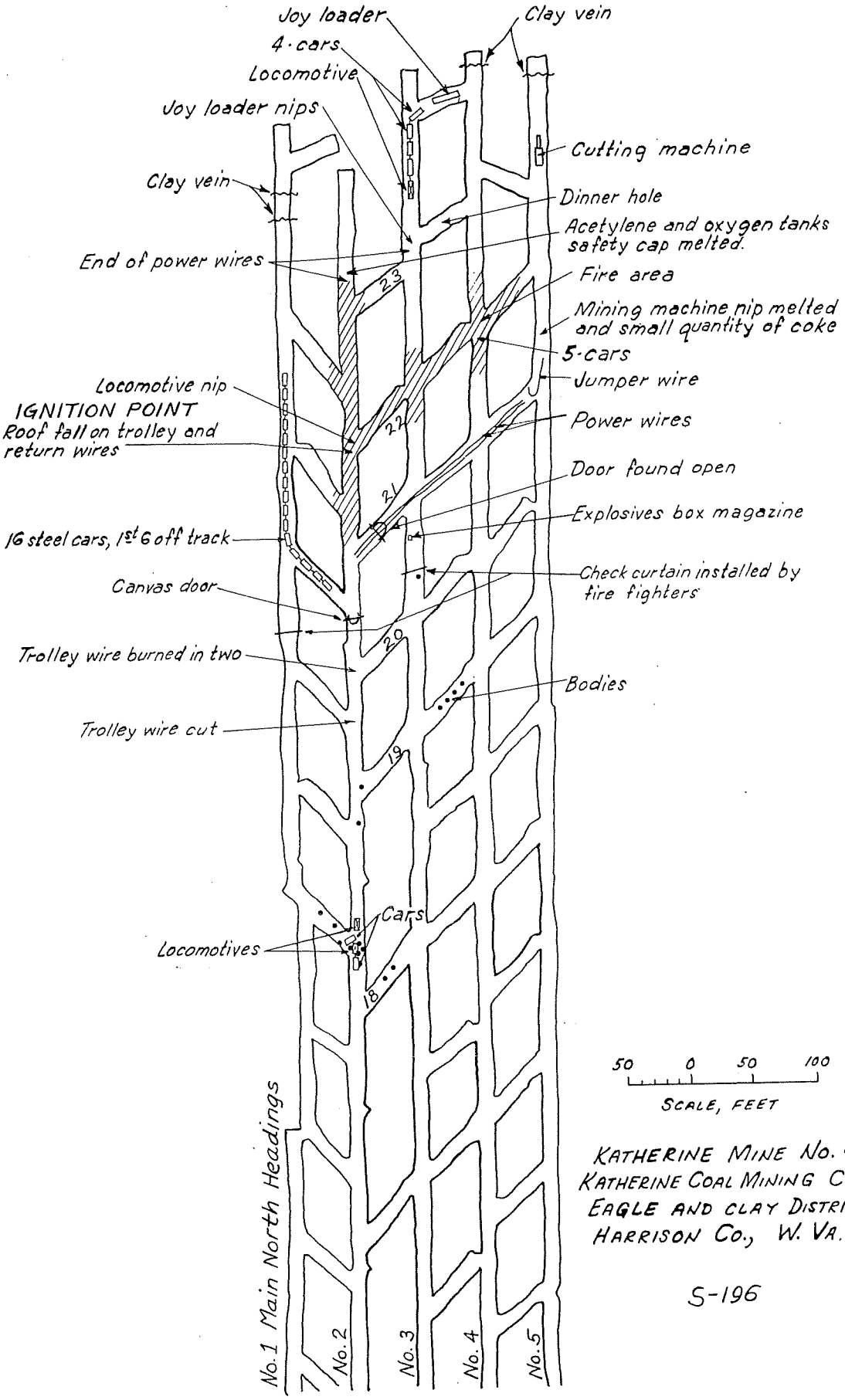
5/3/44	3:00 p.m.	688	1	3.8	2.4	-	1.1	19.8	72.9
	2:55 p.m.	689	2	3.8	2.5	-	1.1	19.8	72.8
5/5/44	6:00 p.m.	477	1	3.6	3.3	-	1.0	19.4	72.7
	6:05 p.m.	478	2	3.8	2.0	-	1.0	20.8	72.4
5/8/44	3:40 p.m.	678	1	3.7	2.2	-	.96	21.5	71.64
	3:30 p.m.	679	2	3.6	2.4	-	.99	21.1	71.91
5/11/44	5:30 p.m.	686	1	3.7	1.7	-	.91	22.7	70.99
	5:25 p.m.	687	2	3.6	1.8	-	.85	22.9	70.85
5/14/44	2:20 p.m.	471	1	3.5	2.4	-	.72	22.7	70.68
	2:15 p.m.	472	2	3.5	1.9	-	.80	23.3	70.50

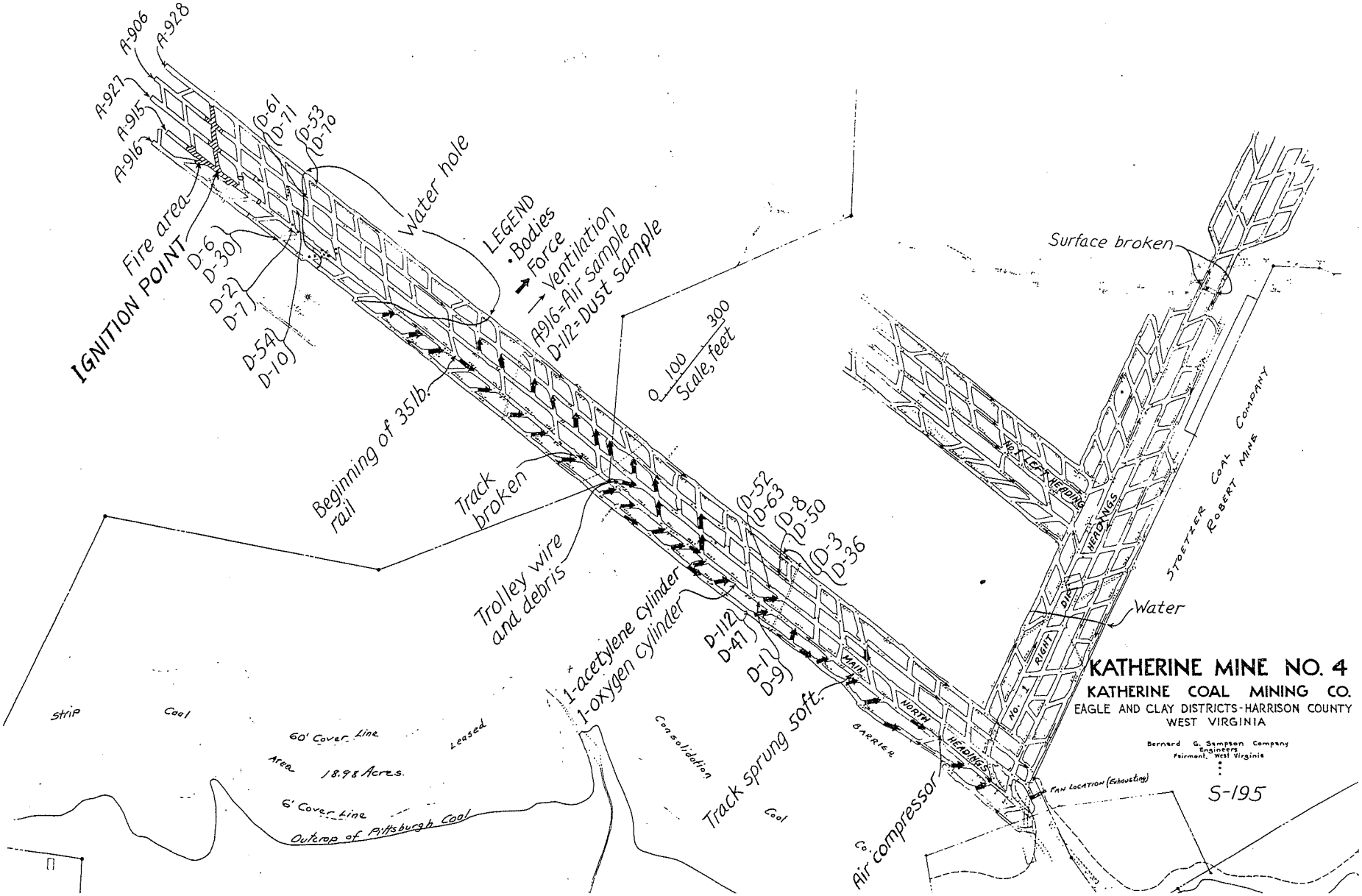
Analyses of air samples from sealed Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia (Cont'd.)

Date	Time	Bot. No.	Seal No.	Percent					
				CO_2	O_2	H_2	CO	CH_4	N_2
5/16/44	4:03 p.m.	475	1	3.3	2.8	-	0.71	22.8	70.39
	4:00 p.m.	476	2	3.5	1.6	-	.71	24.0	70.19
5/19/44	8:00 p.m.	790	1	3.5	1.1	-	.70	25.6	69.10
	8:03 p.m.	791	2	3.2	2.9	-	.61	23.3	69.99
5/23/44	8:38 p.m.	798	1	3.0	3.3	-	.52	24.1	69.08
	8:35 p.m.	799	2	3.3	1.9	-	.56	25.3	68.94
5/26/44	2:55 p.m.	709	1	3.3	1.3	-	.53	26.9	67.97
	2:53 p.m.	710	2	3.4	1.1	-	.57	27.3	67.63
5/30/44	3:40 p.m.	696	1	3.3	1.2	-	.43	28.3	66.77
	3:38 p.m.	742	2	3.3	.9	-	.54	28.3	66.96
6/2/44	3:52 p.m.	187	1	3.1	2.1	-	.48	27.4	66.92
	3:46 p.m.	188	2	3.1	1.8	-	.48	27.7	66.92
6/8/44	5:55 p.m.	404 S	1	3.2	.8	-	.35	30.1	65.55
	5:58 p.m.	405 I	2	3.1	1.5	-	.45	29.0	65.95
6/10/44	3:35 p.m.	155	1	3.1	.7	-	.32	29.8	66.08
	3:30 p.m.	156	2	3.0	2.1	-	.33	27.9	66.67
6/14/44	5:03 p.m.	171	1	3.1	.9	-	.24	30.3	65.46
	5:00 p.m.	172	2	3.2	.5	-	.24	30.8	62.26
6/19/44	2:20 p.m.	569	1	2.6	4.2	-	.20	25.4	67.60
	2:15 p.m.	570	2	3.1	.2	-	.23	31.9	64.57
6/21/44	7:38 p.m.	384 M	1	3.1	.6	-	.22	32.3	63.78
	7:35 p.m.	385 D	2	3.0	.9	-	.22	31.9	63.98
6/24/44	5:48 a.m.	370 N	1	2.9	1.2	-	.19	31.6	64.11
	5:45 a.m.	371 S	2	3.0	.4	-	.19	32.9	63.51
6/28/44	3:20 p.m.	432 D	1	2.9	.9	-	.15	33.1	62.95
	3:15 p.m.	467 I	2	2.9	1.8	-	.14	31.1	64.06
7/1/44	4:25 p.m.	389	1	2.8	1.2	-	.13	33.2	62.67
	4:20 p.m.	390	2	3.0	.2	-	.12	34.3	62.38
7/5/44	4:45 p.m.	912	1	3.0	.3	-	.11	35.1	61.49
	4:48 p.m.	919	2	2.8	.6	-	.12	34.9	61.58
7/9/44	8:05 p.m.	163	1	2.9	.6	-	.08	35.0	61.42
	8:08 p.m.	164	2	2.6	2.2	-	.07	32.0	63.13
7/12/44	9:15 p.m.	422	1	2.8	.5	-	.09	35.8	60.81
	9:13 p.m.	423 I	2	2.7	1.1	-	.09	34.6	61.51
7/15/44	2:35 p.m.	193	1	2.5	2.6	-	.07	32.4	62.43
	2:34 p.m.	194	2	2.8	1.0	-	.07	35.5	60.63
7/19/44	3:00 p.m.	406 D	1	2.8	.1	-	.05	38.6	58.45
	3:15 p.m.	407 I	2	2.8	.1	-	.06	38.7	58.34
7/22/44	3:30 p.m.	951	1	2.7	.4	-	.06	38.8	58.04
	3:35 p.m.	952	2	2.7	.4	-	.06	38.9	57.94
7/26/44	3:20 p.m.	547	1	2.4	3.0	-	.02	34.1	60.48
7/29/44	2:48 p.m.	424 N	1	2.7	.4	-	.02	40.1	56.78
	2:45 p.m.	425 D	2	2.7	.5	-	.02	40.5	56.28



KATHERINE MINE No. 4
KATHERINE COAL MINING CO.
EAGLE AND CLAY DISTRICTS
HARRISON CO., W. VA.

S-196



KATHERINE MINE NO. 4

KATHERINE COAL MINING CO.

EAGLE AND CLAY DISTRICTS-HARRISON COUNTY

WEST VIRGINIA

Bernard G. Sampson Company
Engineers
Fairmont, West Virginia

S-195

CWO:AK

August 26, 1944.

Memorandum to Mr. J. J. Forbes:

I have reviewed the report on the fires and explosions at the Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia, on March 24 and 25, 1944. An abstract covering the essential details has also been prepared.

The maps do not indicate the point of origin, nor do they show the extent of force and flame. It is stated in the report that flame extended throughout the mine. Even so, I believe that this should be shown on the map.

The mine is rated nongassy by the West Virginia Department of Mines; however, no rating is given by the author of this report. Inasmuch as the section foremen are reported to have found methane in the mine using a flame safety lamp, and as one sample contained 0.34 percent methane, it is believed that this report should state definitely that the mine is gassy and should be operated as such.

C. W. OWINGS.

cc: Coal Mine Insp. Div.
~~E. H. Denny~~
C. W. Owings
W. O. Files
G. W. Grove - Pittsburgh

August 3, 1944 [illegible]

VIA AIR MAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- The 14 bodies mentioned as having been located, in my telegram of yesterday, were removed from the mine on the night of August 1. Yesterday, on August 2, an investigation of the cause of the fire and explosion was made by members of the West Virginia Department of Mines and Bureau representatives, at which time the main entries were again thoroughly covered, with the exception of the portions under water. The five dip entries leading off the main were also ventilated to the point where the water, which had been turned in from the outside, was reached, but the two missing bodies were not located. A pump was set to pump out the accumulation of water in the local swale near the faces of the main entries, and when we left there last evening, the pump was about ready to be started. Messrs. McCall, Walker, MacDonald, Metcalfe, Senio, and Udy are today collecting detailed data and air and dust samples in connection with the investigation.

I have just received a call from Mr. McCall in which he advises that, as a result of pumping the water from the main entries, the two missing bodies have been located, this occurring around noon today. The information regarding the finding of the bodies has previously been submitted to you in a telegram.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There is nothing new to report on the Emerald mine. No additional air samples have been analyzed; however, the one mentioned in yesterday's letter on which the carbon monoxide test had not been finished, has now been checked by the laboratory and showed the carbon monoxide content to be 0.02 percent.

(1) Denny (2) Files - 3 copies ✓

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Quenon called about noon and advised that the No. 1 entry, at 11:30 this morning, had been driven 74 feet in the last 24 hours, a total distance of 580 feet, and the No. 2 entry had been driven 90 feet in the last 24 hours, a total distance of 615 feet. Work is continuing on the erection of air locks at the bottom of the Cat's Run shaft, and it is expected that this work will be completed on Friday.

A sample collected at 10 a.m. from the borehole and analyzed locally on the Orsat apparatus contained the following:

Carbon dioxide	3.8 percent
Oxygen	1.2 percent
Carbon monoxide	0.8 percent
Methane	8.8 percent

A sample was also collected at 8:30 a.m. about 400 feet inside the present air-lock seals which contained the following:

Carbon dioxide	0.4 percent
Oxygen	17.7 percent
Carbon monoxide	Too low to be determined
Methane	0.6 percent

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

August 2, 1944 [illegible]:DCH

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- The following wire regarding this mine was received from Mr. Grove today:

"Katherine No. 4 mine opened today, 14 of 16 bodies located. All faces main entries explored, no fires. Other bodies probably under falls or under water. Washington notified."

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- The preliminary results of a sample collected at the Ten-mile Creek borehole on July 29, at 12:30 p.m., are as follows:

Carbon dioxide	2.5 percent
Oxygen	10.8 percent
Methane	8.7 percent
Carbon monoxide	No results yet

There is nothing new to report on the Emerald mine.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Quenon reported at 1:30 p.m. today that the left entry is in 506 feet, the right 525 feet, and that seven crosscuts have been made between the entries. In advancing the seals working through the air locks, four seals are in; these were put in the most difficult places, and they expect to install six more seals tomorrow. By Friday the work will be completed on the outby side of the fire. A sample taken inby the present air locks and analyzed on the Orsat apparatus contained the following constituents:

Carbon dioxide	10.8 percent
Oxygen	15.0 percent
Carbon monoxide	0.2 percent
Methane	1.0 percent

(1) Denny (2) Files - 3 copies✓

[illegible]

Mr. Quenon reported that the analysis of the sample collected at the 9-inch borehole was not yet completed at the time of his call.

A sample collected July 31, at 11:45 p.m., against a water-gage pressure negative 1 inch, and analyzed at the Pittsburgh laboratory, contained the following:

Carbon dioxide	4.2 percent
Oxygen	1.3 percent
Carbon monoxide	0.4 percent
Methane	8.8 percent

These are preliminary results and the carbon monoxide may change when the final test is completed.

Very truly yours,

E. R. MAIZE, Acting For
G. W. GROVE
Supervising Engineer
District A

August 1, 1944

VIA AIR MAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is submitted relative to the progress at the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- No information has been received concerning progress at the Katherine No. 4 mine. Mr. Grove is expected to return to Pittsburgh tomorrow, and the progress will be reported at that time.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There is nothing new to report on conditions at the Emerald mine.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Quenon reported at 1:45 p.m. today that the left entry is in 430 feet and the right 433 feet. At 3 a.m. today, a sample taken from the 9-inch drill hole contained the following constituents:

Carbon dioxide	3.8 percent
Oxygen	1.2 percent
Carbon monoxide	0.3 percent
Methane	9.2 percent

The pressure on the entire mine for the last 60 hours has been negative; that is, air has been intaking.

At 7 a.m. this morning, one team explored inby the seals erected July 31 and marked places for the erection of seals to isolate the fire. The furthest inby seal will be approximately 450 feet from the present air lock. It is expected that ten seals will be built, and the work on the outby side of the fire will be completed by Thursday. Conditions were very favorable for sealing, and no water was encountered. Some falls were found in the entries to the left, but no great difficulty is expected in erecting seals. The oxygen

(1) Denny (2) Files - 3 copies

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content 300 feet inby the air lock was 15.0 percent, and the methane .4 percent. No carbon monoxide was indicated on the Hoolamite detector and the carbon dioxide was indicated as .2 percent. Mr. Quenon says this is due to the fact that the pressure has been inward for the last 60 hours, and they have been working in the leakage from the seals.

Very truly yours,

E. R. MAIZE, Acting For
G. W. GROVE
Supervising Engineer
District A

July 31, 1944 ERM:RK

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington 25, D. C.

Dear Mr. Harrington:

The following information is submitted relative to the progress at the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.-There have been no further developments regarding this fire since the letter of July 29. Two air samples were received today, but as yet, have not been analyzed. Messrs. Grove and McCall are attending a conference today for the purpose of preparing final plans to start unsealing operations on August 1.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.-No further developments have occurred with respect to the fire. Mr. Garfield Thomas, Deputy Chief Inspector, Bituminous Division, was in the office today discussing plans with Mr. Denny and me to be used in unsealing the fire. The tentative date of August 7 for starting unsealing operations still stands. No additional samples have been received.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.-Mr. Quenon reported at 10:00 a.m. this morning that both the left and right entries driven from the outcrop have reached a distance of 375 feet. The fan is in operation; the locomotive, Jeffrey Universal mining machine, and a loading machine are being used. A sample taken from the 9-inch borehole at 3:00 a.m. today had the following constituents:

Carbon Dioxide	4.0 percent
Oxygen	1.6 do.
Carbon Monoxide	.40 do.
Methane	8.8 do.

Mr. Quenon reported, in addition, that on July 30 at 8:00 a.m. the seals were entered in the Cats Run slope. By using three rescue teams, one from the Dorothy mine, Youghiogheny & Ohio Coal Company, one from the Blaine mine of the Lorain Coal and Dock Company, and the foremen's team of Powhatan, four seals were erected in the main entries inby the slope. This work was completed at 6:30 p.m. At 7:30 a.m., July 31, Mr. Quenon and a party of men examined the seals, and at 9:00 a.m.,

(1) Mr. Denny (2) Files - 3 copies

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the airshaft and hoisting shafts were unsealed on the surface, and at 10:00 a.m., they were ventilating the outby portion of the mine. Everything went well.

Mr. Quenon plans to start at 7:00 a.m., August 1, and make the first move to advance toward the fire and hopes to get seals erected inby A north by August 2 unless difficulties are encountered. He reports that the sample that he took inby the four seals erected, shortly after their completion, indicate that the seals that were being depended on the surface were not too efficient. The sample contained the following:

Carbon Dioxide	1.00 percent
Oxygen	11.00 do.
Methane	1.70 do.
Carbon Monoxide	Not run

Very truly yours,

E. R. MAIZE
For O. W. GROVE
Supervising Engineer
District A

P. S. Since this letter was written, the following preliminary analyses of samples taken at the Katherine mine have been received:

		Carbon dioxide	Oxygen	Methane
Bottle No. 424	No. 1 drift fire seal, July 29, 2:48 p.m. Pressure on seal - .3 positive	2.7	0.4	40.1
Bottle No. 425-D	No. 2 drift fire seal, July 29, 2:45 p.m. Pressure on seal - .3 positive	2.7	0.5	40.5

Samples were not analyzed for carbon monoxide since content was too low.

E.R.M.

July 29, 1944

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is submitted relative to the progress at the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There have been no further developments regarding this mine since my letter of yesterday. As previously indicated, Mr. McCall and I will attend a conference with State mine inspectors and company and UMWA officials at this mine on Monday, July 31, to prepare final plans for the unsealing operations on Tuesday, August 1. No additional air samples or analyses have been received since those mentioned in yesterday's letter.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There is nothing further with respect to this mine. Analyses of two air samples collected at the Ten-Mile Creek borehole are as follows:

	Carbon dioxide	Oxygen	Carbon monoxide	Methane
July 26, 1:55 p.m.	5.2	1.5	0.04	16.1
July 27, 2:15 p.m.	5.3	1.9	0.03	16.0

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole called about noon today and advised that the No. 1 heading advanced 37 feet in the last 24 hours to a total distance of 262 feet, and that the air course advanced 39 feet during the last 24 hours to a total distance of 242 feet. Three crosscuts, which have been driven on an angle from the outside, have now been turned towards the faces of the C north entries. Trolley wire has been hung and an electric locomotive is now being used for haulage purposes.

cc: (1) Denny (2) Files - 3 copies

An air sample collected at 2 a.m. this morning, July 29, on analysis with an Orsat apparatus showed the following:

Carbon dioxide	4.0 percent
Oxygen	2.1 percent
Carbon monoxide	0.5 percent
Methane	8.4 percent

State mine rescue instructors are brushing up two State teams from other mines and it is expected that work in connection with sealing off the mine inby the Cat's Run shaft will be started at 7 a.m. tomorrow morning (Sunday, July 30).

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

July 28, 1944 GWG:DCH

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is submitted relative to the progress at the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There have been no further developments regarding this mine since the letter of yesterday. Plans are still for opening the mine on August 1. Air samples collected on July 26 have been analyzed and show the following:

	No. 1 drift 3:20 p.m.	No. 2 drift 3:22 p.m.
Carbon dioxide	2.4	2.2
Oxygen	3.0	4.2
Carbon monoxide	0.02	0.02
Methane	34.1	31.7

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There have been no further developments at this mine since our last letter. Two air samples were received today, but they have not yet been analyzed.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole reported about noon today that the No. 1 heading had advanced 40 feet during the last 24 hours to a total distance of 225 feet. The No. 2 heading has advanced 48 feet to a total distance of 213 feet. He also stated that they were getting sufficient development to permit the handling of cars, and he believes that from now on advancement will be more rapid. A sample was collected about 2:30 a.m. this morning, July 28, after pumping 1-1/2 hours. The analysis of this sample is as follows:

Carbon dioxide	4.2 percent
Oxygen	2.2 percent
Carbon monoxide	0.5 percent
Methane	8.5 percent

(1) Denny (2) Files - 3 copies ✓

There is no further development with respect to the dispute between the company and the mine rescue men regarding the air-locking work at the Cat's Run slope. We may have more information on this tomorrow.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

July 27, 1944 MCH:DCH

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is submitted relative to the progress at the Katherine No. 4, Emerald, and Powhatan mine fires:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There have been no further developments regarding this mine since the letter we sent you yesterday. Air samples were collected yesterday, the 26th, at 3:20 and 3:22 p.m.; these, however, have not been analyzed as yet. The results of the analyses will be sent to you tomorrow.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There have been no further developments at this mine since the letter sent you yesterday.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. E. E. Quenon supplied the following information in a telephone call received in this office at 11:20 a.m. today:

An air sample collected at the borehole in the C north entries at 2 a.m. today contained the following: carbon dioxide 4.2 percent, oxygen 2.4 percent, carbon monoxide 0.5 percent, and methane 8.0 percent. Another sample collected in the Cat's Run slope at 4 a.m. contained the following: carbon dioxide 0.2 percent, oxygen 18.0 percent, carbon monoxide 0.01 percent, and methane 0.2 percent.

The heading and air course being driven from the outside to intersect the faces of the C north entries have been driven 185 and 165 feet, respectively, from the slope portals. There was some delay in the driving of these two entries because of difficulties with the water pump.

cc: (1) Denny (2) Files - 3 copies ✓

Entrance to the Cat's Run slope, planned for this morning, was delayed because of demands made by the union members of the mine rescue teams. The company trained three teams of six men each to be used in sealing the main west entries inby A north. These men were notified that their services would be required at 7 o'clock this morning. Yesterday, some of these men called on Mr. Roy Fox, superintendent of the Powhatan mine, and demanded pay at the rate of $3.00 an hour for participating in the work of erecting air locks.

Mr. Quenon states that, by law in Ohio, a rate of $1.50 an hour has been established for this work and that Mr. Fox offered to compromise and pay $2.00 an hour.

Six apparatus men reported for work this morning; five of these were foremen and are not members of the union, while the sixth man is an electrician who does belong to the union. Three members of the State team maintained at Powhatan and who are members of the union did not report.

The rescue men who failed to report this morning will be contacted this afternoon and an effort will be made to persuade them to go to work tomorrow, July 28. If these men will not report, it will be necessary that teams be obtained from the Blaine mine of the Loraine Coal and Dock Company and the Dorothy mine of the Youghiogheny and Ohio Coal Company. These are both State-maintained teams. If it is necessary to depend on the teams from the Blaine and Dorothy mines, entrance to the Cat's Run slope will be delayed until Sunday, July 30.

Very truly yours,

M. C. McCall

M. C. McCALL, Acting For
G. S. GROVE
Supervising Engineer
District A

ADDRESS ALL COMMUNICATIONS TO
THE DIRECTOR, U. S. BUREAU OF MINES
WASHINGTON, D. C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

May 2, 1944.

Mr. G. W. Grove,
U. S. Bureau of Mines,
Pittsburgh 13, Pennsylvania.

Dear Mr. Grove:

I note from carbon copies of letters to Mr. Redyard of April 24 and April 27 that carbon monoxide seems to be rather prevalent in the samples of the atmosphere behind the seals at the Katherine mine. Presumably this means that the fire is still existent and that it may be some time before the reopening of the mine to try to obtain the sixteen bodies can be attempted.

Would like to have you write me as to the up-to-date status of this.

Very truly yours,

D. HARRINGTON,
Chief, Health and Safety Service.

July 26, 1944 [illegible]

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There has been no further information received on conditions at the Katherine No. 4 mine since the previous letter written July 24.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- The Bureau has a man from the gas laboratory at the Emerald mine training one of the company's engineers to operate an Orsat. Arrangements have been made for one sample to be collected each day at the Ten-Mile Creek borehole. This arrangement will be terminated August 2 when it is planned to collect a complete set of samples from all the sampling points. The latest analyses of samples collected are as follows:

July 24:	Carbon dioxide	Oxygen	Carbon monoxide	Methane
Hoist shaft, 1:20 p.m.	5.4	2.5	0.1	14.6
Borehole on Cox farm, 3:30 p.m.	3.1	0.6	0.4	33.2
Chartiers fan, 3 p.m.	5.9	3.8	0.1	9.2
Lippincott airshaft return, 3:45 p.m.	4.9	0.6	0.3	25.2
Chartiers slope, 2:45 p.m.	5.5	2.4	0.1	14.7
Ten-mile Creek borehole, 2:25 p.m.	5.6	1.7	0.1	15.0
River slope, 1:55 p.m.	4.2	4.9	(not determined, probably low)	12.2

These are preliminary analyses and subject to change.

cc: (1) Denny (2) Files - 3 copies

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. E. E. Quenon, in a telephone conversation at 1:20 p.m., supplied the following information:

The heading and air course being driven to intersect the faces of C north entries are now 160 and 140 feet, respectively, inby the slope portals. Plans for entering the manway slope at Cat's Run have been completed, and entrance will begin at 7 a.m. July 27. The advance by air locks to a point inby A north off the main west entries will entail two air-lock jumps and will require 14 stoppings. Mr. Quenon is of the opinion that the seals will be installed in the main west entries by Sunday, July 30. I have asked that this work be completed by Monday, July 31, if possible, so that the mine rescue telephone can be used at the Katherine No. 4 mine on August 1.

An air sample collected at 3 a.m., July 26, from the drill hole in the C north entry was analyzed by an Orsat apparatus at the Powhatan mine, and contained the following:

Carbon dioxide	4.4
Oxygen	2.0
Carbon monoxide	0.6
Methane	7.4

Very truly yours,

M. C. McCall

M. C. McCALL, Acting For
O. W. GROVE
Supervising Engineer
District A

July 25, 1944

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at this mine, except that Mr. Redyard called me yesterday with reference to my letter to him of Saturday regarding the possible opening of this mine. He indicated that he was favorably inclined; however, he asked me to call him when the analyses of the last samples have been completed, in order to make a definite decision. I will, therefore, probably have more definite information on this by tomorrow.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- As stated previously, during the conference held July 22, the State Department of Mines was agreeable, as were we, that work of air-locking down the Chartiers slope could be started at the convenience of the company; however, at that conference the Republic Steel Corporation objected to the opening of the mine and the possible effect it would have on the men employed in their Clyde mines, as they apparently fear that if work is started at the Emerald mine they will have a work stoppage at the Clyde mines.

Another conference was held yesterday, which Mr. McCall and I attended, together with two members of the State Department of mines, company officials, representatives of the Republic Steel Corporation, and representatives of the United Mine Workers of America. Little was accomplished at this conference and no decisions were arrived at.

Today, however, I was informed by an official of the Hillman Coal and Coke Company that it has been decided to accede to the request of the Republic Steel Corporation for a delay of 2 weeks in order to permit them to pull pillars and provide a gob line immediately in front of the entries connecting the Clyde No. 3 and Emerald mines. According to this official of the Hillman Coal and Coke Company, the Republic Steel Corporation has been notified that they

cc: ~~(1) Denny~~ ✓ (2) Files - 3 copies

will delay starting until the morning of August 7, but that no further delays will be considered.

Samples were collected yesterday, but the analyses of these are not yet available. Mr. Scott has returned to the mine in order to give one of their men instructions in the use of the potentiometer which will be used at the Ten-Mile Creek borehole.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Quenon reported about noon today that there has been no advancement made during the last 24 hours. Both the mining machine and the loading machine were broken down, but repairs have been completed and work will be resumed as soon as possible. A sample collected at 2 a.m. this morning and analyzed on a local orsat apparatus showed the following:

Carbon dioxide	4.6 percent
Oxygen	2.3 percent
Carbon monoxide	0.3 percent
Methane	7.7 percent

Messrs. Quenon and Loucks went to the mine this morning to discuss with company officials and members of the Ohio State Division of Mines details in connection with air-locking into the mine at the Cat's Run slope to erect stoppings to permit them to ventilate the portions of the mine in the vicinity of the Cat's Run shaft and to provide room for switching cars, locomotives, etc., there. Mr. Quenon states that detailed plans have all been completed and that four stoppings will be erected about 500 feet from the bottom of the Cat's Run shaft by crews wearing oxygen breathing apparatus. When these stoppings are completed, the main hoisting shaft will be opened and the area between the Cat's Run shaft and the main hoisting shaft will be ventilated.

Following this, again working through an air lock, 7 stoppings will be erected across the main west entry inby a short distance inby A north to permit switching room for equipment around the bottom of the Cat's Run shaft. This work is to be done with three oxygen breathing apparatus crews, composed of employees of the Powhatan Mining Company, supervised by Mr. Quenon, company officials, and members of the State Division of Mines. Messrs. Cole and Loucks will also be available to assist in the work.

With the completion of the contemplated work as described above, nothing further will be done towards air-locking into the mine until such time as the entries now being driven from the outside reach the faces of the present C north entries.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

P. S. Samples received from the Katherine No. 4 mine, which were collected on July 22, have been analyzed and contain the following:

	No. 1 fire seal 3:30 p.m.	No. 2 fire seal 3:35 p.m.
Carbon dioxide	2.7	2.7
Oxygen	0.4	0.4
Carbon monoxide	0.06	0.06
Methane	38.8	38.9
Nitrogen	58.04	57.94

After receiving the above information, I called Mr. Redyard and he has set the date for starting the opening of the mine on the morning of August 1. I will attend a conference at the Katherine mine on Monday afternoon, July 31, to make definite plans and arrangements with Mr. Redyard and company officials for opening the mine.

G.W.O.

July 24, 1944

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at this mine, as samples received today have not yet been analyzed. Mr. Grove has written Mr. Redyard asking for a conference, at which time an attempt will be made to persuade Mr. Redyard to give permission for opening the mine.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- Messrs. Grove and McCall are attending a conference today at Chartiers, possibly preliminary to starting work on the opening of the mine. At the conference that was held July 22, representatives of the Republic Steel Corporation objected to opening the fire at this time, although the State representatives had no objections. When tomorrow's letter is prepared, we will no doubt have sufficient information to determine whether or not unsealing procedures will be started. The results of Messrs. Scott's and Kennedy's run of temperatures at the bottom of the Ten-Mile-Creek borehole indicated a maximum temperature of about 116°F. and a minimum of about 88°F. The greater number of the temperature readings were above 100°F.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole reported at 12:55 p.m. today that the left entry had advanced 37 feet and was now at a point 136 feet from its origin. In addition 22 feet of coal has been taken out in the break-through going to the right entry. The right entry has advanced 15 feet to a point 87 feet and will be continued by hand until the break-through is intercepted. The narrow gage track has been removed and standard 42-inch gage track has been installed. Coal from the two openings is being dumped over a temporary tipple and hauled 8 miles by truck to the cleaning plant.

cc: (1) ~~Kenny~~ ✓ (2) Files - 3 copies

ERM.

A sample taken at 4 a.m. today at the 9-inch borehole, which was blowing and had a water-gage pressure of 0.8 inches (this hole has been blowing since 3 p.m. on July 23), contained the following constituents:

Carbon dioxide	4.8 percent
Oxygen	2.4 percent
Carbon monoxide	0.4 percent
Methane	7.0 percent
Nitrogen	85.4 percent

Over the week end several samples were taken and analyzed as follows:

	Carbon dioxide	Oxygen	Carbon monoxide	Methane
Main slope at river	1.0	18.4	0.0	0.7
Big Run shaft	2.8	6.9	0.0	10.8
B north	3.0	8.6	0.6	4.0
Cat's Run slope	1.0	15.5	0.1	1.2

Following the conversation with Mr. Cole, I talked with Mr. Fox, superintendent of the Powhatan mine, who stated that a meeting would be held at 10 a.m. July 25 by the State and company officials, and they requested that the Bureau of Mines be represented as plans are being formulated to air-lock down the Cat's Run to erect seals inby A north as described in the letter of July 20. Mr. Fox expects to have this work started possibly Wednesday, but certainly Thursday, July 27. They plan to use three rescue teams one shift a day and expect to complete the work in 4 or 5 days. The time for completing the work appears to us to be optimistic.

Very truly yours,

H. R. MAIZE, Acting For
G. W. GROVE
Supervising Engineer
District A

July 22, 1944 BRANCH

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at this mine, other than that air samples were collected July 19, the analyses of which are as follows:

	No. 1 drift 3:00 p.m.	No. 2 drift 3:15 p.m.
Carbon dioxide	2.8	2.8
Oxygen	0.1	0.1
Carbon monoxide	0.05	0.06
Methane	38.6	38.7
Nitrogen	58.45	58.34

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- Mr. Grove is attending a conference at the Emerald mine, the results of which are not known, but it is doubtful that steps will be taken within the next week to open this mine. Samples were collected on July 18, 19 20, but the following are only preliminary analyses and have not yet been checked by the laboratory:

	Carbon dioxide	Oxygen	Carbon monoxide	Methane
July 18, 1944				
Ten-Mile Creek borehole, 1:30 p.m.	8.5	3.9	0.09	10.6
July 19, 1944			approx.	
Ten-Mile Creek borehole, 11:00 a.m.	7.4	3.6	0.01	11.7
July 20, 1944				
Ten-Mile Creek borehole, 10:00 a.m.	6.9	1.9	0.08	14.1
Chartiers Fan, 8:30 a.m.	5.5	4.8	0.09	8.4
Hoist shaft, 8:40 a.m.	6.7	2.0	0.09	13.5
Lippincott shaft return, 10:50 a.m.	4.9	1.2	0.40	23.3
River slope, 2:30 p.m.	3.8	6.1	(less than 0.005	10.2
Chartiers slope, 8:50 a.m.	6.6	2.6	0.08	13.3
Borehole on Cox farm, 10:30 a.m.	2.8	1.4	0.3	35.3

cc: (1) Denny (2) Files - 3 copies

Messrs. Scott and Kennedy of the Explosives Division completed a 24-hour run of recording temperatures at the bottom of the Ten-Mile Creek borehole, using a potentiometer.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole reported at 12:55 p.m. today that the left entry had advanced 21 feet to a point 99 feet from the place of origin. An 8-BU Joy loading machine and a shortwall cutting machine are now being used in this entry. The right entry advanced 6 feet to a point of 72 feet; the coal is being cut and loaded by hand. As soon as the entries have both reached sufficient distance for the first break-through, they will be cut and loaded by machine.

A sample was taken at the 9-inch borehole at 3:30 a.m. by a vacuum pump pumping an hour and a half. The hole has been intaking air since 8 p.m. on July 20 and at the time of sampling had a negative water-gage pressure of 2.2 inches. The sample contained the following constituents:

Carbon dioxide	5.0 percent
Oxygen	2.8 percent
Carbon monoxide	0.4 percent
Methane	6.8 percent
Nitrogen	85.0 percent

Very truly yours,

E. R. MAIZE, Acting For
G. W. GROVE
Supervising Engineer
District A

July 21, 1944 [illegible]

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at the Katherine No. 4 mine and no additional air analyses have been received since my last letter.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There has been no change in conditions at the Emerald mine. Air samples were received this morning, but the reports of analyses have as yet not been received. Arrangements were made for Messrs. Scott and Kennedy of the Explosives Division here to go to Emerald mine for the purpose of taking hourly temperature readings in the Ten-Mile Creek borehole by means of a potentiometer and thermocouplings.

As mentioned in several previous letters, I expect to attend a conference tomorrow at the Emerald mine when existing conditions and future plans will be discussed.

3.- Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole reported about 1 p.m. today that the left-hand heading, which will be the main opening, has advanced 8 feet during the last 24 hours, or a total of 78 feet. This heading is now in coal and the cutting machine has put in one cut. The right-hand entry advanced 6 feet during the last 24 hours to a total of 66 feet. It is still not quite to the bottom of the coal bed. Considerable trouble has been experienced with water in both headings.

An air sample was collected at 2 a.m. by using a vacuum pump on the 9-inch borehole. The analysis of this sample on an orsat apparatus at the mine showed the following:

cc: (1) Denny
Room 160

(2) Files - 3 copies ✓

Carbon dioxide	4.3 percent
Oxygen	3.2 percent
Carbon monoxide	0.8 percent
Methane	5.3 percent
Nitrogen	85.9 percent

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

July 20, 1944

VIA AIRMAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at the Katherine No. 4 mine and no additional air analyses have been received since the letter of yesterday.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There has been no change at the Emerald mine, with the exception of air analyses and temperature readings. Preliminary (not yet checked by laboratory) analyses are as follows:

	Carbon dioxide	Oxygen	Carbon monoxide	Methane
Borehole on Cox farm, 10:30 a.m.	2.9	1.4	0.4	32.4
Lippincott airshaft return, 11 a.m.	4.8	1.2	0.4	21.9
Hoist shaft, 1:30 p.m.	6.5	4.6	0.1	10.6
Chartiers fan, 1:45 p.m.	5.4	6.0	0.2	6.7
Chartiers slope, 2:40 p.m.	6.0	5.1	0.1	10.3
River slope, 2 p.m.	3.6	7.2	0.2	9.2
Ten-Mile Creek borehole, 3 p.m.	13.1	2.4	0.2	10.9

Temperature readings are more uniform than they were previously. Hourly readings taken from 12 noon, July 19, to 8 a.m. today, range from a low of 69°F. negative pressure to a high of 87°F. with positive pressure. These were taken in the Ten-Mile Creek borehole.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole's report today at 12:45 p.m. states that the left entry, being driven from the outcrop to the face of C north entry, advanced 6 feet during the past 24 hours, and the right entry was not advanced at all. One man was injured

cc: (1) Denny (2) Files - 3 copies

in a fall of slate at 2:30 a.m. this morning in one of these entries. Both entries are now to the bottom of the coal bed and future driving will be in the coal bed. A bottom cutting machine will start in the left-hand entry and a loading machine will be put in as soon as possible. Entries are being driven 12 feet wide. Advancement may be somewhat slow until sufficient development is obtained to permit shifting of equipment from one entry to the other.

The 9-inch borehole, from which samples have been collected, showed a slight positive pressure when the last samples were collected; however, pumping was performed for about an hour and a half to be certain to get a representative sample. The last analyses on an orsat apparatus at the mine showed as follows:

Carbon dioxide	5.0
Oxygen	3.6
Carbon monoxide	0.4
Methane	6.0
Nitrogen	85.0

As previously indicated, Messrs. McCall, Simpson, Cole, and I had a conference with company officials, Messrs. A. J. Ruffini, vice president; Roy Fox, superintendent; Charles Young, assistant superintendent; and David Elerick, mine foreman, and with Mr. Marcus Kerr, Chief, Division of Mines, and Mr. Richard McGee, District mine inspector, at Powhatan yesterday afternoon. Various details were discussed as to possible methods of recovering the mine, but the chief reason for the conference apparently was that the mining company is desirous of air-locking a short distance from the Cat's Run slope and erecting seals inby A north. This would permit the starting of the fan (forced fan) and would ventilate the haulage roads outby the Cat's Run shaft to the shaft at Powhatan. Their objective in doing this is to permit them to clean the haulage roads and perhaps make track repairs also between the Cat's Run shaft and the main mine opening.

Since this work will be approximately 8,000 feet from where the fire is located and the atmosphere is believed favorable, we can see no reasons why this work cannot be done, and both the State and we agreed that it would be satisfactory to start this work sometime next week when they can get their rescue crews assembled.

The work involved will require one advance from the present air lock at the bottom of the Cat's Run slope, erecting stoppings on two entries about 500 feet from the bottom of the Cat's Run slope, ventilating that portion of the air lock, and then advancing another 300 to 500 feet and erecting stoppings in the 6 or 7 main entries. This work will be performed by local oxygen breathing apparatus crews, with representatives of the State Division of Mines present, and we will also have Bureau representatives present to assist and advise in conducting the work.

Every effort is being made to vigorously prosecute the work of driving the two entries from the outcrop to the face of the C north entries. Considerable difficulty was experienced with water and bad ground in sinking the slope and

driving to the bottom of the coal bed. The bottom of the coal bed, as indicated above, has now been reached in both entries and the work should progress more rapidly from this point.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

July 19, 1944 GWH:DCH

AIR MAIL
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is being submitted regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is little or no change in conditions with respect to this mine, other than that air samples were collected July 15; the analyses of these samples are as follows:

	No. 1 drift 2:35 p.m.	No. 2 drift 2:34 p.m.
Carbon dioxide	2.5	2.8
Oxygen	2.6	1.0
Carbon monoxide	0.07	0.07
Methane	32.4	35.5
Nitrogen	62.43	60.63

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There has been little change in conditions in this mine. Temperature readings have been taken at the Ten-mile borehole (completed last Friday) and these from 5 a.m. yesterday to 11 a.m. today range from a low of 65°F. with negative pressure to a high of 130°F. with positive pressure.

As previously indicated, I expect to attend a conference regarding this mine on Saturday, July 22. Samples collected July 17 are in the process of being analyzed and samples which will be collected July 19 will be analyzed in preparation for this conference. In addition, portable potentiometer readings will be made at the bottom of the Ten-mile borehole either July 20 or 21.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Cole reported at 1:15 p.m. today that the left slope is in 64 feet and the

cc: (1) Denny (2) Files - 3 copies ✓

EKM.

right slope 60 feet. This indicates about 4 feet progress in the last 24 hours. The water has been pumped from both slopes and they have been timbered. They are not quite at the bottom of the coal yet, but the next 24 hours should put them in position to level off having normal coal height. Better progress may be expected on both entries now that more favorable roof conditions have been encountered. A measurement of the coal by drilling vertically at the face indicates there is approximately 66 inches of coal.

A sample taken at 2 a.m. at the 9-inch borehole contained the following constituents, as analyzed by the orsat:

Carbon dioxide	3.8 percent
Oxygen	7.0 percent
Carbon monoxide	0.6 percent
Methane	4.2 percent

Messrs. Grove and McCall have gone to Powhatan mine for a conference with the company officials and State mine inspectors today.

Very truly yours,

E. R. MAIZE, Acting For
G. W. GROVE
Supervising Engineer
District A

P. S. The following mine-air analyses have just been received from the laboratory, the samples having been collected at the 9-inch borehole at the Powhatan mine on July 16 and 18 and analyzed at Pittsburgh:

	July 16 4:00 p.m.	July 18 11:00 a.m.
Carbon dioxide	4.7	4.3
Oxygen	5.3	6.6
Carbon monoxide	1.1	0.9
Methane	5.7	5.1

E.R.M.

July 18, 1944 GWS:DCH

AIRMAIL - SPECIAL DELIVERY
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the three important sealed mine fires in this district:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions in the mine and no reports of analyses have been received since the ones shown in my letter of yesterday. However, two samples were received yesterday, reports of analyses of which it is expected will be available sometime later this afternoon or tomorrow morning. Mr. Ober, vice president of the company, called me today and stated, as indicated in my letter yesterday, that he had gone to Charleston to confer with Mr. Redyard regarding opening the mine. He apparently was not able to get any decision from Mr. Redyard as to opening the mine at the present time or any definite date as to when it might be opened in the future. Mr. Ober stated that he had proposed to Mr. Redyard that he permit them to erect seals inby the first right dip entries, pump the water from these entries, and ventilate them with a view of recovering the equipment, most of which is now under water in this set of entries, but that Mr. Redyard again was not receptive to this idea. It therefore is not possible to indicate at this time when the mine may be opened up.

After the next reports of analyses have been received, if there still is an appreciable reduction in the carbon monoxide, I am going to propose to Mr. Redyard that a conference be held with him, company officials, and Bureau representatives, with a view of further considering the possibility of opening the mine.

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pa.- There has been little change in conditions at this mine, excepting that the last reports of analyses looked considerably better than anything we have had up to the present time. This may be influenced to some extent by the introduction of

(1) Denny (2) Files (3 copies) ✓

additional carbon dioxide gas which was completed last Saturday. The latest samples received were collected on July 14 and 15, and the analyses are as follows:

	Carbon dioxide	Oxygen	Carbon monoxide	Methane	Nitrogen
July 14					
River slope	3.2	8.6	less than .005	8.2	80.0
Chartiers slope	5.3	3.8	0.2	10.0	80.7
July 15					
140 feet down hoist shaft	5.6	2.1	0.2	11.8	80.3
121 feet down Ten-mile borehole	5.5	1.8	0.2	11.9	80.6
Chartiers fan	5.5	2.3	0.2	11.3	80.7
Lippincott airshaft return	4.8	1.5	0.4	21.5	71.8
Borehole on Cox farm	3.0	2.0	0.5	27.5	67.0

As stated above, these samples are by far the most uniform and look considerably better than any previous samples, in that the oxygen ranges from 1.5 percent to 3.8 percent, with the exception of one sample that shows 8.6 percent. The carbon monoxide also is down to 0.2 in four samples. The temperature today at 10:30 a.m. in the new borehole directly over the fire was 160°F. and at 11:30 a.m. it was 96°F. (In the above samples this borehole is shown as "Ten-mile borehole," so named because it is alongside of "Ten-mile Creek.") This is rather typical of how the temperature readings which have been taken quite frequently fluctuate. I believe this is due to internal circulation and hot air currents reaching the vicinity of the borehole and then cooler air moving in from some other places as a result of internal circulation.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Charles Cole reported about noon today that the work on the driving of slopes and entries did not progress very much during the last 24 hours. Both openings were driven a distance of 4 feet during that time. The lack of progress was due to considerable water being in the openings and to the fact that considerable time was spent timbering and securing the sides of the new slope openings. The one slope has been driven its maximum distance of 60 feet and is now at the bottom of the coal bed; the other one is in 56 feet and still has 4 feet to go until it reaches the bottom of the coal bed, after which both openings will be driven in coal. A sample collected from the 9-inch borehole by using a hose and vacuum pump for about an hour when analyzed on an orsat apparatus at the mine contained the following:

Carbon dioxide	3.2 percent
Oxygen	6.7 percent
Carbon monoxide	0.6 percent
Methane	4.5 percent

This sample was taken about 5 o'clock this morning.

As indicated in my letter yesterday, Mr. McCall and I are going to attend a conference at Powhatan mine tomorrow afternoon with company officials and State mine inspectors regarding this fire.

Another letter will be sent to you tomorrow giving you such information as we may have.

Very truly yours,

G. W. GROVE, Supervising Engineer, District

July 17, 1944 GWO:BCH

SPECIAL DELIVERY
Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following is information regarding the fires in the Katherine No. 4, Emerald, and Powhatan mines:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, W. Va.- There is no change in conditions at this mine; however, in talking with Mr. Ober, vice president of the company, today he advised us that he is going to Charleston, W. Va., to, as he expressed it, "bring some pressure on Mr. Redyard to open up the mine." Therefore, there may be some developments in the relatively near future. The analyses of the latest samples collected on July 12 are as follows:

	No. 1 drift 9:15 p.m.	No. 2 drift 9:13 p.m.
Carbon dioxide	2.80	2.70
Oxygen	0.50	1.10
Carbon monoxide	0.09	0.09
Methane	35.80	34.60
Nitrogen	60.81	61.51

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pennsylvania. The borehole mentioned in our last letter, which was being drilled immediately over the fire area, has been completed and 8 tons (16,000 pounds) of Cardox was put into this hole. The Cardox was run through a 1-1/4-inch pipe on the inside of the diamond drill hole immediately above the fire area, and the liquid carbon dioxide was fed in at a rather rapid rate. Thermometer readings were taken on Saturday night, July 15, after the Cardox had been introduced into the hole, and at 8:45 p.m. the temperature was 50°F. At 10 p.m., it was 45°F. and at 11 p.m., 50°F. Today the temperature was 72°F. Presumably, the carbon dioxide had an effect on cooling the air for a shorter or longer period, but it is believed that the temperatures before very long will come back to about where they were before, in the vicinity of 100°F. to 120°F.

cc: (1) ~~Denny~~ (2) Files

Samples will be collected from this borehole daily, and from various other sampling points about three times a week.

As mentioned previously, a conference between State mine inspectors, company officials, and Bureau representatives is to be held on Saturday, July 22, at 10 a.m. at the Emerald mine, at which time the feasibility of air-locking down the Chartiers slope will be discussed.

There are no later analyses than those contained in our letter of July 15; however, the gas laboratory advised me that the samples which were collected on Saturday are now in the laboratory for analysis.

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. Charles Cole reported about 1:30 p.m. today that the work is progressing on the slopes being driven to intersect the coal bed. One of these slopes has been driven 56 feet and has about 15 feet more to go before it reaches coal. The other slope has somewhat further to go. The slopes are being driven on a 17-degree pitch and, apparently, still have some distance to go before they can actually start driving in the entries. They advanced 10 feet during the last 24 hours.

A sample was collected and analyzed on an orsat apparatus last night from the 9-inch borehole. The borehole was under negative pressure, but by using a hose and a vacuum pump a sample that was thought to be representative was obtained. The analysis of this sample on an orsat apparatus, made at the mine, is as follows:

Carbon dioxide	3.8 percent
Oxygen	7.6 percent
Carbon monoxide	0.6 percent
Methane	4.8 percent

I might add that we have been requested to attend a conference between State mine inspectors and company officials at 2 p.m. on July 19. Doubtless, at this conference plans will be discussed. We will attend and will give you further information regarding it after it has been held. A letter will be sent to you tomorrow to give such information as we may have by that time.

I am enclosing herewith for your information and for possible photostating letters received from Mr. A. J. Ruffini, vice president of the Powhatan Mining Company, and from Mr. Marcus Kerr, Chief of the Division of Mines, Department of Industrial Relations of Ohio, expressing appreciation for the cooperation and work of the Bureau in connection with the mine fire at the Powhatan mine.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

Encl.

July 15, 1944 MCH:DCH

Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

The following information is being sent you in compliance with the request made by Mr. Denny by telephone this morning:

1. Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia.- The date for the opening of this mine has not yet been decided on by Mr. Jesse Redyard, Chief of the West Virginia Department of Mines. The analyses of the latest air samples collected at this mine on July 9, are as follows:

	No. 1 drift 8:05 p.m.	No. 2 drift 8:08 p.m.
Carbon dioxide	2.90	2.60
Oxygen	0.60	2.20
Carbon monoxide	0.08	0.07
Methane	35.00	32.00
Nitrogen	61.42	63.13

2. Emerald mine, Emerald Coal and Coke Company, Clarksville, Pennsylvania. The date has not been decided upon for opening the Emerald mine. A conference which was to have been held between State, company, and Federal representatives on July 18, has been cancelled and will be held on Saturday, July 22, at 10 a.m. The company had a diamond-drill hole sunk over the location of the fire on Friday, July 14, and air samples will be collected from the foot of this drill hole today. Mr. William Stevenson this morning informed this office that a thermometer lowered in the drill hole last night registered 120 degrees after it was pulled to the surface, having been allowed to remain at the foot of the drill hole 30 minutes. This was not a maximum and minimum thermometer and the temperatures were undoubtedly higher than 120 degrees at the foot of the drill hole. Analyses of the last samples received in Pittsburgh from the Emerald mine are as follows:

cc: J. J. Forbes
(1) Denny (2) Files

	Carbon dioxide	Oxygen	Carbon monoxide	Methane	Nitrogen
Lippincott airshaft return	4.6	1.9	0.4	19.7	73.40
Borehole on Cox farm	3.0	2.6	0.4	25.0	69.00
Hoist shaft	5.9	1.9	0.2	10.2	81.80
Chartiers fan	7.0	2.8	0.3	6.8	83.10
Chartiers slope	5.7	2.5	0.25	9.9	81.65
River slope	3.0	9.2	less than .005	7.0	80.8

3. Powhatan mine, Powhatan Mining Company, Powhatan Point, Ohio.- Mr. O. V. Simpson supplied the following information by telephone this morning: The overburden has been removed near Capitain Creek about 1,300 feet from the faces of C north entries, and the electric shovel has been removed from the excavation. A mining and loading machine are already at the new proposed openings and work will be started driving entries in the coal bed on Monday, July 17. It is expected that these entries will connect to the C north main faces in a month. The 3-inch drill hole in 7 left has been plugged so that samples will not be collected at that point. The latest analyses received in this office were collected at the foot of the 9-inch drill hole near the faces of C north entries at 2 p.m. on July 14. The analyses were made at the mine on an orsat apparatus and are as follows:

Carbon dioxide	3.0 percent
Oxygen	10.0 percent
Carbon monoxide	0.9 percent
Methane	5.0 percent

The 9-inch drill hole has been reduced to 2 inches by the grouting of a 2-inch pipe in the hole.

You will be informed daily as to the status of the above three sealed mines, in accordance with Mr. Denny's instructions.

Very truly yours,

M. C. McCall

M. C. McCALL, Acting For
G. W. GROVE
Supervising Engineer
District A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

~~OFFICE OF THE DIRECTOR~~

May 19, 1944.

Mr. G. W. Grove,
U. S. Bureau of Mines,
Pittsburgh 13, Pennsylvania.

Dear Mr. Grove:

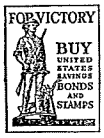
I note from your letter of May 12 that Mr. Redyard is being "pressured" in connection with the opening of the Katherine #4 mine in West Virginia, but that he is holding to his stand that nothing towards the reopening will be done until the air analyses indicate that the fire is extinguished.

I think he is to be commended for his firmness in not taking too many chances, but my interpretation of the analyses of air taken at the seals, as given in your letter of May 12 to him, is that the fire is now extinguished even though there is CO around 1% at or near the seals. With oxygen less than 3% and CO_2 over 3%, I am of the opinion that much if not all of the CO is now residual and that the atmosphere in the fire region is likely to be free of CO_2 and probably consists of nearly pure methane. However, it is Mr. Redyard's right to make the decision and I don't think we should interfere.

at or near the seals near the surface.

Very truly yours,

D. HARRINGTON,
Chief, Health and Safety Service.



May 19, 1944 GWG:BCH

Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

You will no doubt be interested in knowing that a conference was held at Shinnston, West Virginia, on Tuesday, May 16, regarding the possibilities of opening up the Katherine No. 4 mine of the Katherine Coal Mining Company, at Lumberport, West Virginia. The persons attending this conference were as follows:

West Virginia Department of Mines.- Jesse Redyard, chief,
Peter McLinden, inspector-at-large, and Thurman B. Horner,
district inspector
Company officials.- Earle Ober, vice president, and John
Hogue, superintendent
Bureau of Mines.- M. C. McCall, W. D. Walker, Jr., and the writer

After discussing the situation from various angles, Mr. Redyard was of the opinion that he did not care to open the fire area with the high carbon monoxide content shown in the most recent samples. He still is of the opinion that the carbon monoxide should be reduced to a comparatively low figure and that, if the carbon monoxide disappears and the mine is left standing 10 days or 2 weeks, it would be comparatively safe to reventilate the sealed area. He seemed to think that, while it would be feasible to air-lock and recover the bodies, it would be almost as quick, if not as quick, to wait longer and then recover the mine with direct ventilation.

The final conclusion was that another conference will be held on May 26, at which time, depending on the carbon monoxide content on about that date, future steps will be decided upon. Incidentally, I have just received a report from the gas laboratory that a sample collected on Tuesday afternoon, May 16, still contained 0.71 carbon monoxide.

I might add that on Wednesday Messrs. Walker, McCall, Quenon, and I accompanied Mr. Redyard and two of his inspectors, together with company

cc: ~~(1) Denny~~ ✓ (2) Files
Room 161

officials, into the Pursglove No. 15 mine, where one body has not yet been recovered from the fire which occurred in January 1943. Sufficient of the fire area has been loaded out so that the locomotive (the operator of which is the missing man) has been reached. Both decks, front and back, have been uncovered, although there is still a considerable fall on the remainder of the locomotive, but no indications of the motorman's body have been found.

The recovery work will be continued by loading out the material until the locomotive and the 23 cars comprising the trip have been recovered and the remaining part of the entry toward the air shaft cleaned up. It is still expected that the body of the motorman will be recovered during this work.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

May 5, 1944 GWG:BCH

Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

This will acknowledge receipt of your letter of May 2 regarding the sealed fire area in the Katherine No. 4 mine of the Katherine Coal Mining Company, Lumberport, Harrison County, West Virginia, in which you state that the carbon monoxide seems to be rather prevalent in the samples, also that presumably this means that the fire is still existent, and that it will be some time before the opening of the mine can be attempted. It is noted that you would like me to give you an up-to-date picture of the status of conditions.

Please be advised that little or nothing further has been done since I talked with you, excepting to collect air samples periodically, results of which analyses have been sent to you from time to time. It is my understanding, in talking with Mr. Walker over the telephone, that Mr. Redyard has stated that no recovery work will be started until the carbon monoxide is reduced to 0.05 percent. If this is true, apparently additional time will be necessary, as two samples collected at 3 p.m. on May 3, analyses of which I have just obtained, show 1.1 percent as being the carbon monoxide content. Other gases in these samples are carbon dioxide 3.8 percent, oxygen 2.4 and 2.5 percent, and methane 19.8 percent in both samples.

I might add that I am sending Mr. Senio to West Virginia on Monday to start oxygen breathing apparatus training for at least two teams, composed of employees of the Katherine Coal Mining Company. This was requested because the State apparently had difficulty in obtaining more than four State teams and the plans seem to be to use six oxygen breathing apparatus teams on either three or perhaps four shifts a day. This work, of course, will require all of the coming week and perhaps some additional time

I expect to go to West Virginia next week and will see Mr. Walker and perhaps others at the same time. Any additional information obtained will be forwarded to you promptly.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

cc: (1) ~~Denny~~
(2) Files
Room 161

May 12, 1944 GWG:DCH

Mr. D. Harrington
Bureau of Mines
Interior Building
Washington (25), D. C.

Dear Mr. Harrington:

With further reference to the Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia, please be advised that I was in West Vrginia the early part of this week and, in discussing this matter with Mr. Walker, he informed me that there has been no definite time set for opning the sealed fire area.

Mr. Walker stated that he and company officials had a conference with Mr. Redyard and an effort was made to pin him down to a definite date, such as May 5, but he would not agree to fixing a date. He further stated that he did ot think a date could be fixed because of the unknown conditions that miht prevail on any definite date with respect to the carbon monoxide.

As itated to you previously, Mr. Redyard has indicated that he will not consideropening the fire area until the carbon monoxide has been reduced to 0.05 perent. I have just received the report of analyses of samples collecte on Monday, May 8, which indicates that the samples from the Nos. 1 and 2 drft fire seals contain 0.96 and 0.99 percent carbon monoxide, respectibly. This is the first time that the samples have shown less than 1 percen. At the past rate of reduction of carbon monoxide, several more weeks prably will be required to reach the figure at which Mr. Redyard indicatehe would be willing to open the sealed area.

I mht add that Mr. Walker informed me that considerable pressure is now being brght to bear on Mr. Redyard to open the area by the widows of the men killed anstill sealed in the explosion area. He stated that some of them have obtaed legal advice and that they are apparently going to try to force Mr. Redyal to take action. However, according to a public statement issued by Mr. Reard, which appeared in the newspapers on Sunday, May 7, he will take no adon towards opening the area until he is convinced that the fire is definitly out, as shown by air analysis.

Very truly yours,

G. W. GROVE
Supervising Engineer
District A

cc: (1) ~~Day~~ (2) Files
Foom 3

25, D. C.

May 19, 1944.

Mr. C. W. Grove,
U. S. Bureau of Mines,
Pittsburgh 13, Pennsylvania.

Dear Mr. Grove:

I note from your letter of May 12 that Mr. Redyard is being "pressured" in connection with the opening of the Katherine #4 mine in West Virginia, but that he is holding to his stand that nothing towards the reopening will be done until the air analyses indicate that the fire is extinguished.

I think he is to be commended for his firmness in not taking too many chances, but my interpretation of the analyses of air taken at the seals, as given in your letter of May 12 to him, is that the fire is now extinguished even though there is CO around 1% at or near the seals. With oxygen less than 3% and CO_2 over 3% I am of the opinion that much if not all of the CO is now residual and that the atmosphere in the fire region is likely to be free of CO and probably consists of nearly pure methane. However, it is Mr. Redyard's right to make the decision and I don't think we should interfere.

Very truly yours,

D. Harrington

D. HARRINGTON,
Chief, Health and Safety Service.

cc: ~~Mr. E. H. Denny,~~
Pittsburgh 13, Pa.

C
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CORONERS VERDICT

Rendered Court House, Harrison County, West Virginia, August 11, 1944

County of Harrison, State of West Virginia

We, the undersigned, coroners jury at the inquest of the death of John Spiker and others, which occurred at the Catherine Mine No. 4, March 25th, 1944, find that these men came to their death as a result of negligence on the part of the West Virginia Department of Mines in that said Department of Mines failed in the enforcement of their mine laws.

We also find the Catherine Coal Company, guilty, in a lesser degree, of breaking said laws, inasmuch as an effort was made to correct these violations.

Signed Frank Abruzzino
H. M. Garrett
Richard K. Gerrard
F. L. McDaniel
Frank DePace
Loring M. Griffin

This is a correct and exact copy of the verdict rendered by the Coroners Jury at the inquest of John Spiker and others.

/s/ L. H. Hills, M.D.
Coroner, Harrison County,
West Virginia

Mine portals, Katherine No. 4 mine, Katherine Coal Mining Company, Lumberport, West Virginia
(prior to mine fire and explosion March 2nd, 1944)