# DEPAREMENT OF COMMERCE BUREAU OF MINES SAFETY DIVISION

REPORT OF GAS AND DUST EXPLOSION IN MINE NO. 6. SUNDAY CREEK COAL COMPANY, MILLIFIELD, ORIO NOVEMBER 5, 1950

## By

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# HEPORT OF GAS AND DUST EXPLOSION IN MINE NO. 6. SUNDAY CREEK COAL COMPANY, MILLYTELD, OHIO NOVEMBER 5, 1930

## INTRODUCTION

A localized gas and dust emplosion occurred in the north-westerly section of Mine No. 6 (Appendix A) of the Sunday Creek Coal Company, near Millfield, Ohio, on Wednesday, November 5, 1950, resulting in the death of eighty-two men, listed in Appendix F, of whom two were killed outright by the force and flame of the explosion; six by combination of burns and afterdamp; and seventy-four by afterdamp. About one hundred and forty men escaped or were rescued following the explosion. Of these one hundred and nineteen escaped with little or no assistance; two were rescued from behind a barricade.

Notice of the explosion was received at the Bureau of Mines about 1:45 p.m. on November 5 from the Associated Press; and after a confirmation of their report, mine safety car No. 3 and crew - W. D. Walker, Jr., and R. A. Morgan then at California, Pa.; the Pittaburgh Safety Station mine-rescue truck with Messrs. J. J. Forbes, G. W. Grove, and K. L. Marshall; and S. P. Howell and H. R. Burdelsky by auto, left Pittaburgh, the truck first at 2:30 p.m., and all arrived at the mine by 9:45 p.m., November 5.

Because several of the officials of the company had been killed or entombed by the explosion, rescue work did not progress

perhaps with that speed and precision with which it otherwise would have, although all bodies had been taken out of the mine by 6:30 a.m., November 6, except four which were discovered on the afternoon of Hovember 7 and removed from the mine by 11:00 p.m.

Ventilation had been sufficiently restored by Sunday marning, Nevember 9, so that the official investigation could be made.

This was done Sunday between 10:55 a.m. and 4:20 p.m.; dust and air samples were taken on November 9, 11, and 15; the coroner's inquest was held in Millfield, Ohio, on November 12 and the ear and truck left the mine for Pittsburgh the afternoon of November 14.

recovery operations or in the investigation. They were J. J. Forbes, G. W. Greve, K. L. Marshall, S. P. Howell, H. R. Burdelsky, W. D. Welker, Jr., R. A. Morgan, M. J. Ankeny, W. H. Tomlinson, J. C. Marshall, Jr., and J. M. Webb.

#### LOCATION

Mine No. 6 of the Sunday Greek Coal Company is located in Dover Township, Athens County, Ohio, about one mile east of the unincorporated village of Millfield, Ohio.

The mine is served by a switch from Millfield of the Ohio Central Lines of the New York Central Railroad.

#### COMPANY OFFICIALS

The offices of the Sunday Creek Coal Company are in the Outlook Building, Columbus, Ohio. The officers there were:

George K. Smith, chairman, Board of Directors, and secretary

C. C. Cook, treasurer

P. A. Com, vice-president

William E. Tytus, president

H. H. Upson, assistant to the president

R. J. Jones, assistant chief engineer

# Other general officers of the company were:

H. E. Lancaster, chief engineer, Tiltonville, Chie. C. H. McKinley, district superintendent, Athens, Chie.

#### The officers of Mine No. 6 were:

Malter Hayden, superintendent, Glouster, Ohio. John Bean, mine foremen, Millfield, Chio. R. A. Marshall, assistant mine foremen, Glouster, Chio. Thomas Harley, assistant mine foremen, Millfield, Chio.

#### BAPLOYEES

There were about 370 men normally employed at Mine No. 6, approximately 225 of these being employed underground on the day shift.

#### DAILY PRODUCTION

The daily production averages about 1500 short tens.

For about a month prior to the explosion the mine was eperating about 5 days per week.

#### THE MINE

Mine No. 6 of the Sunday Creek Coal Company is a shaft mine. It was operating in the No. 6 bed which generally in this field dips southeasterly about 28 feet per mile. The mine is served by three shafts, a 3-compartment main shaft, 187.5 feet deep, which

is the full main return for the ventilation, and equipped with cages operated in belance used for hoisting coal and rock, raising and lowering men and supplies. The dimensions of this shaft are 24 feet by 10 feet 6 inches.

The second shaft, located about 300 feet from the main shaft, is used as a fan shaft and is the main air inteke. This shaft is 176.5 feet deep. This shaft is about 15 feet by 20 feet in section.

A new air shaft completed about six months age, but not in operation at the time of the explosion, is 176 feet deep. The new air shaft is located about 7100 feet from the main shaft. This shaft is divided into two compartments, one of these containing a stairway, and the other being for use as a fan shaft. A small fan was being installed over this shaft at the time of the explosion. The shaft, however, was sealed off from the active workings of the mine by stoppings located at and near the bottom of the shaft. One of these stoppings was partially wrecked by the explosion and this had an important bearing on the rescue and recovery operations, as will appear later.

Surface scenes at Mine No. 6 are shown in Appendix D.

The Goal Bed:

The No. 6 bed is a non-frieble, medium rank, bituminous coal. The bed has a fire clay floor and in some places it is smooth and hard, such as near the fact of No. 5 N. entry on 18 R. off main

north. Above the coal is 12 to 14 inches of bone above which is a thin layer of slate and then about 60 feet of sandstone.

When the coal is overcut the immediate top is bone coal but when the coal is undercut the immediate top is slate. There is a very hard rock parting, about 2-1/2 feet from the floor. The roof stands well.

# Sections of the No. 6 Bed:

Sections of the No. 6 bed, corresponding to the location where face samples were taken, are given in detail in Appendix H, both graphically (Figure 1) and by individual sheets.

The total thickness of the bed varies from 4 feet, 4-1/2 inches to 6 feet, 7-3/4 inches. Bone or other impurities occur in one to three places in the bed, each varying from 1/2-inch to 11 inches. The thickness of the coal samples varied from 4 feet, 3-1/4 inches to 5 feet, 9 inches.

#### The Coal:

Six samples of face coal from the Mc. 6 bed were taken on Movember 11 and 15, 1950, in Mine No. 6, Sunday Creek Coal Co., Mill-field, Ohio, by J. M. Webb, R. A. Morgan, and J. O. Marshall, Jr., of the U. S. Bureau of Mines.

The coal analyses reports of these and of the composite cample are included in Appendix G of this report. The location where the samples were taken is shown on the map (Appendix A). Table 1 shows these analyses:

Date,: Lab. : Location  1007. : No. :  11 A-66126 10 feet from face of 17  12 A-66235 60 feet from face of 5 N.  13 A-66235 60 feet from face of 5 N.  14 A-66235 12 feet from face of 2 N.  15 A-66237 12 E. off lain N. Manlage entry  15 A-66237 12 E. off lain N. Manlage			. Vola-:Vismed: : \$110 : car-: Ash : : \$150 : car Ash : : \$15		4		place : walue.	3	Retto
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The average air-dry less is 2.5 per cent. On the "as received basis the average total incombustible (moisture plus ash) is 14.7 per cent. The average ratio of volatile matter to total combustible is 41.5 per cent.

The proximate analysis of the average sample - A-66126 - computed ash-free, places this coal as a medium rank, bituminous coal,

of the six samples, sir-dry loss varied from 1.6 to 3.4 per cent; the moisture from 7.7 to 9.8 per cent; the volatile matter from 34.7 to 36.0 per cent; the fixed carbon from 48.7 to 51.5 per cent; the sah from 5.2 to 7.4 per cent; the sulphur from 0.5 to 1.1 per cent; the B.t.u. from 12,090 to 12,420; the softening temperature of ash from 3420 to 2860 degrees F.; and the ratio of volatile matter to total combustible from 0.40 to 0.42.

in case no gas is present, will require at least 65 per cent of incombustible dust. Some of this incombustible content is provided by the moisture and ash of the coal, but what the net effect of this and other variables will have on the quantity of added rock-dust required to prevent propagation of an explosion will be given after tests of the five-ton sample of coal from Mine No. 6 have been made at the Bureau's Experimental Mine.

# Coal Preparation:

The coal is all prepared in a new Jeffries screening plant equipped with picking belts. This new plant was ready to operate about June 16, 1930; a total of about 72,000 tens of coal has been

run over it, most of this since August 1, 1950. Four pickers can be used on each belt. Some rock is picked off the railroad cars. Besides a domestic bin there are four loading tracks.

The following table shows the designation of the sized products, size of sereen on which or through which collected, the percentage of each size, and the use of each size:

Designation	Size	Percentage	Use
Lump E <b>SS</b> Nut	On 4-inch On 2 x 4-inch On 12-inch	32 28 10.5	Domestic Railroad Power plants
Slack	Through Li-inch	29,5	Philo power plant

For general power plant use the slack and nut are mixed, but before mixing the nut is run over the picking belt.

The No. 7 Bed:

About 125 feet above the No. 6 bed is the No. 7 bed. It is 3-1/2 to 4 feet in thickness, and in the immediate vicinity of Mine No. 6, the Sunday Creek Coal Co. has a mine - No. 7 - opened in this upper bed. It is pretty well worked out, and the main entries of the No. 7 Mine lie directly above the 3rd and 4th N. entries of the No. 6 Mine. There is a little standing water in Mine No. 7, and it was stated that none of the caves in the worked-out areas in Mine No. 6 had extended up to Mine No. 7.

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15.0	8.6	4.8	85.0	83.0	A.09	7.80	738	1.8

This ecal when in the form of dust suspended in air is emplosive. Because the usual deposits of coke on outby and inby surfaces were not visible, the designation of this explosion as a gas and dust explosion and not simply a gas explosion is founded on the cepious supply of coked particles of dust deposited throughout and beyond the entire explosion area and an estimation of the relative quantity of coked particles as made by the Coal Analysis Section of the Bureau of Kines in all of the dust samples taken. Photomicrographs of coked particles at 12 diameters are shown in Appendix E.

Much dry coal dust was observed throughout the mine, especially in the region affected by the explosion.

were taken; the position at which taken, that is, road, rib and roof, tipple, etc.; the proximate analyses of the samples; the relative quantity of coked particles found in the sample, if any; the finances of the dust; and their apparent wetness or dryness when taken. The locations where the dust samples were taken are shown on the map (Appendix A). The individual dust-analysis report sheets are given in Appendix I arranged numerically by laboratory sample numbers. The data are grouped in Table 2 by areas as follows: 18 samples from within area of flame; 12 samples without, but mear, area of flame; 35 samples remote from area of flame; and one sample from tipple.

Normally the mine is dry but on November 11 and 15 when the dust samples were taken, the roofs and ledges apparently had an unusually large percentage of moisture on them.

The dust samples within the flame area indicate an ample quantity of fine dust whose total combustible varied from 46.9 per cent for road sample A-66264 to 75.5 per cent for rib and roof sample A-66267. The three samples of settled dust and six other samples contained large amounts of coked particles and the seven other samples centained small amounts of coked particles. Notable is the very high percentage of minus 200-mesh dust in the rib and roof samples A-66136, A-66140, and A-66285.

The dust samples without, but near, the area of flame indicate an ample quantity of fine dust but whose total combustible varied greatly from 75.1 for road sample A-66137 to 34.2 per cent for road sample A-66272. There was a large smount of coked particles on 17, 18, 19, and 20 west near area of flame and small amounts elsewhere. The significant feature in this group of samples is the very high total incombustible in samples from 19 W. outby 3 N., varying from 44.0 per cent for rib and roof sample A-66271 to 65.8 per cent for road sample A-66272. This is due to the cinder ballast used along 19 W. haulage. The high total incombustible along this haulage—way certainly extinguished the flame along 19 W. outby 3 H. and may have had a determining effect on localizing the explosion because of the release of pressure here at a critical moment.

The dust complex remote from the flame area show an ample

quantity of fine dust and, except for the samples taken on the main haulage roads, had a combustible content varying from 50.2 per cent for road sample A-66127 to 78.1 per cent for road sample A-66243. The dust samples taken on the main haulage roads - main N., 19 W. outby 3 N., 8 W., and 3 H. outby 15 W. - had a total combustible varying from 29.3 per cent for road sample A-66260 to 57.1 per cent for road sample A-66260 to 57.1 per cent

Some 40.5 per cent of the machine cuttings - semple A-56284 passed through 20-mesh, of which 38.5 per cent was through 48-mesh;

19.4 per cent through 100-mesh and 10.2 per cent through 200-mesh and 81.9 per cent was combustible material. Such machine cuttings
were the major source of dust distributed by the ventilating current
and by bankage throughout the mine.

The very fine and high combustible content of the sample of tipple dust is shown in sample A-66282.

#### METHOD OF MINING

The double entry, room and pillar method of mining was used and all mining was done on the advance. No pillars are robbed.

Though some coal is undercut most of the coal is overcut by are wall mining machines. It is shot with pellet powder fired by equibe. Much of the coal is loaded with pit-car loaders, and a larger proportion is to be so loaded.

The pit-car leaders are made by the Northern Conveyor and Manufacturing Co. of Jamesville, Wisconsin, and are equipped with non-permissible 1-1/2 horsepower motors, there being one for each

conveyor.

There is very little timbering on new entries. There was considerable timbering in the old workings.

# Ventilation and Games:

The mine was rated as gamey by the Chic Department of Mines. Two fire because were employed who made pro-shift inspections of active workings, and inspections twice a week of abandoned workings. The pre-shift inspection was made between 3:00 0'clock and 6:00 c'clock, a.m., and after 6:00 c'clock these fire bosses were mostly employed in building brattices.

The fire bosses only carry flame safety lamps, and these were of the non-permissible Welf key-locked type, but were not locked.

Installed at the fan shaft was a double side inlet 7-foot fan operating blowing. By the operation of doors, the air current could be reversed. It was normally operated on 6-points, that is, about 75 per cent of full speed. The fan was equipped with a 60-inch pulley belted to a 20-inch pulley on a variable speed induction motor, model No. 2017, General Electric, of 100 horsepower, speed at full load, 700 revolutions per minute, on 2200 volts, 5-phase, 50-cycle, alternating surrent.

A steam engine was installed in the fun house as a secondary source of power and previously, prior to a water shortage, the fun had been normally operated by this steam engine.

The relation between the points on the starting controller and the percentage of full speed of the motor is estimated as follows:

On 3-point, 50 per cent; on 6-point, 75 per cent; on 9-point, 85 to 90 per cent; and on 12-point, 100 per cent.

At the time of the explosion the fan is said to have been delivering approximately 65,000 cubic feet of air per minute at about 2 inches water gauge.

The mine was ventilated (See Appendix A.) by two separate splits, one split of which presumably ventilated all of the section east of the main north entries. This section was inactive at the time of the explosion. The other split coursed through the area on the west side of the main north entries which included all of the active working places, the inactive third and fourth north, off 19 and 20 west, off the main north, section; and several abandoned unscaled sections. The major portion of the main haulage was on return air and the main shaft served as the main return. It is definitely known that only a small portion of the total intaking air reached the active working parts of this mine.

After ventilation had been restored, air samples and air velocities were taken at the places indicated on the map of the mine (Appendix A) on which is also shown the probable course of the air before the explosion and the course of the air after the recovery operations.

Table 3 shows the quantity of air circulating at the designated points and the quantity of methane produced in the 3 and 4 north section inby 20 west by each of the two splits, and for the entire mine.

These data clearly indicate that the accumulation of gas in sections 5

and 4 off 20 west off main north can be easily accounted for. Details of the analyses of the mine air samples for the different locations are shown in Appendix J. The following remarks apply to the analysis of mine air samples reported in Table 5.

Sample laboratory No. 53166 was taken during the recovery operations and before the stoppings between 20 and 21 east off 3 north had been erected inby the point of sampling, and when the air directed into these entries was short-circuited outby the point of sampling. At the time of taking this sample, the flame safety lamp showed no indication of carbon monoxide. The sample was taken to confirm these readings, and did so, there being but 0.01 per cent of carbon monoxide and 0.22 per cent of methans.

After recovery operations had been completed and ventilation fully restored in the third and fourth morth off 20 west section, samples 53150-1 were taken on Nov. 9 at the intake to this section, and samples 53156-7 taken in the return from this section. These samples show that this section was making in the neighborhood of 5,270 cubic feet of methane every 34 hours; that the intake air carried 0.16 per cent of methane and the return air 0.20 per cent of methane; that the entering air carried 27,680 cubic feet of methane per 24 hours and the return air carried 32,950 cubic feet of methane per 24 hours.

Analogous samples were taken on Hovember 11, Nos. 55162-9, the intake air carrying 0.15 per cent of methane, and the return air, 0.20 per cent of methane, while the section was then making 11,780 cubic feet of methane per 34 hours.

These six semples amply demonstrate that substantial quan-

tities of methans were being produced in the section, so that unless ventilated, dangerous percentages of inflammable gas would accumulate there.

On November 9 them, enough methane was being made in this section to fill an entry whose average cross-sectional area was 73 square feet with an explosive mixture of methane and air at the lower limit (5 per cent) for a distance of 1440 feet, and similarly, on November 11, there was enough methane being made in this section to fill an entry with an inflammable mixture for a distance of 3,230 feet.

Presupposing a short-circuiting of the mir to this section, the accumulation of a dangerous percentage of inflammable gas must result.

Table 1 shows further - sample No. 53165 - that the air entering the 15 west off 4 north section is free of methane and that the air returning from this and the 15 west section is making methane at the rate of 17,520 cubic feet per 24 hours with 0.15 per cent of methane.

Most of the air entering 4 north from 20 west off 4 north came from 4 north outby 20 west or from 19 west off 4 north as indicated by a comparison of samples Nos. 53167 and 53162.

Samples Nes. 53154 and 5 show that much of the return air from the west split returned by leaking through the abandoned sections just west of main north.

The full return - samples Nos. 53171 and 2 - carried an average of 0.14 per cent of methane and 90,720 cubic feet of methans

per 24 hours. This is enough methans to fill an entry 75 square feet in cross-sectional area for a distance of 24,850 feet with an inflammable mixture of methans and air containing 5 per cent of methans.

The seven face samples tabulated at the bottom of Table 5 show that methane is being made at all of the faces, the highest percentage being 0.44 per cent at the face of 6 north, sample No. 53168, and that substantial quantities were being made at the face of 22 cast off 4 north and 21 cast off 4 north, samples Nos. 53170, 82. Haulage:

The track gauge is 42 inches and this is standard for all of the mines of the Sunday Creek Coal Gompany, save one.

Forty-pound rails are used on the main line haulage and twenty-pound rails on back entries and rooms. The clearance is 5-1/2 feet on both sides of the track.

Two types of cars are used; one is the square steel and-gate type of 3-tem capacity, and the other the side slope wooden and-gate of 2-tem capacity.

Main and secondary haulage is with trolley locomotives.

Cathering is with erab-real trolley locomotives.

All haulage is on return air except that portion of one of the two main line haulage routes, which is along 8 west off main north and a portion of 4 north off 8 west. Return air is here used to mean other than pure intake air. For haulage 200 to 275 volts direct surrent generated at 275 volts direct current is used. The trolley lines were not guarded at any point either at cross-overs or elsewhere. The new haulage route recently in operation along main north inby 8 west and 19 west off main north outby 4 north had been ballasted with einders thus accounting for the high ash content of the road samples taken on 19 west off main north.

Lighting:

Portable carbide lights were used for illumination by mon and officials. Fixed lights were used at the bottom of the shaft at the landing, at main haulage switches, at all doors and side tracks.

Trips carried no tail lights.

# Mechinery Underground:

No permissible type machinery of any kind was used underground.

The power for all motor-driven machinery was 200 to 275 welts direct current.

There were nine trolley locomotives; two main line locomotives, one switch-haul motor, and six gathering locomotives of the cable-real type.

There were five gathering pumps of which two discharged to the surface.

A total of seven mining machines were in use, five used for overcutting and two for undercutting. Of those used for overcutting three were of the 29-B Jeffrey are wall type, and two of the 29-C Jeffrey are wall type. One of the latter had at one time been per-

missible but it had not been maintained in a permissible condition.

Of the two mining machines used for undercutting one was a Goodman

Universal and the other a Goodman Standard type.

All pit-our loaders, mining machines, and crab-reel locomotives within the area of Appendix B are located therein; these outside this area are located on the map, Appendix A.

There were five power drills. Two were rock drills of the Jeffrey 10-A type; two were Van Dorn coal drills, and snother one probably a Chicago passuratio.

# Pewer:

Steam generated at the mine is used for the hoisting engine and for the standby engine in the fem house.

rolts alternating current to 2500 volts alternating current at the company's main transformer station and is transmitted to three substations located (a) on the surface in the hoist house, (b) underground at 17 east just off main north, and (c) underground in the first crossent between 5 north and 6 north just inhy 20 west (Appendix A).

The equipment at the three substations is identical and consists of a 150 kilowatt General Electric Rotary Convertor (motor-generator set), the motor being a 206-volt alternating current, 3-phase, 60-cycle, and the generator being 275 volts direct current; and a transformer, the in-current being 2500 volts alternating current; and the outgoing current 206 volts alternating current. Each of the

three substations is provided with a switch at the substation; the two underground substations are provided with switches at the surface; and the current may likewise be cut off of each at the main transformers.

The motor for the fan previously described operates at 2500 volts alternating current.

The underground substation between 5 north and 6 north is a new substation, is served by an armored cable hung in the new air shaft, and was in operation at the time of the explosion.

The other underground substation at 17 east near main north is served by an armored cable in a borehole to the surface.

All power used underground is 200 - 275 volts direct current.

The explosion caused the power to go off the mine as evidenced by the circuit breaker at the hoisting room opening at 11:45 a.m., Hovember 5, 1950, and the automatic reclosing switch would not stay reclosed, and would open promptly when closed manually so the switch was opened here. Workman at the collar of the new air shaft pulled the switch there promptly after the explosion. The substation at 17 east near main north was evidently entirely forgotten since its motor-generator set was found running at mid-day on November 10 when the fire bosses inspected the entire mine but because of a short circuit in the mine the automatic reclosing switch was then open and presumably had been for the preceding five days. Then one of the fire bosses pulled the switch at this substation.

About 1:00 p.m., November 5, when Deputy Mine Inspector Ginman

and District Superintendent McKinley were in the mine, power from the substation at the main shaft was put on the main haulage outby 5 north on 8 west and main north and used to move the loaded trip them on 8 west to main north where it was placed on main north just inby 8 west.

About 4:00 p.m., when Chief Inspector E. W. Smith arrived at the mine, power from the substation at the main shaft was cut off the mine.

# Explosives:

The explosives used in the six mines of the Sunday Creek Coal Company are received in carload lots at Murray City and are transported to the distributing magazine for Mine No. 6 (See map, Appendix A.) by a small automobile truck not especially equipped for the purpose. As observed, a home-made cardboard sign, "Explosives - Danger", hangs on the front of the truck at all times.

Mine No. 6 distributing magazine is located about 3800 feet west by southwest from the tipple in an isolated hilly section. It it 2500 feet from the Millfield School, 2000 feet from the mearest public road, 1800 feet from the main transformer station, and 1600 feet from the nearest inhabited dwelling.

The magazine is not barricaded.

The magazine is 10 feet by 12 feet in plan; the wells are 7 inches thick of two inside layers, of 6-inch tengue-and-groovs, blind nailed lumber, and two outside 1-inch thicknesses of oak lumber with staggered joints. The wall has a 4-inch space filled with sand. The

immediate roof is a tray of sand above which is an air space. The floor is of wood and is blind-nail. The door, 3 feet wide, is made of 1/4-inch steel plate and two 1-inch thicknesses of oak and is secured shut by two straps of steel, but at the time of inspection but one of these was secured with a padlock. The one outside step was not in good repair. Except for the bolts in the door which secured the steel plate to the oak, no metal was exposed on the inside of the magazine. The magazine was well designed and well constructed. The space above the sand tray was ventilated by a single louvre window.

The space about the magazine was clear of all dry combustible matter except a little dry bush against one side of the magazine.

At the time of inspection on November 13, this magazine contained nine 25-pound cases of pellet powder, No. 18, 1-3/8 by 8-inch cartridges manufactured by the E. I. DuPont de Nemours & Company; fifteen 50-pound cases of "C" Extra Dynamite, 1-1/2 by 7-inch cartridges, manufactured by the DuPont Company; and eleven 50-pound cases of 1-1/4 by 8-inch 20 per cent strength extra Red Cross dynamite also made by the DuPont Company.

Explosives (pellet powder) are delivered to the mine just prior to 3:00 o'clock on Friday afternoons by automobile truck of ne special construction, in the original 25-pound boxes. The explosives are transferred to a powder car which is placed on the cage during the night shift, after 5:00 e'clock p.m. The powder car is hauled alone by a trolley locamotive, from which the explosive is delivered to the

working places. Insulated couplings are not used.

As originally made, the powder car was of wood completely enclosed and had four slide lids on the top, each covering about one-quarter of the top of the car. No metal was exposed on the inside of the car. The car had no brakes.

As observed outside, it had but two slide lids in place and the grooves in which the other two slide lids had been placed were not on the car. In fact, the car had the appearance of not having been used for some time, and there was considerable sawdust or woodmanl in the bottom of the ear as though it had been used as a cushion.

It is judged that this powder car is not suitable to even be repaired and a new powder car should be built.

It is understood that dynamics mentioned as being in the magazine was used during the recent construction work along main north and 19 west off main north, and that at the present time little dynamics is used in the mine.

and rook is blasted with 40 per cent or 60 per cent strength low freezing dynamite. Shooting is done in most cases by the miner any time during the working shift although in one section shot-firers are employed who blast during the shift.

Power augers are of 1-3/4 to 2-inch gauge for the starter, and three lengths are commonly used, the bottom of the hole being at least 1-5/8 inches in dissector.

Most of the coal is overcut to a depth of six feet with an

are wall mining machine; the holes are about 6 feet deep. The maximum charge used per hole in shooting soal is four cartridges (sixteen pellets). Machine cuttings are often used for stemming.

After the explosion there was found in the first break-through east of 3 north between 19 and 20 west, ten full and one open box of pellet powder. The cartridges from the open box were scattered about, and both boxes and cartridges were discolored by the coal dust.

After the explosion there was found on 20 west off main north about 400 feet west of main north on top of an old fall two half-cartridges of dynamite. Both half-cartridges were wet.

The eleven boxes found in the crosscut were placed here for the use of the shot-firer on the afternoon shift. He uses explosives in substantial quantities.

If the supply of explosives delivered on Friday afternoon is not adequate to last the entire week, small additional quantities are sometimes delivered on Tuesday afternoons and taken underground on the night shift.

# Drainage:

The mine makes but little water which it easily handles by the five gathering pumps, two of which discharge to the surface.

Rock-Dusting and Matering:

No rock-dusting has been done in this mine.

No watering is done to allay dust in any part of the mine. Furthermore, the mine is naturally dry and dusty.

#### CONDITIONS IMMEDIATELY PRIOR TO THE EXPLOSION

The barometer at Ohio University, Athens, Ohio, about seven miles from Mine No. 6 had fallen gradually from 29.80 inches of mercury at 2:00 a.m., November 5, to 29.45 at noon, November 5, from which time it started to rise gradually. The temperature at Athens, Ohio, at noon on November 5 was 51° F.

The mine had worked the two days previously, that is, November 3 and 4, and since November 4 was Election Day, a short shift of six hours was worked on that day. The mine was working normally the morning of November 5.

The fan was in operation as in a normal manner and it was stated by the District Mine Inspector that the fire bosses' report was clear.

About six weeks prior to the explosion, the track and trolley at the junction of 3 and 4 north and 19 west had been changed so that trips from the section inby 4 north on 19 west could be directed out 19 west and main north haulage instead of as previously out 3 north and 8 west to main north. This necessitated the removal of a brattice on 19 west near 3 north. Shortly after this, fixtures for an automatic mine door to be installed at this point had been brought in, but the door had not been made or installed prior to the explosion. This caused the short-circuiting of the air at this point and permitted the accumulation of gas in the 5 and 4 north section inby 19 west.

The investigation disclosed that the section insulator switch which was installed on the trolley line entering 4 north inby

19 west was closed at the time of the explosion. This switch was located on 4 north, 75 feet inby 20 west. As this section - 3 and 4 north inby 19 west - had been inactive for many weeks, there was no necessity for the power being on the trolley line inby the section insulator.

All three substations were delivering current to the mine at the time of the emplosion.

a difference of opinion between the mine foremen and the fire bosses as to whether the fire bosses should inspect the old workings or de "a more important thing" such as building brattices and that the mine foremen insisted on their doing the "more important thing". It is probable, therefore, that old or inactive workings were not inspected as often or as thoroughly as they should have been.

The new air shaft was scaled at, and near, the bottom and the small fan installed over it was not in operation.

At the time of the explosion, workers were closing that portion of the top of the new air shaft which was outside the fan duct. This consisted of placing and securing planks over the collar of the shaft.

The official party, including several visitors, had reached the vicinity of the new substation when the explosion occurred.

#### PREVIOUS EXPLOSIONS

It was reported that there had been no provious explosion in this or nearby mines but a sea explosion with no Inteli-

ties was reported in a mine near Clouster, some 25 or 50 years previous. Details of this are not available.

It was also reported that some ten years ago there had been a fire in this mine which resulted in no fatalities.

#### PROPERTY DAMAGE

The aggregate property damage to trolley wire, track, wood, and brick stoppings, doors, pumps, cars, is estimated at \$1500. Full time operation was to be resumed on November 20, 1950.

### RESCUE AND RECOVERY OFBRATIONS

The explosion occurred about 11:45 a.m., Wednesday, November 5, 1950.

The fan was in no way damaged by the explosion and it contimed in operation.

Though a slight air movement was noted at the bottom of the shaft, it was not known there that an explosion had occurred.

A farmer - B. H. Pettit - who lived near the new air shaft, and his son were returning from work, in a field, toward the new air shaft, and saw Ed. Dempsey - a mechanic who was working on top of the shaft - blown from the top of the shaft and land 15 feet from the shaft. Pettit immediately rushed home and attempted to report the occurrence to the office at Mine No. 6 but was unable to get them on the telephone, so reported it to the office of the Sunday Greek Scal Gempany at Glouster, Ohio, who in turn reported it by telephone to the superintendent's office near the main shaft of Mine No. 6.

The explosion wrecked the stopping or seal at the bottom of

the new air shaft, thereby changing the wentilation in a part of the mine. (See maps, Appendices A. B. and C.)

Six men escaped up the manway compartment of the new air shaft within an hour after the explosion according to George Rasp, an are wall machinessan, whose version is confirmed in part by Joe Reynolds and B. H. Pettit.

The first man out was George Rasp, followed in sequence by Frank Shummay, Lester Shummay, Joe Reynolds (who was working in No. 11 room off 20 west at the time of the explosion), Steve Butsko, and Devore.

Devore was too week to reach the top of the shaft alone so Tod Beel, (a carpenter who had been working at the top of the new air shaft) went down two flights and helped him out.

A seventh man, Emerson LeFever, collapsed six flights down and, after about twenty minutes, Jemes Mackey (a fire boss at Mine 255, Ohio Collieries, who was off shift and nearby when the explosion co-curred) went down after him, carried him up two or three flights, and called for help, and Tod Beal went after Mackey and Pettit and another also assisted so that finally LeFever's body was recovered. Artificial respiration was administered for about 1-1/2 hours but without success.

When the explosion occurred, assistant mine foremen Robert Marshell was at the lower switch on 4 north, i.e, just inby 8 west off main north, and he with other nearby man directed, or assisted, at least 111 man from the 13 east, 13 west, and 16 west entries off 5 and 4 north out 5 north, 8 west, and main north.

A party of six led by Marshall found a machineman, Frank

Williams, at the door near 15 west and 4 north and though apparently dead and badly burned, they carried him to fresh air at 15 west and 4 north, gave him artificial respiration for about an hour and finally carried him out on an improvised stretcher. This was the first injured man to reach the bettem of the main shaft, where they arrived about 1:50 p.m., November 5.

About this time, Deputy Mine Inspector Andrew Ginnan arrived, and Marshall and others under Ginnan's direction erected stoppings at 7 east and 4 north and conducted air up 17 west. They then proceeded up 17 west by erecting temporary stoppings where they found the first body at No. 11 room on 17 west and as they proceeded up 17 west they found many more bodies (Appendix B).

On reaching 5 and 6 north off 18 west, they proceeded up these entries to 19 and 20 west. After reaching 19 and 20 west, an exploration was made up 5 north where the bodies of the official party were located a short distance inby 20 west on 5 north. One of the man in the rescue party (Jake Maurer) were a self-contained oxygen breathing apparatus a short distance sheed of fresh air at this point and located two additional bodies on a side track off 5 north.

The rescue party made its way to the bottom of the new air shaft, arriving there about 8:00 p.m., and by calling up the air shaft to Chief Mine Inspector E. W. Smith, informed him that bodies found were dead.

The rescue party then returned to 17 west off 4 north and at this time was joined by Deputy Inspectors Elmer Sagle and Wal E. Brown.

west by building additional stoppings and when about 600 feet from the face Sagle heard some one whistle. This proved to be one of the 19 men behind the barricade, which was found at about 9:00 p.m. (Appendices A and B.) Fresh air was then conducted to the barricade and the men removed to fresh air where artificial respiration was given to most of them and aromatic ammonia to all of them.

After additional treatment by doctors who were brought in from the outside, the rescued men, all save one who walked out, were carried on stretchers to the shaft bottom, wrapped with blankets and removed to the surface. All of them after reaching the surface, excepting the one who walked, were given oxygen intermittently for several hours before being removed to the hospital or their homes. The wrapping of these men in blankets and the administration of oxygen probably resulted in the saving of a number of lives as some of them were in serious condition when rescued.

cooled outby on 18 west to 5 north and again made their way to the bodies of the official party located inby 20 west on 5 north. About this time, the rescue party was joined by J. J. Forbes and G. W. Grove of the U. S. Bureau of Mines. After a conference the exploration work was continued up 5 and 6 north, and 21 and 22 west off 6 north where another barricade was found at the face of 21 west (Appendiced A and B). On opening the barricade, the bodies of 7 men were located. All of these had apparently been dead for some time. At about this time

three additional Deputy Mine Inspectors, Lot H. Jenkins, Thos. Reece, and Andrew Mullen, joined the rescue party. After this the remainder of 5 and 6 north and 21 and 22 east off 5 north were explored. The rescue party then went to 17 west at 4 north where a mine-rescue team from Elm Grove Mine, Walley Camp Goal Company, Elm Grove, W. Wa., wearing gas masks, explored up 4 north and on to 19 west off main north, finding Andy Kish, Jr., the trapper boy, at his assigned station at the send box at the west end of the switch on 19 west off main north. A fresh air crew following the Elm Grove team then found Clyde Dean, the pumper, on 4 north about 300 feet north of 18 west. Both of these men were badly burned.

By this time it was thought that all of the dead had been located and all bedies then located were taken out of the mine by 6:00 o'clock, Thursday norming. However, it developed that 4 bedies were yet to be found, and they were all located - one at the foot of the new air shaft; one on 6 north, 300 feet inby 20 west; and two fix flights up the air shaft. These bedies were removed by midnight, Thursday.

on Thursday afternoon, on the initiative of Mr. Forbes, a conference of state officials, i.e., mine inspectors, company officials, and representatives of the Bureau of Mines, was held to organize for the completion of the recovery work. It was agreed that two representatives of the Bureau of Mines, two state inspectors, and representatives of the company with six to twelve material handlers, bruttice men, and drivers, should comprise each of three shifts of

eight hours each, working continuously, beginning at 7:00 o'clock, Friday morning, and continuing until the work was completed.

This work consisted in erecting brattices and doors, sealing the new air shaft, all in proper sequence, in order that the entire active portion of the mine and the inactive portion on and off 3 and 4 north inby 20 west off main north could be explored.

This work was completed by 7:00 e'clock, Sunday morning, November 9.

#### MINE CONDITIONS AFTER THE EXPLOSION

The official underground investigation was made between 10:55 a.m. and 4:20 p.m., Sunday, November 9, by representatives of the mining company, the State Mining Department, U. S. Bureau of Mines, and interested Ohio mine officials. This and other inspections showed that the principal demage to the mine was the blowing out of stoppings, the carrying down of trolley and power lines in certain sections; the displacement of a pump near 19 west inby 4 north, located in room 4 off 18 west toward 18 west for about 20 feet; and the displacement of certain I-beams on 19 west off main north outby 5 north. Some track was also apparently displaced on 21 and 22 east off 3 north.

The force and flame of the explosion apparently came out of 3 and 4 north ento 19 and 20 east and west as from a blunderbuss, and the flame and force of the explosion extended from this point outby and inby 19 and 20 east and west off 3 and 4 north and outby 3 and 4

north naturally in accordance with the contour of the entries and rooms as shown in Appendices A. B. and C.

The seal at the bottom of the new air shaft, which was the roof of the 20 west entry, was damaged by the explosion, causing the ventilation to return up the new air shaft.

It was determined on the official inspection, and proviously by a few others, that the section on 3 and 4 north off 80 west off main morth, though it had been inactive for eix months, still had the power of the trolley line in it; that a trolley hanger pulled out by a fall; that the trolley line along 21 east off 5 north at a point 200 feet outby the face of this entry was broken; that this was a fresh break; and that the ends of the trolley wire were beaded as though by a spark or an are.

Because of this combination of diremstances it appeared that the most probable cause of the explosion was the ignition of an accumulation of gas on 21 east, 200 feet outby the face of 21 east off 5 north by an are or spank from the trolley wire on the rail which trolley wire had been broken by a fall (Appendix C).

There was, however, a rather large and extensive fall at the face of 4 north (Appendix C), some of which had fallon after the explosion but some of which had fallon during or before the explosion, which may have displaced the inflammable gas out of this section onto the open light worm by the pumper on 4 north somewhere inby where his body was found, i.e., 500 feet north of 18 west off 4 north.

#### STATE INSPECTORS' CONCLUSION

It was the conclusion of the Chief, Division of Mines of Chie, that the gas and dust explosion was probably caused by an are or spark from a trolley line igniting an accumulation of gas on 21 east off 5 north not far from the face of 21 east. The are or spark was caused by a fall of roof carrying the trolley line to a rail.

Prior to the report of the Metallurgical Department, Chic State University, it was held as possible that an open light might have caused the ignition of gas, but subsequent to that report this possibility was not held.

#### INVESTIGATION OF BROKEN TROILEY WIRE

Professor Dana J. Demorest, Metallurgical Department, Chic State University, Columbus, Chic, after making a metallurgical investigation of the broken trolley wire from 21 east off 5 north, Mine No. 6, Sunday Creek Coal Co., concluded that the break in the trolley wire was a new break and that it had arced after it broke.

#### CORCHER'S INCURST

The corener's inquest was held in a motion picture theatre at Milifield on Wednesday, November 12, 1950, by the corener of Athens County, Mr. L. F. Jones, assisted by Prosecutor R. D. Williams.

Salient features brought out at the coroner's inquest were:

- A. That after the pre-shift inspection the firebosses worked on the brattices and doors, i.e., attempted to improve the wentilation at the working places.
  - B. That on occasion when the firebosses teld the mine foreman

they were going to inspect the eld workings, he ordered them to do other things in line with their work - that is, build brattices, etc.

- C. That the gas accumulation could probably not accumulate in the 3 and 4 north sections between 5:00 o'clock a.m. and the following midday.
- D. that because of the apparent lack of coke formation, it was thought by some witnesses that the explosion was of gas only though Deputy State Mine Inspector Andrew Cinnan testified that it was a "gas and dust" explosion.
- E. That the explosion originated in the 3rd and 4th north sections inby 20 west off main north.
- F. That the most probable cause of the explosion was an electric are at the point where there was a broken trolley line on 21 east off 3 north.
- G. That it was possible that the explosion was caused by an open light.

The coremer's report is given in Appendix K.

SUMMARY OF EVIDENCE AS TO THE CAUSE, ORIGIN, AND PROPAGATION OF THE EXPLOSION

During the recovery operations, much gas was found on 3 north just inby 20 west off main north and during the official inspection gas was detected by a finne safety lamp at the face of 22 east off 3 north, and at the face of 22 and 21 east off 5 north by a U.C.C. Detector as well as elsewhere in this section and in return air along 19 west off main north and along main north, varying from 0.35 to about 1 per cont.

Though properly searched for, no evidence was found that a door had been placed on 19 west off main north between 5 north and 4 north - a gathering haulage road - which would have been necessary had the air been conducted properly up 4 north and back down 5 north. It is, therefore, concluded that for at least several days, perhaps several weeks, this 3rd and 4th north section had not been ventilated. This would cause an accumulation of gas somewhere in this section.

Though the trolley line along 4 north inby 20 west off main north was wreaked as a result of the explosion, a careful inspection of it showed that it's sectional switch was closed, and had been closed at the time of the explosion, and that power was then on the trolley line in this section.

The freshly broken trolley line having a "beaded" end at a position 200 feet outby the face of 21 east off 3 north and the presence of a fall which evidently broke this trolley wire down, point definitely to this as the most probable point of ignition, and that ignition was by an electric are or spark between the trolley line and the rail at this point.

The direction of force as shown by track, trolley hangurs, and trolley wires displaced, stopping and I-beams blown out, indicates that the origin of the explosion was in the 3rd and 4th morth section particularly on 21 east off 5 north.

The finding of a considerable quantity of coked particles

in the assigned explosion area and the finding of successive lesser quantities in samples without the explosion area, and in an area where they could be carried by the force of the explosion or perhaps in such directions by the ventilating current after the explosion indicated definitely (1) that coal dust entered into the explosion, and (2) assisted in the elimination of other areas in the mine as possible places where the explosion might have originated.

Reference to the area of flame in the Appendices A and B shows that it extended a considerable distance on 3 and 4 north outby 19 west: a shorter distance west from 3 and 4 north along 17. 18. 19. and 20 west: and a still shorter distance east of 3 and 4 north along 19 and 20 west. It will be recalled that the five samples taken along the side track along 19 west just outby 3 north had a very high ash content, some of the samples approaching that recommended as a minimum content for rock-dusting. It, therefore, can be definitely concluded that the flame on 19 and 20 west was extinguished because of this high ash content and that the flame was extinguished along the other entries in a westerly and southerly direction by the release of pressure behind the advancing flame, this release of pressure being along 19 west just outby 3 north. Another reason why the flame was extinguished, but of lesser importance, was the expansion into the rooms off 18 west inby 4 north, especially those rooms which were nearer to 4 north and the errension from 19 west into room 4 which extended through to 19 west. This action would likewise tend to release the pressure back of the flame front, advancing along 19 and 20 west, 17 and 18 west, and 3 and 4 north in the vicinity of 16 west.

To be potent this release of pressure behind the advancing flows front must occur at the moment when it can be effective and it is, therefore, not safe to predict that a single rock-dusted entry will usually have this desirable effect although it apparently did so in this case.

Violent though the gas explosion was in the 5 and 4 north section, it can not be said that this gas explosion was as violent as it might have been, for the accumulation of gas in this section was probably not of that composition and quantity that the maximum violence was produced.

COMPLINATION OF CINCOMSTANCES WHICH PRECIPITATED THE DISASTER

The primary cause of the explosion was the accumulation of gas in the 3 and 4 north section. Gas accumulated there because the air was short-circuited. The air was short-circuited primarily because the automatic doors were not made and placed. Also the fire bosses had too much work to do.

There is no excuse whatever thy wire should have been in the 3rd end 4th north and imactive section and still less excuse for power being on the wire prior to the explosion. Lack of attention to these important details made possible the ignition of the body of gas.

A fall of roof carried the live trolley line to the rail causing the are which ignited the accumulation of gas resulting in a gas and dust explosion.

Though this mine is classed as gassy by the Ohio Department of Mines, open lights were permitted, and the lack of appreciation of

the hazard of open lights in a gassy mine is greatly to be deplered.

PROBABLE CAUSE OF THE EXPLOSION

The explosion was certainly caused by an accumulation of gas at 3 and 4 north section, the ignition of which was in all probability caused by an electric are between a trolley line broken by a fall and a rail in an inactive section, and where there was no reason whatever for power being on the line.

It is remotely probable that the ignition of this gas may have been caused by open lights worn or carried by the pumper somewhere along 4 north inby 18 west off 4 north, for one of his duties was to go 50 feet into 4 north inby 20 west off 4 north to open or close the valve of a water line through which the water was pumped out of this section.

#### RECOMMENDATIONS

In order to prevent a recurrence of a similar disaster and to increase safety in this mine it is hoped that careful consideration will be given to the following recommendations. Most of these recommendations have been discussed verbally with the officials of the company.

 A ventilating fon of adequate capacity for present workings and future developments should be installed over the new air shaft.

This fan should be operated exhausting and should be connected to the ventilating system in such a manner that the entire new main haulage would be on pure intake air fresh from the outside.

The fen should be offset at least thirty feet from the

top of the shaft and the air conducted from the shaft to the fun by an air dust substantially built of fire-proof material.

Explosion doors should be installed at the fan, which, in the event of an explosion, would release the explosion pressure and prevent possible damage to the fan.

The fun should be so equipped and installed that the air current may be reversed at any time in case of emergency.

The fun should be equipped with an automatic power release which would cut off all power from the mine in case of stoppage of the fun.

2. All worked-out areas between the main north entries and 3 north, and all old workings to the west of 4 north, including 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 west off 4 north, should be effectively scaled off from the rest of the mine by strong fire-proof stoppings.

Seels which are conveniently located near return airways should be provided with pipes and valves through which air samples can be collected and pressure released when necessary,

3. The present workings, and in future developments, each set of north entries should be worked on primary splits of air. All east and west entries worked off the norths should be placed on secondary splits.

In order to do this efficiently, all sets of north entries should be driven in sets of three entries each. The center entry should compose the haulage and intoke, and the parallel entries the returns.

Rooms should be developed off one entry of each pair only, and the entry from which they are developed should be the intake entry.

When a panel becomes worked out it should be effectively scaled from other portions of the mine by strong fire-proof stoppings, and the air which it normally used should be diverted to new workings.

- 4. Fire-proof stoppings only should be used in any mine.

  The use of wood and brattice cloth for building permanent stoppings should be discontinued.
- 5. The use of doors for regularly coursing the air should be avoided as far as possible. With the system of ventilation recommended above, doors need only be used temporarily.
- 6. Overcasts should be substantially built of fire-proof material and should be constructed so as to allow an easy passage of air over them.
- 7. The quantity in cubic feet of pure intake air flowing per minute in any ventilating split should be at least equal to 100 times the number of man in that split and as much more as may be necessary to dilute and render harmless all explosive and numious gases.

The air should be made to circulate continuously to the face in every unscaled place into which an appreciable amount of methane enters,

Any place in which methane is present in sufficient quantity to be detected by an approved flame safety lamp should be considered unsafe and should be fenced off, and no one should be allowed

to enter such places except for the purpose of improving the ventilation.

- 8. Permissible electric cap lamps should be used by all employees for illumination, and permissible flame safety lamps should be used by officials for inspection purposes.
- 9. The mine should be thoroughly rock-dusted in every open part to within 40 feet, at least, of all working faces, and the rock-dusting should be maintained so that the non-combastible content (ask and moisture) shall be 65 per cent or more at all times.
- and hose and attachments should be provided so that water can be applied to the outter bar of all mining machines, and the face region should be kept in a watered and wet condition at all times, and high-pressure water sprays should be installed at all main partings for wetting loaded trips.
- il. All open-type and non-permissible electric machinery should be installed or operated in pure intake air. Only permissible type electrical machinery should be permitted on other than pure intake air.

A measure of protection can be produced if all replacements of electrical machinery be of the permissible type and such permissible equipment be used in places where gas is most likely to be encountered.

12. Non employed as fire bosses should be required to devote their entire time to the inspection of working places and inactive or

abandoned unscaled workings.

15. Permissible explosives, used in a permissible manner, should be used exclusively for shooting ecal and rock.

Permissible explosives are used in a permissible manner if the quantity used per shot does not exceed 1-1/2 pounds. It is recommended that the explosives be properly confined in the borehole with incombustible stemming such as fire clay, to the mouth of the borehole; that shots be fired with electric detonators by means of a permissible single shot blasting unit; that shots be not fired in a dangerous percentage of fire damp; that the holes in which the shots are fired be not drilled on the "solid"; that no shot be fired if it is obviously liable to blow out; and that the place in which the shot is to be fired be examined for gas before and after being shot.

Pellet powder, no matter how it is used or fired, is not a permissible explosive, and its was use in this mine should be discentinued.

Consideration should be given to the feasibility of firing all shots from the surface when all men are out of the mine. In any event, shots should be fired by shot-firere, preferably when all other men are out of the mine.

14. Electrical switches should be provided for each section of the mine so that power can be out off the section when necessary.

All abandoned or inactive sections equipped with electrical power should have the power out off and the switches locked.

Appendix E.- Photomicrographs of coked particles floated from dust samples in affected area, 12 diameters.

#### APPENDIX P

### List of the Fatally Injured and Those Rescued from Behind the Barrisade:

Pollowing are the names of those killed in the explosion of November 5, 1930, in Mine No. 6, Sunday Greek Coal Co., near Mill-field, Athens County, Ohio:

Bay Andrews Walter Andryvich Joe Bergin George Brown Samuel Brown William Brown Alex Burnick Joe Butsko John T. Butsko Delmar Bauer John Bauer Paul Burdis P. A. Com Mike Claney Wm. Clency Andy Cuba R. Davis Clyde Dean Peul Brvin Phil Ervin Silas Ervin Ben Fielder James Gennice George Green Charles Grim Miles Grim James Handa, Sr.

Thomas Harley Walter Hayden John Hillen Charles Hoak Urbin Howath Bay Bunter James Burd Joe Jackson Frank Korn Andy Kish, Sr. Andy Klah, Jr. George Kish Stanley Kish William Kish **Embert** Lancaster W. E. LeFever George Love James A. Lyons John McAllister George McClean Barl McGes E. F. McKee M. McManaway James Martin Wa. Hessinger John Kadroski James North

Wilbur North Bay Parry Robert Parsons John Patterson Floyd Petitt Thomas Peyatt Ma. Peyatt Virgil Phillips Phil Powell Abe Renkin Vernon Roberts Carl Robinette Charles Sekers Harry Sycks George Thomas Ma. Tytus Andy Tonak Thos. B. Trainer H. H. Upson Alfred Wade Luther Wade S. M. Wallace John Weis John Williams Andrew Willis Oscar Willis Virgil Willie

## The 19 Men Who Were Rescued from Behind the Barricade:

The names of the 19 men who were rescued from behind the barricade, and whether they were taken to the hospital or home, is indicated as follows:

Fifteen men were taken to the Sheltering Arms Hospital,

### APPENDIX F (Cont'd)

### Athens, Chic, as follows:

Floyd Ayers
John Cebolo
Ralph Channel
Howard Davis
John Dean
Henry Forsbaugh
James Honda
Earl Hunter

James Hunter Chris Parker Edward Parker Carl Pickering James Norton James Rainaldo Clifford Watson

One man, Fieldem Willis, was taken to the Cherrington Hospital at Logan, Ohio. Three men were taken to their homes, namely, Floyd Crabtree, Robert Cobb, and Harold Phillips. Phillips is the man who walked out without assistance.

#### APPININI G.

- 1. Description of Mine.
- 2. Coal Analysis Reports of six face samples of coal.
- 3. Proximate and ultimate analysis of a composite of the six samples.

## U. S. BUREAU OF MINES

### E-DESCRIPTION OF MINE

) State Ohio	(2) County Athens	(3) Town Willfield
	-	(Fost once.)
Mine sample of Bit. face (Material—for coal give class	(5) Coal field Hocking	(6) District
Sunday Creek #6		700 ft.
Mine	(b. Kind of opening—if shaft give depth.)	
		and the control of th
(d. Distance and direction from town.	) (e. Sec., T., and R., if necessary.)	(f. Railroad connections.)
Mill field		
(g. Shipping point.) <b>Hocking #6</b> Coal bed		t and give distance from shipping point.)
	(a. Name.)	(b. Geologic system.)
(c. Formation.)	(d. Dip, degrees.)	(e. Strike, direction.)
Room & Pills		
(Long	wall, room and pillar, panels, etc.)	(Hand or machine.)
) Explosives pellet pewer	(a. Used for cost.)	(b. Used for roof or floor.)
Sunday Creek	Coal Co. Millfield, O	(a. operior rest or more)
Operator	(Name and address.)	
0.91	·	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
o) Sales agent	(Name and address.)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
'\ Output from advance workings nor ea	(During past ye	
) Run-of-mine, per cent	(18) Lifetime of (At present.)	of mine(Years—estimated.)
) Run-of-mine, per cent(Of output shipp	(18) Lifetime of (18) Lifetime of (20) Is coal screened?	of mine(Years—estimated.)(21) Type of screens
9) Run-of-mine, per cent(Of output shipp	(18) Lifetime of (18) Lifetime of (20) Is coal screened?	of mine
P) Run-of-mine, per cent (Of output shipp)  Type of washer	(18) Lifetime of (At present.) (20) Is coal screened?	Of mine(Years—estimated.)(21) Type of screens
(Of output shipp  Type of washer  Maximum size washed	(At present.) (18) Lifetime of (At present.) (20) Is coal screened?	(Years—estimated.)  (21) Type of screens  (23) Per cent of coal washed  (Washed coal.)
Run-of-mine, per cent (Of output shipp      Type of washer (A) Maximum size washed (A) Sizes produced	(At present.) (18) Lifetime of (At present.) (20) Is coal screened?	(Years—estimated.)  (21) Type of screens  (23) Per cent of coal washed  (Washed coal.)
(Of output shipp  Type of washer  Maximum size washed  Si Sizes produced	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens (3) Per cent of coal washed (Washed coal.)  s coal picked? (State whether on car or belt.)
P) Run-of-mine, per cent (Of output shipp) P) Type of washer (Of output shipp) Naximum size washed (Of output shipp) Sizes produced (Of output shipp)  Of output shipp	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens (23) Per cent of coal washed (Washed coal.)  s coal picked? (State whether on car or belt.)
Run-of-mine, per cent (Of output shipp)  Type of washer  Maximum size washed  Sizes produced (Of output shipp)  (Of output shipp)  (At mine.)	(At present.)  (20) Is coal screened?	(Years—estimated.)  (Years—estimated.)  (21) Type of screens  (Washed coal.)  (State whether on car or belt.)  (Screenings, crushed, washed, etc.)
P) Run-of-mine, per cent (Of output shipped)  E) Type of washer (Of output shipped)  S) Maximum size washed (Of output shipped)  S) Sizes produced (Of output shipped)	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens  (Washed coal.)  s coal picked?  (State whether on car or belt.)  (Screenings, crushed, washed, etc.)
P) Run-of-mine, per cent (Of output shipp)  P) Type of washer (Of output shipp)  Naximum size washed (Of output shipp)  Sizes produced (Of output shipp)  Per cent of coal coked (At mine.)  Pype and number of ovens (Of output shipp)	(20) Is coal screened?	(Years—estimated.)  (21) Type of screens (23) Per cent of coal washed (Washed coal.)  s coal picked? (State whether on car or belt.)  (Screenings, crushed, washed, etc.)
P) Run-of-mine, per cent (Of output shipp)  P) Type of washer (Of output shipp)  Naximum size washed (Of output shipp)  Sizes produced (Of output shipp)  Per cent of coal coked (At mine.)  Pype and number of ovens (Of output shipp)	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens (23) Per cent of coal washed (Washed coal.)  s coal picked? (State whether on car or belt.)  (Screenings, crushed, washed, etc.)
Per cent of coal coked	(At present.)  (20) Is coal screened?	(Years—estimated.)  (Years—estimated.)  (21) Type of screens  (Washed coal.)  (Screenings, crushed, washed, etc.)  (For any additional information indicate att X28, B937 & F72
Per cent of coal coked	(At present.)  (20) Is coal screened?	(Years—estimated.)  (Years—estimated.)  (21) Type of screens  (Washed coal.)  (Screenings, crushed, washed, etc.)  (For any additional information indicate att X28, B937 & F72
9) Run-of-mine, per cent (Of output shipp 2) Type of washer 4) Maximum size washed 6) Sizes produced (Of output shipp (At mine.) 7) Type and number of ovens 7) Type and number of ovens 7) Subject by mark X if additional information is given.	(20) Is coal screened?	(Years—estimated.)  (Years—estimated.)  (21) Type of screens  (Washed coal.)  (State whether on car or belt.)  (Screenings, crushed, washed, etc.)  (For any additional information indicate att 454 & X28 , B937 & F72
Run-of-mine, per cent (Of output shipp)  Type of washer  Maximum size washed  Sizes produced (At mine.)  Type and number of ovens  HOS. F149 A76, H155  subject by mark X if additional information is given by the standard of the standard o	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens  (Washed coal.)  (State whether on car or belt.)  (Screenings, crushed, washed, etc.)  (For any additional information indicate att  454 & X28 , B937 & F72  ded.)
9) Run-of-mine, per cent (Of output shipp 2) Type of washer 4) Maximum size washed 6) Sizes produced (At mine.) 7) Type and number of ovens 7) Type and number of ovens 7) Type and number of ovens 8) Per cent of coal coked (At mine.) 9) Type and number of ovens 9) Type and number of ovens 14 A76, H155 15 subject by mark X if additional information is given by mark X if additional	(At present.)  (20) Is coal screened?	(Years—estimated.)  (21) Type of screens (23) Per cent of coal washed (Washed coal.)  s coal picked? (State whether on car or belt.)  (Screenings, crushed, washed, etc.)

Te	st No		G-CO.	AL-ANALYSIS REPORT		Lab. No. A 66120
Sai	mple of	Face o	oal			F 148 Can No4_76
Op	erator	Sunday Cree	k Coal Co.	Mine <b>Sund</b>	ay Creek #6	
Sta	ate	Ohie	County Athen	Bed Rock	ding #6	
То	wn 1	ill field		·		
Lo	cation is	n mine 21 Ra	st off 3 nor	th 15 ft. from	face	
Μe	thod of	sampling		Gross weight,	lbsNet	weight, grams 2095.
Da	ite of sa	mpling 11/11/3	O Date of La	b. sampling 11/15/	30 Date of an	nalysis 11/21/50
В.	of M. or	U.S.G.S. section	Boll	Collector	Webb - Mc	rgan
	ir-dry Loss	2.3	Coal (Air dried)	.Coal (As resolved)	COAL (Moisture free)	COAL (Moisture and ash free)
Sis	Moistu	re	7.1	9.8		
Analy	Volatile matter			· ·	39.1	41.5
Proximate Analy	Fixed carbon		51.2	50.0	55.1	58.5
	Ash		5.4	5.3	5.8	
			100.0	100.0	100.0	100.0
	Hydro	gen				
ysis	Carbon	1	·			
e Anaî	Nitrog	en	·			
limat	Oxyge	n				
Ultimate Analysis	Sulphu	ır			1.0	1.1
	Ash					
. (	Calorific	Calories	7011	6850	7550	8011
	value	British thermal units	12620	12330	13590	14420
Sc	ftening	temperature of ash		° C.	2510	° F
D	ate	U. S. GOVERNMENT FRINTING OFFICE: 192	950	(Signed)	M. M. Coop	Chemist.

. . . A 66121

rest No.		G-CC	AL-ANALYSIS REPORT	Γ	Lab. No. 99444
Sample of	Face coal	·			Can No. H 155
perator \$	Sunday Creek C	oal co.	Mine Sand	lay Creek 46	
State	Ohio (	County Athen	Bed Heel	ring #6	
Cown	Milluola				
Location i	n mine <b>5 north</b>	60 Fest from	a face		
Aethod of	sampling Sta		Gross weight,	lbs. Ne	et weight, grams 2099
			ab. sampling 11/15/		
			Collector		
AIR-DRY LOSS	2.4	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free
Moistu	re	6.5	8.8		
Moistu   Volatil   Fixed	e matter	36.3	35.5	<b>Z8.9</b>	41.5
Fixed	carbon	51.7	50.3	55.2	58.7
Ash		5.5	5.4	5.9	
		100.0	100.0	100.0	100.0
Hydro	gen		·		
Carbon	1				
Nitrog	en				
Carbor   Nitrog   Oxyge	n				
Sulphi	ır		.6	.6	.7
Ash		·		= <del></del>	
Calorific	Calories	7067	6900	7561	8033
value	British thermal units	12720	12480	18610	14460
Softening	temperature of ash		° C.	28 60	٥
J	•	ov. 24, 198		R. M. Coo	

	G-CC	AL-ANALYSIS REPOR	RT	Lab. No. A
Face co	<u>1</u>			
Sunday C	reak Coal Co	Mine St	nday Creek #6	· · · · · · · · · · · · · · · · · · ·
Ohio	County Athe	Bed Ko	eking #6	
Millfield		· 		
n mine 10' fr	om face in 1	7 W off 6 nor	th.	·
sampling	<b>14</b>	Gross weigh	t, lbsNe	et weight, grams
mpling 11/11/	Date of L	ab. sampling 11/1	<b>5/30</b> Date of a	analysis 11/19/50
5.4	. COAL (Air dried)	COAL (Asreceived)	COAL (Moisture free)	COAL (Moisture and ash free)
ire	6.6	9.8		
le matter	e matter		39.2	42.0
carbon	50.4	48.7	54.0	58.0
	6.4	6.1	6.8	
	1 00.0	100.6	100.0	100.0
gen				
n	:			
gen				
en	:			
		. 8	, 9	1.0
Calories	6956	6717	7444	7989
British thermal units	12520	12090	13400	14380
·		<del></del>		······································
	Sanday C Ohio  Millfield  In mine 10' from sampling 3' many sampling 11/11/  T. U. S. G. S. section sand sand sand sand sand sand sand san	Sanday Creek Coal Co   Ohio   County   Athe   Millfield     n mine   10' from face in 1     sampling   Std     cmpling   11/11/30   Date of L   r U. S. G. S. section   B of M     re	Sunday Greak Goal Co.   Mine   St.	Sunday Greek Cosl Co.   Mine   Sunday Greek #8   Ohio   County   Athens   Bed   Bocking #6   Willfield   Mine   10

				AL-ANALYSIS REPOR	<b>₹</b>	Lab. No. A 66236
Sai	nple of	I Pace	coal			© <b>P195</b> Can No
Op	erator	Sunday (	reak Conl Co.	• Mine 8	anday Creek #(	<b>3</b>
Sta	ite	Ohio	County Athens	Bed	ocking #6	
To	wn	Millfiel	đ			
Lo	cation in	mine Face of	3 north 30	ft. back fro	m face (fall s	t-face)
Me	thod of	sampling	td	Gross weigh	t, lbs Net	weight, grams 2144.
Da	te of sa	mpling 11/13/	<b>20</b> Date of La	b. sampling 11/1	Date of ar	nalysis 11-/19-/20
					•	all
A:	R-DRY LOSS	1.6	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Proximate Analysis	Moistu	re	6.2	7.7		
	Volatile matter		36.1	85.5	28.5	41 .8
ximat	Fixed carbon		50.2	49.4	53.3	58.2
Ĕ	Ash		7.5	7.4		
= 10 .	;		100.0	100.0	100.3	130.0
	Hydrog	gen				
ysis	Carbon	, 				
imate Analysis	Nitrog	en	· .			
	Oxygei	ı				
Ē	Sulphu	r	1.1	1.1	1.2	1.3
	Ash					
	•					
	Calorific	Calories	6900	6790	7360	8000
	value	British thermal units	12420	12220	13250	14400
So	ftening	temperature of ash		° C.	8510	° F.
D٤	ite	U. S. GOVERNMENT PRINTING OFFICE: 1:	24, 1930	(Signed)		Chemist.

				AL-ANALYSIS REPOR	r I	ab. No. <b>He454</b>
Sar	nple of	Face coal				Can No. X 28
Op				Mine	<u>.</u> .	<u> </u>
			County Athens	Bed	oking #6	
Tor	wn	Millfield				
Lo	cation in	n mine face c	f main north	entry		
Me	thod of	sampling	ta	Gross weight	, lbsNet	weight, grams 2021.
Da	te of sa	mpling 11/13/2	Date of La	b. sampling 11/1	Date of an	alysis 11/ <b>1/9/3</b> 0
				Collector		
Aı	R-DRY LOSS	2.2	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moistu	ture6.8		8.8		
Proximate Analysis	Volatil	e matter	35.4	34.7	38.0	40.8
ximate	Fixed	carbon	52.5	51.3	56.3	59.7
Pro	Ash		5.3	5.2	5.7	
			100.0	100.0	100.0	100.0
	Hydrog	gen				
sis	Carbon	L				
mate Analysis	Nitrog	en				
imate	Oxygei	n			•	
Ē	į	ır	.6	. 5	.6	. 6
	Ash			-		
	•					
	Calorific	Calories	7044	6889	7550	8011
	value	British thermal units	12680	12400	18590	14420
— С	ftonin ~			° C.	255	° F
		temperature of ash		•	н. н. Соо	

Tes	st No		G-COAL	-ANALYSIS REPORT	•	Lab, No. A. W. A.
Sai	mple of	Ceal				Can No. 1
Op	erator	Sanday Cre	k Coal Co.	Mine SRYA	y Crook #6	<u></u>
Sta	ite	Oh10	County Athens	Bed Hook	ing #6	
To	wn M	lll field				
Lo	cation i	n mine 18 cast	off main nort	h 100 ft. be	esk from out	by room 12
Me	thod of	sampling	Std	Gross weight,	lbs N	et weight, grams 2120.
		<del>-</del> -				analysis 11/19/80
			B of M			
Aı	R-DRY LOSS	1.8	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moistu	re	6.1	7.8		
Proximate Analysis	Volatil	matter36.6		36.0	39.0	42.2
	Tixou our bonz		50.2	49.2	53.5	57.8
Pro			7.1	7.0	7.5	
			100.0	100.0	100.0	160.0
	Hydro	gen				
sis	Carbon	1				
Analys	Nitrog	en	. , ,			
timate Analysis	1			• .	,	<u></u>
Ď	Sulphi		1.1	1.1	1.8	1.8
	Ash					
٠						
	Calorific	Calories	<b>6967</b> o	6839	7417	8017
	value	British thermal units	12540	12310	13350	14480
So.	ftening	temperature of ash		° C.		° F.
-	ate	Nov. 2	4, 1930	(Signed)	н. м. Сеор	2420

res	t No	'	G-C0.	 AL-ANALYSIS REPOR	г	Lab. No. 4 66126
San	nple of _	Bit.	face coml			Can No.
			esk Coal Co.	Mine	ands J Creek	<del>/6</del>
ta	te01	hio	County Athen	Bed Ko	king #6	
'ov	vn	Millfield				
oc	eation in	mine Com	of A 66120,	121, 1 <i>2</i> 4, A 60	6236 <u>, 235</u> , 28	7.•
[et	thod of	sampling	- 	Gross weight	, lbs./Net	weight, grams
at	te of sai	mpling	Date of La	ab. sampling	Date of a	nalysis 11/19/36
<b>}.</b> (	of M. or	U. S. G. S. sectio	n <b>B_of M</b>	Collector	Nobb - Nex	uhall
An	R-DRY LOSS	2.8	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	Moistu	re	6,4	8.6		
	Volatile matter		56.1	35,3	<b>58.6</b>	41.8
	Fixed carbon		51.3	50.0	54.8	58.7
	Ash		6.8	6.1	6.6	
			100,0	106.0	100.0	100.0
	$\mathbf{Hydrog}$	gen	5.4	5,6	5,1	5.4
	Carbon	L	71.0	69.4	75.9	81.3
	Nitrog	en	1.5	1.4	1.5	1.7
	Oxyge	n	15.0	16.7	10.0	10.6
j	Sulphu	ır	.9		. 9	1.0
	Ash		6.2	6.1	6.6	
	<u>.                                    </u>		100.0	100.0	100.0	100.0
(	Calorific	Calories	6978	6817	. 7456	7989
	value ,	British thermal unit	s 12560	18270	13420	14580
۳.	ftoning	temperature of as	.h	° C.		, , o

\*H XIGNORAY

second als is bed ison to anothers and strong antiques.

F 148 A 76

## U. S. BUREAU OF MINES

F-SAMPLING REPORT

Lab. No. A 661.20

	nple of <b>Face coal</b>						
	thod of sampling						
Loc	cation in mine 2k x 21 Eas	t off	3 north	, 15	feet from face (Distance and direction from	om opening. Loc	ate with respec
	room, pillar, aircourse, entry, etc.)						
Co	pal, dry or moist	(1	1) Gross wt., I	bs	(Sample cut.) (12) Net wt., l	bs. (Sam	ple mailed.)
Sa	imple from fresh or weathered coal	resh					
	oofbone co						
	· · · · · · · · · · · · · · · · · · ·	•	(K	ind and qu	nality.)		
D	raw slate or roof coal 12 to	14"		(Descri	ption and thickness.)		
F	loor Fireclay						
	•				nooth or rough.)		
Ve	ertical depth from surface to point of	sampling,	feet				
·	Section of Bed	Fr.	Ins.	No.	Section of Bed	FT	Ins.
L	Coal		10	. 10			
3	Bone		6	1.1			
	Coal	1	1	10			
3				. 12			
ŧ	Bone		1-1/2	. 13 .			
5	Coal		11	14			
1	Dane		1/2				
3	Bone		-/-	. 10			
7	Coal	1	7	. 16			
,		-		То	tal thickness of bed	Б	<b>a</b>
3	· · · · · · · · · · · · · · · · · · ·				•		
)				<u> </u>	nickness in sample	<b>_</b>	
ימר	excluded from sample, marked X, sec	tion Nos	2, 4,	6			
15	xciuded from sample, marked A, sec	LIOH INOS				Pittab	

## U. S. BUREAU OF MINES

Can No. H 155, 99444

F-SAMPLING REPORT

Lab. No. A 66121

	ethod of samplingStd.						
ĻΟ	cation in mine 5 North,	iO feet	from f	800	(Distance and direction from	opening. Locate	with respect
ib,	room, pillar, aircourse, entry, etc.)				(9) Date	(Of sampling.)	1950
C	oal, dry or moist	(11)	Gross wt.,	lbs	(12) Net wt., Ibs.	(Sample:	mailed.)
S	ample from fresh or weathered coal	Fresh		••• <del></del>			~~~~ <del>~~~</del>
R	CoofBone cosl	·		Kind and o	nality.		
	raw slate or roof coal						
	loorFire clay						
ν.	ertical depth from surface to point o	1	et	11 1			
•	Section of Bed	FT.	Ins.	No.	SECTION OF BED	Fr.	Ins.
	Ceal	1	6	10			
	Bone		<i>ŋ</i>	11			
			· 1A	. 12	***************************************		
	70.174		_				
			4				
				_  15			
				_ 16			
				To	otal thickness of bed	5	4
				T	nickness in sample	4	<u> </u>
	xcluded from sample, marked X, sec	41 N		6 A			

an No. \_\_\_\_\_\_A 17. 11

## U. S. BUREAU OF MINES

F-SAMPLING REPORT

Lab. No. A 66124

Sample of	(2) Count	ty	hens	(3) Te	wn Millfield	Sun da; (4) Mine	
рашрте от	face ecal				(Post office.)		
-	Sta.			,			
Method of sampling				(Describe if other	r than standard.)		
Location in mine	10' from	face	in 17	W. off	6 no rth  (Distance and direction from o		
					·	•	•
	entry, etc.)		**-**		(9) Date	(Of sampling.)	
) Coal, dry or moist	MOISE	(11)	) Gross wt.,	lbs.	(12) Net wt., lbs.	(Somnlan	ngilad )
) Sample from fresh or	weathered coal	Fresh	· · · · · · · · · · · · · · · · · · ·	(Nan		(Sample II	
) Roof	one coal			777		***************************************	
) Draw slate or roof coa							
				(Description	and thickness.)		
) Floor	Fire clay	7	(Kind as	ft or hard, smooth	or rough )		
N TT . 1° 3 3 . 17 6	C 4	1 £.					
) Vertical depth from s	urface to point of sa	mpung, 16	et				
o. Section	гог Вер	FT.	Ins.	No.	SECTION OF BED	FT.	Ins.
1 Coal		1		10			
Bone			11	11			
Coa l		5	٥				
3				12			
1				13			
5		-		- 14			
3				15			
7				10			
7				_ 16			
8				Total t	hickness of bed	5_	8.
			•	mhial	ess in sample	4	6
9				-ii ruickn	coo in sample		

## U. S. BUREAU OF MINES

A 66235

Can N	lo		F	-SAMPL	ING RE	PORT				
<del></del>	Ohie		At	h ens		Mil	lfield	<del>Su</del>		rock 6
1) Sta	ate	(2) Coun	ty		(3)	Town	(Post office.)	(4)	Mine	·
5) Sa		Standard		(6) Analys	is desired					
		face of 5 r								
8) <b>L</b> o	cation in mine	iace of o	iorta,	30 I 6.	OSCK	IIUM I	See (ISII	<b>44</b>	Inde	
•					. '	(1)1	(9) Date	NG NG	₩. 13	with respect
to rib	, room, pillar, aircourse,	entry, etc.)	/3.3	\	24	£	(70) 31 4	(0:	sampling	,
			<b>五五安</b> 克	14						
13) S		weathered coal							~~~~~~	
14) I	Roof	ceal		(K	ind and qual	ity.)		<b></b>		
15) I	Draw slate or roof coa	.1 <b>fi</b> ;			L (Descript	ion and thickne	.ss.)			
16) F	loor	<b>X1</b> 2	recta?	, SMOOT						
		surface to point of s		18	15					
No.		N OF BED	FT.	Ins.	No.		ction of Bed		FT.	Ins.
140.		K OF DED	1	1	1100		OTTON OF DEB			27.54
1	Coal	·			10			<b></b>		
2	Boney			3	11					
3.	Coal			. 8	12					
4	Boney			1/2		· -			ļ	
5	Coal			2 3/4				-		
	Boney			1	15			******		
6	Coal		1	1/2	16					
7	Boney			1/2					4	8-1/4
8	Ceal	·	1	4			f bed		4	3-1/4
9				2,4,6		kness in sam	ple			
18) E	Excluded from sampl	le, marked X, section	on Nos							
(19) S	end analysis to	.J.Forbes		(20) Collec	tor Webb	& Mari	<b>hall</b> (21) Office	P:	Lttsba	rgh,
-					LoÑe zn	ott	1	lav .	24, 1	930
A	bove information co	opied from B card	by		7	on _				19

H 454 Can No. X 28

## U. S. BUREAU OF MINES

F-SAMPLING REPORT

Lab. No. A 66236

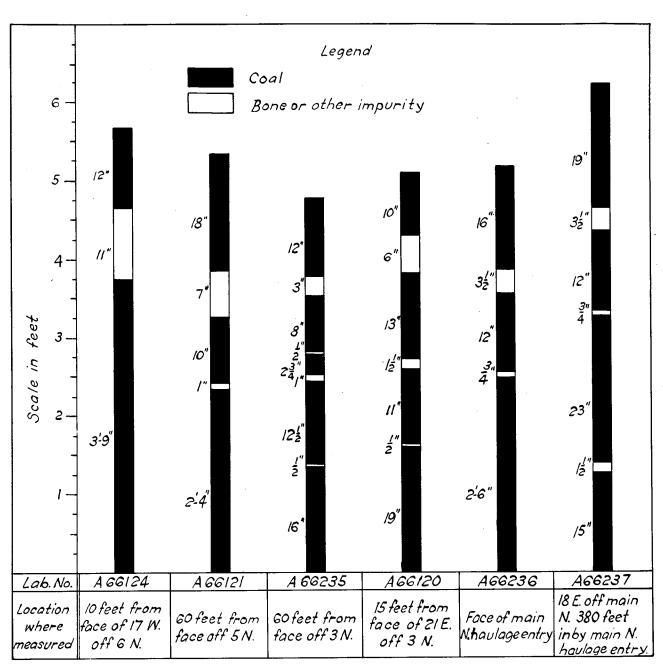
(7) Me	mple of Page Co	oal					(Post office.)		No. 6
(7) Me	e.			(6) Analys	sis desire	ed			
(,, ==,	ethod of sampling	ndard							
	ethod of sampling Sta			) 	Describe	if other than stand	ard.)		
(8) Lo	cation in mine	08 01 MR	ald H	erin en	I	(Di	stance and direction fron	opening. Loca	te with respect
+0 mlb	, room, pillar, aircourse, entry, et						(9) Date	Nov. 1	. <b>5</b> , 19 <b>50</b>
•			/17	Cross ret 1	ha	24	(19) Not set 15	•	•
	oal, dry or moist				US	(Sample cut.)	(12) Net Wt., 10	(Samp	le mailed.)
(13) Sa	ample from fresh or weath	ered coal	Ir	esa					
(14) B	Roof	al							
		4401							
(15) D	oraw slate or roof coal				(Desc	iption and thickne			
(16) F	loor	£	re e	lay	or hard e	month or rough			
			•			•			
· 17) V	ertical depth from surface	to borne or sa	mping, i	eet	<i></i>				
No.	Section of Be	ED	Fr.	Ins.	No.	Se	CTION OF BED	Fr.	Ins.
1	Coal		11	4	10		vd. a o no o de distant i o para para para para para para para pa		
$\mathbf{x}^2$	Bony			3.7/9	11				
3	Coal				12				
<b>X</b> 4	Bony			3/4	13		<del></del>		
5	Coal		2	6	74		·····		
J							,		
6					15		, 		
7					16		*******		
									/-
8					To	otal thickness o	f bed	5	2-1/4
9					T	nickness in sam	ple	4	10
(18) E	xcluded from sample, mar	ked X, section	n Nos	2,	4				
(19) S.	end analysis to T	Bowho		(20) Collect	07 <b>3</b> 4	anda a T T a alma	Was 121) Office		
(20) 26	end analysis to	- 3 AT DG 6		. (20) 0011000	TSE.	SUBLL &	HOD-		
	bove information copied f		Wal	)e mott		on	Nov. 24,	1 930	19

B-\_937 F-72 .

# U. S. BUREAU OF MINES F-SAMPLING REPORT

Lab. No. A 66237

Sta	ohi.	.0	(2) (	County	ati	lens	(	(3) Town	<b></b>	Llfiel	, <b>u</b>	(4) Mine	UO 81	
		7												
	mple of					(6) Analys	sis desir	ed						
Ме	ethod of sampling	8	tand	ard										
_	cation in mine	18 E	ast	off	main	north	100	ft.	an standar back	from	face	ro om	12	outby
									(1)136	ance and dir	SCHOII HOII	opening.	77	L
	, room, pillar, aircours									(9)	Date	11/1	oj <del>o</del> u	, , 19
								A G					Ω	
	oal, dry or moist													ailed.)
) Sa	ample from fresh	or weathe	ered coal	fre	ah	+								
		60	al					•						
	Roof										•			
) D	raw slate or roof c	oal		al			(Desc	rintion an	d thickness	: )				
	'loor	fire	als	<b>v</b> -	8 <b>m0</b> 0	th	100							
						(Mina, soit	or hard, s	smooth or	rough.)		*			
') V	ertical depth from	n surface	to point	of sam	pling, fee	t 185								
	1			1	l	Y			<u> </u>				Teo	Tara
Io.	SECT	HON OF BEI	<u> </u>		Fr.	Ins.	No.		SECT	non of Bed			Fr.	Ins.
	Draw ala	ite				6								
							10							
2	Coal	<b></b>			1	7	11							
	Shale					3-1/2								
							12							
<b>3</b>					1		13		<b>-</b>					
<b>3</b>	coal												1	
4				-		3/4						İ		
4	Boney				•	3/4	14							
4					1	3/4 11	14 15							
4 5	Boney				1		15			 				
4 5	Boney Coal Boney					11								
4 5	Boney				1	11	15			bed				7-3/4
4 6 8	Boney Coal Boney					11	15 16 T	otal thic	kness of	bed				7-3/4
4 5 6	Boney Coal Boney					11	15 16 T	otal thic	kness of					
4 5 6 8 9	Boney Coal Coal				1	11 1/2 3	15 16 T	otal thic	kness of	bed				
4 6 8 9 9 8) E	Boney Coal Coal	- :			1 Nos	11 1/2 3	15 16 T	otal thic	kness of	bed		6	5	9
6 8 9 9 8) E	Boney Coal Coal	- :			1 Nos	11 1/2 3	15 16 T	otal thic	kness of	bed		6	5	
4 6 8 9	Boney Coal Coal	- :			1 Nos	11 1/2 3 1, 3,	15 16 T	otal thichickness	kness of	bed		6	i i	9 sburgh



Appendix H. Sections of No. 6 bed in mine No. 6, Sunday Creek Coal Co. Millfield Ohio Nov. 1930

### APPENDIX I.

- 1. Description of Mine.
- 2. Analytical report of three samples of settled dust,
- Bust enalysis report composition, fineness, and relative amount of coked particles - of 61 rib and roof, road, and tipple dust samples.

## U. S. BUREAU OF MINES

## E-DESCRIPTION OF MINE

st for coal give classific	(5) Coal field		Valley (6) District	(Post office.)
for coal give classific	cation.)	TAGTTER	(6) District	
eek #6			·	
	sha <b>f</b> t		107 44	700 44
··)	(b. Kind of opening—if shaf	ft give depth.)	(c. Height of opening a	bove sea level.)
ld			(f. Railroad conne	
point.) <b>ng #6</b>	(h. State if	wagon mine or prospe	ect and give distance from shippin	ng point.)
	(a. Name.)		(b. Geologic system.)	
mation.)	(d. Dip, de	grees.)	(e. Strike, direction.)	
(Long wa	all, room and pillar, panels, etc	e.)		(Hand or machine.)
Let Powde	(a Head for seel)		(h Trand for sort o	r floor )
w Greek	•			•
y Dicor \	OML CO.	ame and address.)	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		ame and address.)		••••••••••••••••••••••••••••••••••••••
1/1 m	•	,	(10) T	
ross or net tons.)	10) Maximum day's outp	Out(During past y	year.) (16) Last year's or	(Gross or net ton
rkings, per cent	(At present.)	(18) Lifetime	of mine (Year	rs—estimated.)
		ed? <b>Yes</b>	(21) Type of scre	ensshaker
		(	(23) Per cent of coal washe	d
	(25)	Sizes produced	(Washed	coal.)
		(07)	•	•
(Of c	oal not washed.)	(27)	is coar picked (Star	whether on car or belt.)
(At mine.)	(29) Sizes coked		(Screenings, crushed, washed	l, etc.)
ns	(	31) Remarks	/For any oddi	ional information indicate
0 004 E	a co fee Di	DF 44==	` *	
0 084 50	AD WILD DARK	OF AARC	(For any addit	184, X195,
*221 , X2 X213 F	03,1216, (122) 288 1220 F	e alfredictes for a	208, H9, X207,	x215, X214
A 66238	to Ala66284 and	dronedia dely bebie	riespoteting (An nGrad 13	54. : Zl25 inel.
	point.)  18 #6  mation.)  (Long we pill (Long we pill)  (Long we pill)  (Long we pill)  (Long we pill)  (Rong we pill)  (At Powde  (Of output shipped  (At mine.)  18	(a. Name.)  (a. Name.)  (b. State if the property of the prope	(a. Name.)  (a. Name.)  (a. Name.)  (a. Dip, degrees.)  (b. t pillar  (Long wall, room and pillar, panels, etc.)  (a. Used for coal.)  (Name and address.)  (Name and address.)  (Name and address.)  (Name and address.)  (During past y chings, per cent (At present.)  (20) Is coal screened? Yes  (0f output shipped.)  (25) Sizes produced (27)  (0f coal not washed.)  (29) Sizes coked (31) Remarks  (At mine.)  (20) Is coal screened? (27)  (31) Remarks   (a. Name.)  (b. Geologic system.)  (c. Strike, direction.)  (c. Strike, direction.)  (d. Dip, degrees.)  (e. Strike, direction.)  (a. Undercutting (10) Unde	

### ANALYTICAL REPORT

Salpa e	No2125	Laboratory No. 466511
Sample	of Dast - Face of 21 West off 4	North.
Ohi	o, Athens County, Willfield Town -	Sunday Creek #6 Mine
From	Method of sampling: - Brushing surf	see of dast.
	Semple Dry	
Sample	d Nev. 13, 1980 Received at lab.	v191930 Analyzed
Section	n or Bureau	Collector
	ANALYSIS	

Coked particles present: Very large amount

### ANALYTICAL REPORT

Can Samle No.	Z 124	Laboratory No	A 66312
Sample of	Dust from Sunday (	reek No. 6 Mine at face of	C. EL. Bast
o <b>f</b> f	5 north Town: Willfi	eld, Athens County, Ohio	
FrenxBx	n shing sarfaceof dust	Sunday Greek Goal	LCo
Sampled	<b>Nov13,1930</b> Received	at lab. <b>Nov191930</b> . Anal	yzed
Section or	Bureau Kine Acc	Collector	W.J.Ankeney
·		ANALYSTS	

Coked particles present: Very large amount

#### ANALYTICAL REPORT

Dust from the Sunday Creek No. 6 Mine of the Sunday Greek Con- Celly Millfield, Athens County, Chie. Taken at face of 5 north.  From EXEX Method of sampling: Brushing surface of dust  Sampled  Received at lab Nov. 13, 1930  Analyzed
From method of sampling: Brushing surface of dust
Sampled
Nov. 13, 1930 Nov. 19, 1930 Analyzed
Section or Bureau

Coked particles present: About 1/2 as much as in A 66311 and A 66312

Date		(Signed)		
* * * * * * * * * * * * * * * * * * *	Nov. 24. 1930	(prgned)	H. M. Cooper	Chemist.

Tes	t No	DUST	-ANALYSIS REPORT	Lab.	No. A 66127
	nple of Road	dust (through 2	20-mesh screen).		No. F 650
	erator Sunday			Sunday Creek	#6
_	te Ohio				
	wn Killfield	-			
Lo	cation in mineBe	etween 21 & 2	2 room 16 West	off 4 no rth	· ·
Me	thod of sampling		Gross weight, lbs.	Net wei	ght, gms. 1118¢
Da	te of sampling 11/15	/30 Date of I	ab. sampling 11	/15/30 Date of	analysis
Fo	B. of M. section	Mine Ace	Collection	ctor Walker -	Marshall
-	Air-dry Lose 3	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
. <u>s</u>	Moisture	2.6	11,6		
Proximate Analysis	Yelenbraner Comb				(a)
rimate	Fixed carbon	•			
Pro	Ash		1		
	ſ	·····	100.0		
	Hydrogen		,		
sis	on.20 mesh		523.4	47.0	
Ultimate Analysis	thru 20 me sh		589.6	53.0	
fimate	digital wt. of s		A STATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN THE PERSON NAMED IN THE PERSON NAMED IN	I .	
5	Sulphur				
"	Ash				
	Coke particles			i	
	orific Catarian		Sample Moi		
	minod		OCHUAC MOA		
Sci	reen test, through 20 me				Cumulative per cent.
	· -				
			·		
	through 200 n	nesh		<del></del>	12.9
Ar	ea from which sample w	vas taken (sq. ft.)			
Ds	te,	L980	(Signed) H.	M. Cooper	, Chemist.
		a This figure is the ratio	of volatile combustible to		11—9383

	DUST-	ANALYSIS REPORT	T . 1	No. A 66128
est Noample of <b>Eib &amp; Roo</b>	Just (through se	0 magh garaan)	Lad	No. A 416
perator Sunday				
tate Chie				
own Millfield	· .	Ded		·
ocation in mass Beta				·
fethod of sampling	•			ight, gms. 448.
Date of sampling 11/1				
or B. of M. section				
AIR-DRY LOSS 13.0		COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
1	(Air died)	16.5	(Moisture 1166)	(Moisture and asit free)
Moisture Comb	<b>***</b>			
мыналие Gomb	72.0	62.7	75.0	
Fixed carbon		·		
Ash	23.9	20.8	25.0	
,	100.0	100.0	100.0	
Hydrogen		Grams	Per Cent	
on 20 me sh		the state of the s		
thru 20 me sh			57.9	
total wt. of a	ample	259.6		
		448,0		
Sulphur				
Ash			<u> </u>	
,	es present; n			
Calorific value Calories		Sample 1	moist	
termined British thermal units			-	
				Cumulativ per cent.
creen test, through 20 me	sh			100
through 48 me	esh			41.7
through 100 n	nesh			19.0
	nesh		•	
rea from which sample w	as taken (sq. ft.)	· 		
				Chemist

est No.	DUS 1-	ANALYSIS REPORT	Lab.	No. A 66129
ample of Read	dust (through 20	0-mesh screen).	$\mathbf{Can}$	No. 0-102
perator Sunday Cr				
tate Ohio (	County Attachs	Bed	Hocking #6	
own Millfi	olā			
ocation in mine OA 3	north, 10 ft.	outby 3 brea	ka thre outby	13 west
lethod of sampling		Gross weight, lbs	Net wei	ght, gms <b>1162.</b>
ate of sampling 11/1		ab. sampling 11/1	<b>5/30</b> Date of	analysis
or B. of M. section	Mine Acc	Collec	tor Walker -	Marshall
Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	1.6	5.3		
<b>'</b>		59.1	41.3	(a)
Volatile matter Comb Fixed carbon				
Ash		55.6	58.7	
	100.0	100.0	100.0	
	,			
Hydrogen		the state of the s		
Carbon 20 mesh				
thru 20 mesh Nitrogen total wt. of	eample	763.4	64.6	
oxygen wt. of	eau hra	1182.0		
Sulphur				
Ash				
Coked_particle	s present: tr	966		
Calorific value Calories				
etermined British thermal units_		Sample dr	f 	
		·		Cumulative per cent.
creen test, through 20 me				
	esh			
	nesh			
ŭ	nesh			<b>→</b> F1
area from which sample v	_			
Date, Nov. 21	, 1930	(Signed)	H. M. Coor	Ohemist.

est N	To	DU	SI-ANALYSIS REPORT		No. A corpo
ampl	e of Rib & Room	dust (through	20-mesh screen).	Can	No. 334
)pera	torsunday	Creek Coal		Sunday Creek	<u> </u>
			Bed	Hocking #6	
'own	Millfiel	<u> </u>			
ocati	on in mine		.0 ft. outby th		
letho	d of sampling	Std	Gross weight, lbs.	Net weig	ght, gms.
ate o	of sampling 11/11	Date of	Lab. sampling 11	/15/80 Date of a	analysis
or B	of M. section	Mine Acc	Collec	tor Waller -	Marshall
	Air-dry Loss 6.3	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Mo	isture	8. 9	9,9	;	
וי	KNEENKE Comb	62.4	58.5	64. 9	(a)
Fix				, 	
As	h	33.7	31.6	25.1	
		100.0	100.0	100.0	
Hy	drogen		Grams	Per Cent	
0			163.2	42.6	
Ni	hru 20 mesh trogen		219.8	57.4	
Ox	etal wt of sa	IN START	383.0		
Su	lphur	· .			
1	h				
Ò	oked particle	s prepaent:	Trace		
Calorific value	Calories		Sample Dry		
etermine	British thermal units				
					Cumulative per cent.
creer					
	· ·				-
	9	•			
	•				
rea i	rom which sample w				
)ate,	20 10 10 10 10 10 10 10 10 10 10 10 10 10		(Signed)	H. M. Cooper	

Test No.	DUST-AN	ALTSIS REPORT	Lab.	No. A 66131
Sample of <b>Read</b> du	st (through 20-m	esh screen).	Can	No. F 692
Operator Sunday Creek C	cal Co.	Mine	nukay Creek	6
State Chio County	Athens	Bed	Hocking #6	
Town Millfield	••••			
Location in mine 5 west ha	zlage betwe	en 2 & 5 No	rth, 25 ft. (	outby 11 breakt
Method of sampling	G	ross weight, lbs	Net wei	ght, gms. <b>636</b> .
Date of sampling 11/11/30				
For B. of M. section	e Acc	Collec	tor Walker -	Marshall
AIR-DRY LOSS 3		COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	2.5	6.4		
of the desired carbon			61.0	(a)
Volumentation X Uoob D				
Fixed carbon	<b>18.</b> 0	36.5	39.0	
( Asn				
	00.0		4	
Hydrogen			Per Cent	
		284.2	44.7	
Nitrogen		351.8	55.2	
taru 20 mesh Nitrogen total wt. of sampl Oxygen				
5   Sulphur				<del>-</del> <del>-</del>
Ash			· ·	
Coked particles		•		
Calorific value determined Calories		San	ple Dry	
determined British thermal units				Cumulative
Screen test, through 20 mesh				per cent. 100
through 48 mesh				58.7
through 100 mesh				27.1
through 200 mesh				23.8
Area from which sample was take	n (sq. ft.)	·		
Date, Nov. 21.	1980	(Signed)	H. M. Cooper	Chemist.
		latile combustible to t		119383

Te	st No	DUST-A	ANALYSIS REPORT	Lab.	No. A 65132
Sa	mple of Rib & Roc	dust (through 20	-mesh screen).		No. H 42
	erator Sunday Cr				
_	ateOhio(				
	wn Millfiel		~~~~~~		
Lo Me	cation in mine 8 west	t haulage betw	Gross weight, lbs.	th, 25 ft. on Net wei	tt by 11 breakth ght, gms <b>295</b>
	te of sampling 11/11				
Fo	r B. of M. section	Mine Acc	Collect	or Walker -	Marshall
	Air-dry Loss 4.1	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis.	Moisture	3.8	7.8		
Proximate Analysis	vaccasiones Comb	54.0	51.7	56.1	(a)
ximate	Fixed carbon				
Pa	Ash	42.8	40.5	43.9	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
.5	on 20 mesh	·	154.8	52.8	
Inalys	thra 20 me sh Nitrogen		140.7	47.7	
Utimate Analysis	tetal wt. of a	ample	295,0		
5	Sulphur				
	Ash	·			
		icles present			
Cal	orific Calories				
	alue {		Sample d	•	
Sc	reen test, through 20 me	<u> </u>			Cumulative per cent.
	through 48 m	esh			46.7
	through 100 r	nesh	<u> </u>		28.4.
	through 200 r	nesh			14.0
Ar	ea from which sample v	vas taken (sq. ft.)			
Dε	te, <b>Nov.</b> _21_	. 1930	(Signed)	H. M. Ccoper	, Chemist.

a This figure is the ratio of volatile combustible to total combustible.

11---9383

Tes	st No	),	DUS	I-ANALYSIS REPORT	Lab	No. A 66133 .
Sar	mple	of Road	dust (through	20-mesh screen).	Can	No. P 716
Op	erato	rSunday0	reek Coal Co.	Mine S	nday Creek #	<u> </u>
Sta	te	-Ohio	County Ath	ns Bed	Hoeki:	ng #6
		•				
Lo	catio	n in mine Betwe	en 20 & 31 re	oom, 15 West of	f 4 north	
				Gross weight, lbs.		
Da	te of	sampling 11	/11/50 Date of 1	Lab. sampling	1/15/30 Date of	analysis
Fo	r B. (	of M. section	Mine Ac	Collection	ctor Walker	- Narskell
		Air-dry Loss 9.0	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis.			<b>2.0</b>	11.8		
Proximate Analysis	Vola	tile matter - Count		68.1		
Prox	1			25.1		
			100.0	109.0	100.0	
	Hyd	rogen		Grans	Per Cent	
sis				642.7		
Analy	th.	731. 20 me sk		504.3		£
Utimate Analysis	<b>\$49</b>	tal wt. of s		1147.0	1	
5	Sulp	ohur				
	Ash	~	· 			
	Ge	med particle	s present - 1	[one		
	lorific	ſ				
	alue . rmined	}		Sample	Meist	
Sc	reen					Cumulative per cent.
				·		
		through 100 r	nesh			
		through 200 r	nesh			20.
Aı	ea fr					
D	ate, _	Nove	1 980	(Signed)	н. и. Сооре	, Chemist.

l'es	st No.	2001	-ANALTSIS REPORT	Lab.	No. A Color
Sai	rt No. Rib & Ree	dust (through 2	0-mesh screen).		No
)p	Oz			anday creek #6	
	teOhio		Bed	Hooking #6	
oʻ.	wn Willfield				
<b>10</b> .	cation in mine Betwe	en 20 & 21 ro	om, 15 west o	ff 4 north	N See
ſе	thod of sampling	Sta	Gross weight, lbs.	Net wei	ght, gms. 406.
)ค	te of sampling	1/20 Date of L	ab. sampling	/15/30 Date of	analysis
ľo.	r B. of M. section	Mine Ko	Colle	ectorWalker	- Marshall
-	Air-dry Los 13.1	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
		3,0	15.6		
Analysis	Moisture	72.8	63.4	75.1	(a)
5	AND MAKE COMP	1 2 4		· · · · · · · · · · · · · · · · · · ·	
r roximate	Fixed carbon		21.0	9Å / Q	
-	Ash	24.2	V1 *A	24.9	
	,	100.0	100,0	100,0	
	Hydrogen On 20 me sh		Grams	Per Cent	
3			176.0	48.4	
Analysis	thru 20 mesh		230.0	56.6	
Jitmate /	total wt. of Ba		406.0		
5	Oxygen				
	Sulphur				
	Coked partic	les present -	None		
	lorific			<del></del>	
١	alue Calories		1	i i	
ete	British thermal units				
~	4 - 4 41	a alla			per cent.
<b>5</b> 0	reen test, through 20 m	esn			
AJ	rea from which sample	was taken (sq. it.)			
	ate,Nov_	21. 1930	(Signed)	I. M. Cooper	, Chemist

$T_{e^{\epsilon}}$	st No	DUS	ST-ANALYSIS REPORT	Lab.	No. A 66135
	nple ofRoad	dust (through	20-mesh screen).		No. A 215
Oπ	eretor Sunday Or	BOX COST CO	Mine	inday Creek f	<b>6</b>
Ste	te Chio	ounty At he	Bed Ho	king #6	
m <sub>o</sub> .	willfial	LA			
Lo	cation in mine On 4	north outby	third breakthro	e outby 17 to	st
Me	thod of sampling		Gross weight, lbs	Net wei	ght, gms. 1255.
Dα	te of sampling 11/11/	Date of	Lab. sampling 11/	15/30 Date of	analysis
Fo	r B. of M. section	Mine Ac	Collect	or Waller	- Merbhall
	Air-dry Loss 5.4	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
.g.	Moisture	2.3	7.6		
Proximate Analysis	EXECUTE COMb	50.4	47.7	51.6	(a)
ximate	Fixed carbon				
Ţ	Ash	47.3	44.7	48.4	
		100.0	100.0	100.0	
	Hydrogon		Grams	Per Cent	
. <b>s</b>	Hydrogen on 20 me sh Carbon		526.6	42.7	
Analys	thru 20 mesh		BOS A	57.3	
Ultimate Analysis	total wt. of sa	mple	1233.0		
₽	Sulphur	·			
	Ash		- large amount		
	Cored barrior	es brasens.	- TB100 MINETA		
	orific Calories		Sample Dry		
•	aiue {				•
Sc					Cumulative per cent.
20	· -				***
	•				
A٦	•				
431	Nov.	21, 1980			
$\mathbf{D}_{i}$	ate,	. ·	(Signed)	н. м. сооре:	Chemist.

est No	DUST-A	NALYSIS REPORT	Lab.	No. A 66136
ample of Rib & Roe	dust (through 20	-mesh screen).		No. R 422
perator Sunday	Creek Coal Co.	Mine	Sanday Cree	k #6
tateChioC	ounty Athans	Bed	Hooking #6	
Yown Millfield				
ocation in mine. On 4	north outby th	ird breakthr	a outby 17 We	<b>#</b> \$
fethod of sampling				
Date of sampling 11/11/				
For B. of M. section	Mine Acc	Collec	tor Walker	- Karshall
Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	2.7	12,8		
Moisture	66.0	59.6	67.9	(a)
Fixed carbon	*			
Ash	31.3	28.3	<b>32.1</b>	
` [	100.0	100.0	100.0	
Hydrogen		Grams	Per Cent	
on 20 mash		19.2		
thro 20 mesh				
tire 20 mesh total wt. of se				
Sulphur				
Ash				
· · · · · · · · · · · · · · · · · · ·	cles present	- large smour	t	
,	Sam p		i	
				i
Screen test, through 20 mes			<u> </u>	Cumulative per cent.
•	sh			
· ·	esh			
· ·				86
Area from which sample w				
Date,	This figure is the ratio of	(Signed)		70 Chemist.

Test No.	DUST	T-ANALYSIS REPORT	Lab	. No. A \$41.37
Sample of Road	dust (through 2	20-mesh screen).	Can	No. 0 171
Operator Sunday Or			anday Greek	f6
State Ohio				
Town Millfield				
Location in mine_Between	en 9 & 10 re	om 17 West of	-4-no-rth	
Method of sampling				eight, gms. 1010
Date of sampling 1/11/				· · · · · ·
For B. of M. section	•		•	
Air-dry Loss 6 2	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	5,2	9, 5		
Moisture  **Comb  Fixed carbon	80*2	75.1	82.9	(a)
Fixed carbon	·			
Ash	16,6	15.6	17.1	
	100.0	100.0	100.0	
Hydrogen		Grams	Per Cent	
on 20 mesh			58.4	
Carbon 20 me sh		WOOD		
	mole	Water and the state of the stat	47.6	
otal wt. of sa		1010.0		
Sulphur	:			
Ash		<u>                                     </u>		
	Coked part	des present	- More than	185 & 186
Calories	Ga wa	le Dry		
determined British thermal units_	Damp.			·
Screen test, through 20 m	esh			Cumulative per cent.
, 0				
				••
O		<u>.</u>		44.4
Area from which sample v				
_	•			•
Date,		of volatile combustible to		, Chemist.

Test No.	DUST-	ANALYSIS REPORT	Lab	No. A-66138
Sample of Rib & Re	dust (through 20	)-mesh screen).		No <b>D-342</b>
Operator Sunday (	Creek Cosl Cos	Mine	Sunday Creek	6
State	County Athens	Bed	Hooking #6	
Town Millfie	la .			
Location in mine be two	en 9 & 10 room	. 17 west of	t 4 north	
Method of sampling				ight, gms.
Date of sampling 11/1	1/80 Date of La	ab. sampling 11,	/15/30 Date of	analysis
For B. of M. section	Mine Acc	Coll	ectorwalkar	- Karaball
Air-dry Los	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	2,9	12.5		
Moisture	77.8	70.1	DA 3	(a)
Volatile matter			80,1	
Fixed carbon	19.3	17.4	***	
Ash		47.4		
	109.0	100,0	100.0	
Hydrogen		Greens	Per Cent	
on 20 mesh Carbon mesh		149.8	30 . 9	
Nitrogen		385.8	69.1	
Sotal wt. of ea	mple	485.0		
Sulphur				
Ash				
,	ticles present:	large amoun	*	
Calorific Calories		Sample dry		
determined				
( Dittish thermal diff	ts_			Cumulatin per cent.
Screen test, through 20	mesh			
, ,	mesh			UULI
—·	) mesh			======================================
•	) mesh			# # #
Area from which sample	e was taken (sq. ft.)			44.2
Date,	, 1930	(Signed)		, Chemis
	a This figure is the ratio			11—9383

Test No.	DUST	-ANALYSIS REPORT	Lab	. No. A 661.39
Sample of Road	dust (through 2	20-mesh screen).	Can	NoB_830
OperatorSunday			Sanday ores	£-#6
State Ohio C				
Town Killfield				
Location in min 39 11	inby second	breakthru en	4 north inby	20-west
Method of sampling		Gross weight, lbs	Net we	eight, gnis 154
Date of samplin 1/11/3	Date of I	ab. sampling11/	<b>L5/50</b> Date of	analysis
For B. of M. section	Wine Acc	Colle	ctor	
Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	3.2	8,2		
Moisture	68 <b>. 9</b>	65.4	71,3	(a)
Fixed carbon				
Ă Ash	27.9	26.4	28,8	
	100.0	100,0	100.0	
Hydrogen		Grams	Per Cont	
a or a so me sh		The second secon	50.6	
thru 20 mesh		569.6	49,4	
total wt. of man		1164.0		
5 Sulphur				
·				
<b>\</b>	icles present			
Calorific	2.7	Sample dry		
		Dampie wij		
				Cumulative per cent.
Screen test, through 20 me				
•				
m oor demond	109H			26.7 
Area from which sample w				
Date,				, Chemist.
		of volatile combustible to		119383

$T_{e}$	st No		-ANALYSIS REPORT	. Lab	No. A 66140
Sai	mple of Rib & Ro	dust (through	20-mesh screen).	Can	No. <b>H 184</b>
On	eratorSunday Cr	reck Coal Co.	Mine S		#6
Sta	ata Ohio	County Ather	18 Bed	Hooking #6	
ጥለ	Will field				
Lα	cation in mine 30 ft	. inby second	breakthra on	4 north inby	20 West
	ethod of sampling	<b>⊈</b> +2	Gross weight, lbs		a access
D.	te of sampling 11/11/				
	or B. of M. section				
-		COAL (Air dried)	COAL (As received)	COAL	COAL (Moisture and ash free)
	Air-dry Loss 18, 2		(As received)	(Moisture free)	(Moisture and ash free)
sis.	Moisture	2.9	20,6		
Analy	WENTER COMB	75.8	62.0	78.1	(a)
Proximate Analysis	Fixed carbon				
Prox		21.3	17.4	21.9	
	Ash		1		
		100.0	100.0 Grans	100.0	
	Hydrogen 20 mesh			Per Cent	
ysis	Carbon		97.9	21.5	
Ultimate Analysis	thru 20 mesh Nitrogen total wt. of s		357.1	78.5	
imate	Oxygen	ambra	455.0	,	
5	Sulphur				
	Ash	·			
		rticles prese			
C	alorific [		Semala Day		
, 1	auc {	1	Sample Dry		
uer	ermined British thermal units				
<b>e</b> .	reen test, through 20 m	agh	•		per cent.
Ö	• •				70 ft st
	• .				
	_				
	tnrougn 2001 rea from which sample v				
$\overline{\mathbf{D}}$	ate,Nov.	ZI, 1980			, Chemist.
		a This figure is the ratio	of volatile combustible to t	otal combustible.	11—9383

Tes	t No	DUS	T-ANALYSIS REPORT	Lab	. No
	nple of /Rib & Roof	dust (through	20-mesh screen).	Can	No. X 222
On	erator sunday Cz	eek Coal Co	• Mine S	anday Crock	#6
Ste	te Ohio Co	unty Athons	Bed <b></b>	eking #6	
To	wn Millfield	<b>₹</b> ₹			
	cation in mine Betwee	n 9 ' 10 R	on 18 W off 4 N		·
Me	thod of sampling		Gross weight, lbs	Net we	ight, gms. <b>591</b> .
	te of sampling 11/13/				
Fo	r B. of M. section	Kine Acc	Collect	or Waller -	Morgan
	AIR-DRY LOSS 9.5	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moisture	3.5	12,5		
Proximate Analysis	VERNITARE Comb	75.6	68.4	78.2	(a)
xima	Fixed carbon	· 			
F.	Ash	21.1	19.1	21.8	
		100.0	100.0	100.0	<u> </u>
	Hydrogen		Grams	Per Cent	
.22	Carbon 20 me sh			22.0	
Inalys	thra 20 mesh		419.8		
Ultimate Analysis	tetal wt. of se	MDT6	591.0		
5	Sulphur				
	_				
	Ash		ot so much as A	GRORE & A R	A257
۔۔۔۔ Ca					
V	due Calories		Sample dry		
Sc	reen test, through 20 mes				Cumulative per cent.
N					
	Ü				* *** ***
	J				
Aı	ea from which sample wa				
	te, Nov. 21,			H. M. Goog	

Too	t No	DUST	-ANALYSIS REPORT	Lab.	No
202	nple ofRoad	dust (through 9	O-mesh screen)		No. X 217
ว <sub>ะ</sub>	erator Sunday C	reek Coal Co.	Mine St.	MARY Creek #6	<b>3</b>
	te Chio (				
	vn Millfi				
LOV	cation in mine be	tween R 9 & 1	off 18W off	4 N	
	thod of sampling				oht. oms. 1060.
Mre.	te of sampling 11/18	/30 Deta of I	sh sampling 19/1	1/30 Date of	analysis
ノな	B. of M. section	Mine Acc	Collec	tor Walker	- Morgan
. 01	AIR-DRY LOSS 5	<u> </u>	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
				(MOSEUR Bee)	(Moistaro and asin iroo)
7848	Moisture	8,7	7.9		(a)
	Volkerberk Comb	53.1	50.3	54,6	
roximate Analysis	Fixed carbon		· 		
2	Ash	44.08	41,8	45,4	
		100.0	100.0	100.0	
	Hydrogen		A more a	Per Cent	
	on 20 mash			48.1	
Ultimate Analysis	Carbon 20 me sh				•
ate Ar	Nitrogen total wto of		614.		
	Oxygen		1060.		
	Sulphur				
	Ash				
	Coked particl	es present: N	ot as much as	A 56256 & A 6	6257
	orific Calories		saple Dry		
_					
				•	Cumulative per cent.
Sc	reen test, through 20 m	5-4°			-
	through 48 m	esh			45
	<del>-</del>		· · · · · · · · · · · · · · · · · · ·		
	-				
Ar	ea from which sample v	vas taken (sq. ft.)			
	Nove 21	Account of the contract of the	(Signed)	.edu.	

	t No		ANALYSIS REPORT	Lab.	No. A 66240
	aple of Rib & Roo	dust (through 20	-mesh screen).		No. X 56
	erator Sunday Cre	_		Sanday Creek	<b>#6</b>
-	te Ohio Co				
Tov	vn Willfield	·			
Loc	eation in mine in r	oom 24 off 16	W. off 4 N		·
Met	thod of sampling		Gross weight, lbs.	Net weig	ht, gms. <b>585.</b>
	te of sampling 11/18/				
For	B. of M. section	mine Acc	Colle	ctorWal	ker - Mergan
	AIR-DRY LOSS 9.2	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
		Ø E	10 4		
4	Moisture	3.5	•		(a)
ate Aı	Value Reconstruction Com b	61.9	74.3	84.9	
roxim	Fixed carbon				
	Ash	14.6	13.3	15.1	
		100.0	100.0	100.0	
	Hydrogen		Grans	Per Cent	
.g	on 20 mesh		226.9	<b>36.8</b>	
Analy	thre 20 mesh	·	<b>358.1</b>	62.2	
Ultimate Analysis	total wt. of s	emple	585_A	1	
	Sulphur				
ı	<u>-</u>				
Calo	orific And A 6625		III HEW HID 5 A G	out 1/2 as muc	2
val detern	lue Calories				
	British thermal units_		3849	le Dry	Cumulative
Scr	een test, through 20 me	sh		· <del></del>	per cent.
	through 48 me	sh	·		
	through 100 m	esh	·		
	· ·	· ·			
Are	ea from which sample w	as taken (sq. ft.)	·		· 
Day	te,	980	(Signed)	н. м.	Cooper, Chemist.

Sample of Read dust (through 20-mesh screen).  Operator Sunday Greek Coal Ges Mine  State Ohic County Athens Bed Hocking #6  Town Millfeld  Location in mine In room in 22 24 off 18 W. off 4 H.  Mathed of sampling.  Date of sampling.  AR-DEV Location Mine Acc.  Collector Walker - Horgen  AR-DEV Location (Ara dried) (Ara dried	ጥል	st No	DUS	T-ANALYSIS REPORT	Lab	No
Operator   Sunday Greek   Coal   Ge			dust (through	20-mesh screen)	Can	No. X 212
State Ohio County Athens Bed Hocking #6  Town Milifield  Location in mine In room #2 24 off 18 W. off 4 N.  Method of sampling Gross weight, lbs. Net weight, gms #72.  Date of sampling Date of Lab. sampling 11/19/20 Date of analysis.  For B. of M. section Kine Acc Collector Walter - Morgan  Alb-Day Location (Arrestree) (Arrestree) (Moisture bee) (Moisture and sah free)  Moisture 5.5 8.7  Moisture 5.5 8.7  Moisture 5.5 8.7  Fixed carbon 15.9 15.0 16.4  100.0 100.0 100.0 100.0  Hydrogen Grams Per Gent  Willows Suphur					anday Greek	<b>†</b> 6
Town Milifield  Method of sampling Gross weight, lbs. Net weight, gms. 972.  Date of sampling 11/13/50 Date of Lab. sampling 11/19/30 Date of analysis.  For B. of M. section. Kine Acc Collector Walker - Morgan.  Alb-Day Loss . 4 (Ard dred) (Account (Modalure free) (Moda	_				••	
Method of sampling Gross weight, lbs. Date of sampling Date of sampling 11/13/30 Date of Lab. sampling 11/19/30 Date of analysis.  For B. of M. section. Kirs Acc Collector Walker - Morgan  Ana. Dat Los 5.4 (Article)	DU DU	Millfielä	County	Ded		
Method of sampling	Το -	wn <b>Tn</b> 1	room 1% 24 of	f 18 W. off 4 1		
Date of sampling.   Date of Lab. sampling	Lo 	cation in mine			7.T.L.	872.
For B. of M. section	Me	ethod of sampling	50	Gross weight, lbs.	9/30 Net we	
Moisture   S.5   S.7   Moisture   S.5   S.7		,	Date of	Lab. sampling	Date of	•
Moisture   3.5   8.7   Moisture free)   (Moisture and ash free)   Moisture   3.5   8.7   Moisture   3.5   Mo	Fo	r B. of M. section				
Moisture   South   So. 6   76.3   83.6   (*)		AIR-DRY LOSS	COAL (Air dried)	(As received)	(Moisture free)	(Moisture and ash free)
Hydrogen	.9	16-1-4	3.5	8.7		
Hydrogen	nalys		80 A	76.8	83.6	(a)
Hydrogen	nate A				<del></del>	
Hydrogen	roxin	Fixed carbon			***	
Hydrogen		Ash				
Note			100,0	100.0	160.0	
Carbon thrue 20 me sh		Hydrogen		Grams	Per Cent	
Sulphur  Ash  Goked particles present: small amount, about 1/2 as much as A 66255  Calorific value determined British thermal units  Screen test, through 20 mesh  through 48 mesh  through 100 mesh  through 200 mesh  Area from which sample was taken (sq. ft.)	.s:	on 20 mean		378.4	48.4	
Sulphur  Ash  Goked particles present: small amount, about 1/2 as much as A 66255  Calorific value determined British thermal units  Screen test, through 20 mesh  through 48 mesh  through 100 mesh  through 200 mesh  Area from which sample was taken (sq. ft.)	Inaly			495.6	56.6	
Sulphur  Ash  Goked particles present: small amount, about 1/2 as much as A 66255  Calorific value determined British thermal units  Screen test, through 20 mesh  through 48 mesh  through 100 mesh  through 200 mesh  Area from which sample was taken (sq. ft.)	nate /	total wt. of s	am yl <b>a</b>	872.0		
Calorific value determined British thermal units  Screen test, through 20 mesh through 100 mesh through 200 mesh  Through 200 mesh  Area from which sample was taken (sq. ft.)	:: :::					
Goked particles present: small amount, about 1/2 as much as 4 56255  Calorific value determined  British thermal units  Screen test, through 20 mesh  through 48 mesh  through 100 mesh  through 200 mesh  Area from which sample was taken (sq. ft.)		Sulphur				
Calorific value determined Calories British thermal units British thermal units Cumulative per cent.  Screen test, through 20 mesh 100 through 48 mesh 100 m		Ash		- 11 cmount sh	opt 1/2 as m	oh as A 66255
Calories		/ ema A A	AGENT	mar amounts,		
Screen test, through 20 mesh		HOTING Colonion		Sample	dry	
Screen test, through 20 mesh 100  through 48 mesh 48.5  through 100 mesh 21.9  Area from which sample was taken (sq. ft.)		inad				
Screen test, through 20 mesh	_					Cumulative
through 100 mesh	Sc	reen test, through 20 m	iesh			100
through 200 mesh		through 48 m	esh			
Area from which sample was taken (sq. ft.)		through 100	mesh			
H. H. Cooper		through 200;	mesh			21,9
Date Nov. 22, 1930 (Signed) H. M. Cooper Chemist.	Aı	rea from which sample	was taken (sq. ft.)			
	D	nete Nov. 22	, 1930	(Signed)	H. M. Coop	er Chemist.

a This figure is the ratio of volatile combustible to total combustible.

**DUST-ANALYSIS REPORT** A 66242 Lab. No. Test No. X 208 Sample of Rib & Roof dust (through 20-mesh screen). Can No.... Operator Sunday Greek Goal Co. Mine Sunday Greek #6 Hecking #6 State Chie County Athens Bed Town Millfield Location in mine In R 35 off 17 W. off 4 N Method of sampling...... Gross weight, lbs...... Net weight, gms. 522. Date of sampling 11/12/20 Date of Lab. sampling 11/19/30 Date of analysis Kine Acc Collector Walker - Morgan For B. of M. section\_\_\_\_ COAL (Moisture free) COAL (Moisture and ash free) COAL (As received) COAL (Air dried) AIR-DRY LOSS 8.5 11.2 2.9 Moisture \_\_\_\_ 74.6 84.0 Veletilemetter Comb Fixed carbon \_\_\_\_\_ 16,0 14.8 15.6 100.0 100.0 100.0 Par Cent Hydrogen Grans capon 20 me sh 230.7 which 20 me sh 62.3 **291.5** ototal wt. of sample 622.0 Sulphur \_\_\_\_\_ Goked particles present; small amount, about 1/2 as much as A 66256 and A 66257 Sample moist value determined British thermal units\_ Screen test, through 20 mesh 100 through 100 mesh Area from which sample was taken (sq. ft.) (Signed) H. M. Cooper Date, Nov. 22, 1930 ...., Chemist.

Test No	DUST-A	NALYSIS REPORT	Lab.	No. A 66243
Sample ofRoad	dust (through 20-	mesh screen)		NoH 41
Operator Sunday C	reek Coal Co.	Mine		
State Ohio C				
Town Millfield				
Location in mine in re				
Method of sampling		Gross weight, lbs.	Net wei	oht. gms. 942.
Date of sampling 11/13	/20 Date of Lab	sampling	11/19/30 ate of	analysis
For B. of M. section	Wine Aca	Colle	ector Walker	- Morgan
AIR-DRY LOSS	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
1		•	(Monetae noo)	(Mospharo and ask hoo)
Moisture		8.4		. (a)
Total and the Comb	81.7	78.1	85.2	. ( )
Moisture Comb Fixed carbon		· ·		
Ash	14.2	13.5	14.8	
	100.0	100.0	100.0	
Hydrogen		Grams	Per Cent	
on 20 mesh			55.0	
things 20 mesh				1
total wto of a	mple	942.0		
Sulphur				
Coked particle	s mesent: mal	l amount, a	bout 1/2 as mu	chas
Calcuida (	6256 and A 6626	7		
value Calories				
British thermal units				Cumulativ
Screen test, through 20 me	sh			per cent.
	esh			
· ·	nesh			
· ·	nesh			
Area from which sample w	as taken (sq. ft.)		·	
Nov	. 22, 1950		H	
Date,	a This figure is the ratio of			11—9383

Те	st No	DUS	T-ANALYSIS REPORT	Lab.	No. A 6 6244
	mple of Rib & Roof	dust (through	20-mesh screen).		No <b>H_9</b>
On	erator Sunday Cr	ek coal Co.	Mine 5		
Sta	ate Ohio (	County Athens	Bed	Hooking 26	
	wn Millfield				
	cation in mine In 1	7 W. off 4 N.	between R 57	and 58	
	ethod of sampling				ght, gms. <b>535</b>
	ate of sampling 11/13				
	or B. of M. section				
		COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
_	Air-dry Loss	(Air dried)	(As received)	(MORETHE HEE)	(Moistare and ash free)
ysis	Moisture	3.7	16.9		(a)
Anal	Volatile matter Comb	78.9	68.1	82.0	
Proximate Analysis	Fixed carbon	1			
Pro	Ash		16.0	18.0	
			100.0	1	
	· ·	· ·			
	Hydrogen	1	***************************************		
alysis		1	251.4		
Iltimate Analysis	thingen 20 me sh		434.6	63.4	
<b>Jitima</b>	tetal wt. of sa	m DT9	686,0		 
_	Sulphur				
	Ash	· 			, a & # #
	Comed partiale:	present; sm	all so cunt she	mt 1/2 as much	88 A 55255
	dorific Colories	257		mple Moist	
_	. 1		1		ł
					Cumulative per cent.
So	reen test, through 20 m				
	G				
	•				
	. •	•			
	rea from which sample				
D	ate, No Ve	22, 1930	(Signed)		, Chemist
		a This figure is the rati	o of volatile combustible t	to total combustible.	11—9383

Te	st No	DUST	-ANALYSIS REPORT	Lab.	No
Saz	mple of Road	dust (through 2	0-mesh screen).	Can	No. X 220
	erator Sunday Cr			sunday Creek #	6
_	ate Ohio				
To	wn Millfield				
Lo	cation in mine in 1	7 N. off 4 N.	between R 57	& 50	
Me	thod of sampling		Gross weight, lbs.	Net wei	ght, gms. 667.
	te of sampling 11/1				
Fo	r B. of M. section	Mine Ace	Collec	etor Walker -	Morgan
	Air-dry Loss 8.6	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
ysis	Moisture	3,5	11,8		
e Anal	<b>жижиныж</b> к Comb	74.5	68.2	77.3	(a)
Proximate Analysis	Fixed carbon	· · · · · · · · · · · · · · · · · · ·			
Q.	Ash	21.9	20.0	22.7	
		100.0	100.0	100.0	
	Hydrogen		Grams	Fer Cent	
sis.	on 20 mesh		412.2	61.8	
Analy	thm 20 mesh		254,8	38.2	
Ultimate Analysis	ototal wt. of a	a multa	667.0		
5	Sulphur				·
	Ash				
	Coke particles	66257	ll smount abou		as A 66256
dete	mined British thermal units.				
Sci	reen test, through 20 me	•			Cumulative per cent.
	through 48 me	esh			48.6
	through 100 n	nesh			
	through 200 n	nesh			
Ar	ea from which sample w				
Da	.te, Nov. 22		(Signed)	н. м. Со	Chemist.

Te	st No	TSUD	-ANALYSIS REPORT	Lab	No. 66246
Sa	mple of Rib & Rec	dust (through 2	20-mesh screen).	Can	No. X 215
Or	perator Sunday Cr	ek Coal Co.	Mine <b>S</b>	ınday Creek #6	· ·
St	ate <b></b>	County Athens	Bed	Hocking #6	
				•	
Lo	cation in mine n 18	W. off 4 N. C	pposite R 57	in 22 17 W. C	ff 4 N.
Me	ethod of sampling		Gross weight, lbs.	Net we	ight, gms. <b>602.</b>
D٤	te of sampling 1 /1 3/	Date of L	ab. sampling 11/1	9/30 Date of	analysis
Fo	or B. of M. section	Mine Acc	Colle	ector Walker	- Mergan
	Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
. <u>e</u>	Moisture	<b>S.5</b>	16.0		
Proximate Analysis				86.8	(a)
mate	Volatile matter	84.0	78.9		
Proxi	Fixed carbon	12.7		13.2	
		100.0			
	Hydrogen				
alysis	en sh				
Jitimate Analysis	tilangen 20 mesh				
Jitima	total wt. of se	mple	602.		
_	Sulphur				
	Ash				
	- Caked nertial	a present: Fe	<b>W</b>		
	3 ·c			olat	1
_	- Indiana d				,
Sc	reen test, through 20 me				Cumulative per cent.
					ET A
	through 100 n	nesh			30.9
	through 200 r	nesh			29.0
Aı	ea from which sample v	vas taken (sq. ft.)			
	ate,				oper , Chemist.

Tes	st No	DUS I-AI	NALYSIS REPORT	Lab	No. A 66247
	mple of				No. <b>P 288</b>
Op	erator Sunday	Creek Coal Co.	Mine	Sunday Creek	#6
Stε	ate Chio Co	ounty Athens	Bed	Hocking #6	
To	wn Willfield			· 	
Lo	cation in mine in	low. off 4 n.	opposite R	57 in 17 W of	f 4 N
Me	thod of sampling		Gross weight, lbs.	Net we	ight, gms. 722.
Da	te of sampling 11 /18/	Date of Lab	sampling 11/1	9/20 Date of	analysis
Fo	r B. of M. section	Nine Acc	Collec	ctorWaller	- Morgan
	Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moisture	8.7	10.5		
Proximate Analysis	VERTEXANT. Comb		72.0	80.4	(a)
oximat	Fixed carbon	· <del></del>			
4	Ash	18.8	17.5	19.6	
		100,0	100.0	100.0	
•	Hydrogen		Grams	Per Cent	
sis	Carbon 20 mesh		406.7	56.3	
Ultimate Analysis	Nitrogen 20 me sh		515.3	48.7	
timate	total wt. of st Oxygen				
5	Sulphur				
	Ash				
	Colm d particl	es present; Tra	qe		
	(			. 1	1 '
	muc.				
Sc	reen test, through 20 mes				Cumulative per cent.
	through 48 me	sh			<b>30.</b>
	through 100 m	esh			•
	through 200 m	esh			18.(
Ar	ea from which sample wa	as taken (sq. ft.)			
D۶	nte. Nov. 22.	1930	(Signed)	H. M. Sooper	, Chemist.

Test No	DUS	I-ANALYSIS REPORT	${f Lab}$	. No. A 66248
Sample of Rib &	Reofaust (through	20-mesh screen).	Can	No. X 214
Operator Sunday C	resk Coal Co.	Mine		
State Ohio (				
Town Killfield	-		<b>অ</b>	
Location in mine		airshaft		
Method of sampling			Net we	ight, gms. 730.
Date of sampling	Date of I	ab. sampling 11	/19/30 Date of	analysis
For B. of M. section	Mine Aco	Colle	ctor	r - Morgan
Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	4.4	13.6		
Moisture	80.9	73.1	84.7	(a)
Fixed carbon				
Å   Ash	14.7	13.5	15.3	
· ·				
Hydrogen		<b>6</b>	1	
on 20 mesh		340.7		
thru 20 mesh			1	
thm 20 mesh Nitrogen  total wt. of a Oxygen	ample			
5     Sulphur	·			
Ash				
Coked pa	rticles prese	nt: None		
Calorific Calories		Sampl	Damp	
determined				
Screen test, through 20 me	·			Cumulative per cent.
•			•	
ŭ				18.
Area from which sample v				
_	ov. 22, 1930			Chemist.

Test No.	DUST	-ANALYSIS REPORT	Lab.	No. A 66249
Sample of Road	dust (through 2	0-mesh screen).		No. X 213
Operator Sanday Cr			Sunday Greek	#6
State Ohio Co	unty Athens	Bed	Hooking #6	
Town Mill fie	14			
Location in mine en 19				
Method of sampling	· ************************************	Gross weight, lbs.	Net wei	ght, gms. <b>766.</b>
Date of sampling 11/13	/50 Date of L	ab. sampling 11/1	.9/30 Date of	analysis
For B. of M. section	Wine Acc	Colle	ctorWalks	Korgan
Air-dry Loss 7.8	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	3.9	11.5		
Moisture Comb		· ·		(a)
Fixed carbon				
Å Ash		24.4	Į.	
	100.0	100.0		
Hydrogen				
on 20 mesh				
thm 20 mesh				
grotal wt. of sam	o l'o	And the same of th	40.5	
<b>-</b> 1	. •			
Sulphur				
Ash	les present:			
Calacida				
value Calories				
British thermal units				Cumulative
Screen test, through 20 mes	h	·	·	n m aan t
through 48 mes	h			- · • •
•				
through 200 me	esh		·	19,5
Area from which sample wa	s taken (sq. ft.)			
Date, Nov.	21, 1930	(Signed)	H. M. Coope	, Chemist.
	This figure is the ratio	of volatile combustible to	total combustible.	11—9383

Геst No	DUST-A	NALYSIS REPORT	Lab.	No. A 66250
Sample of Rib & Reef	dust (through 20-	-mesh screen).	Can	No. X 211
perator Sunday Gre				
tate Ohio Co	ounty <b>Athens</b>	Bed <b>#0</b>	oking #6	
own willfield	· 			
ocation in mine Ca	19 W between	3 & 9 break	thru between 4	N & 5 N
fethod of sampling		Gross weight, lbs.	Net wei	ight, gms <b>729.</b>
Date of sampling 11/13/	Date of Lal	o. sampling 11/	19/30 Date of	analysis
or B. of M. section	ineAco	Colle	ector_Walker	Morgan
Air-dry Loss 8.9	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	5.4	13.9		
rickit reter Comb	ne a	69.6	80.0	(a)
Moisture				
Ash			19.2	
	100.0			
Hydrogen				
		And the second s	44.6	
thre 20 me sh				
tetal wt. of see		And the same of th	55,4	
Oxygen	į	* -= =		
Sulphur				
Coked particles		amana aka	m + 1 /9 na mma1	00 466988
Calorific And A 662		which the was	TO TAN WE WITH	1 as averes
value Calories	Sample Dr	<del>y</del>		
termined British thermal units				· Cumulative
creen test, through 26 mes	ı <b>h</b>			per cent.
· · · · · · · · · · · · · · · · · · ·				
-			·	
rea from which sample we				
	2, 1930			
<i></i>	This figure is the ratio of			11—9383

**DUST-ANALYSIS REPORT** Lab. No. A 66251 Test No. Sample of Road Can No. F 2 dust (through 20-mesh screen). Operator Sunday Creek Coal Co. Mine Sanday Creek #6 Ohio County Athens Bed Heeking #6 Town Millfield Location in mine On 19 W between 8 & 9 break thru between 4H & 5 N Method of sampling Gross weight, lbs. Net weight, gms. 274. Date of sampling 11/18/80 Date of Lab. sampling 11/19/80 Date of analysis For B. of M. section Mine Acc Collector Weller - Morgan COAL (Moisture free) COAL (Moisture and ash free) COAL (As received) COAL (Air dried) AIR-DRY LOSS 10.6 4.7 Moisture .... 65-8 72.9 PERSONAL PROPERTY COM h Fixed carbon \_\_\_\_ 25.8 27.1 24.2 100.0 100.0 100-0 Per Cent Grens Hydrogen ..... on 20 mesh 61.8 536.1 thru 20 mesh 38.7 257.9 total wt. of sample 874.0 Sulphur ... Coked particles present; small amount, about 1/2 as much as A 66256 Calorific 66257 Semple Dry value determined Cumulative per cent. Screen test, through 20 mesh 100 Area from which sample was taken (sq. ft.) (Signed) H. M. Cooper , Chemist. Date. Nov. 22, 1930

Test No.	DUST	-ANALYSIS REPORT	Lab	. No. A 66252
Sample of Rib & Rec	dust (through 2	20-mesh screen).		No. 509
Operator Sunday	Creek Coal Co	Mine		ek #6
State Ohio	lounty Athens			
Town Millfield				
Location in mine Mai	n side track	250 feet inby	from shaff	
Method of sampling				ight, gms. <b>555</b>
Date of sampling 11/13				_
For B. of M. section	•		*	-
Air-dry Loss 7.8	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	2,1	9.3		-
Moisture Comb  Fixed carbon	34.4	339	35.2	(a)
o diame matter yyur	3			
Fixed carbon	63.5	58.8	64.8	
( Ash		'		
	100.0	160,6	100.0	
Hydrogen		Grams	Per Cent	
carbon 20 mesh		56.1	15.8	
		298.9	84.2	
Nitrogen  Solvan wt. of a  Oxygen	am ple	255.0	·	
Sulphur				
·				
Coked particle		one		
Calorific				
value determined		Sample Dry		
British thermal units_				Cumulative
Screen test, through 20 me	sh			per cent.
through 48 me	sh			63.
S				
•				
Area from which sample w				
Date, Nov. 25.	1920	(Signed)	M. Cooper	, Chemis <b>t.</b>
		of volatile combustible to t		11—9383

Tes	st No	DUST-	-ANALYSIS REPORT		. No. A 65253
	mple of <b>Plcor</b>				No. 0-84
	erator Sunday				
Sta	ate <b>Oh1o</b>	County Athens	Bed	Hocking #6	
To	wn Millfield				
Lo	cation in mine Mair	a sidetrack 25	0 ft. inby fro	a shaft	
Me	ethod of sampling	3 <b>4</b> d	Gross weight, lbs	Net we	ight, gms592.
Da	ate of sampling 11	/13/30 Date of L	ab. sampling 11/	19/30 Date of	analysis
Fo	or B. of M. section	Mine Acc	Collecte	orAnkeny-8	-Burdelsky
	Air-dry Loss 7 6	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
.81	   Moisture	2.1	9.5		
Proximate Analysis	1 .		43,2		(4)
rimate					
Pro	· ·	' - ·	47 . 3		
	~	100.0	100.0	100.0	
	1		Grams		
is.	7		166.6		
Ultimate Analysis	than 20 mesh		425.4		
fimate	digital wt. of B	ample	592,0		
5	Sulphur				<u>.</u>
	Ash				
	•		).Be		1
	alorific Colories				
-	raiue {	!	Sampledry		
<del>-</del>	( Diffish thermal dittes-				Cumulative per cent.
Sc	ereen test, through 20 m	esh			
	through 48 m	esh			25.
	through 100 r	nesh			
	. •				
Αı	rea from which sample v	vas taken (sq. ft.)			
D	ate,Nov. 25		(Signed)	H. M. Coope	
-	MOY. AD,	a This figure is the retion	of volatile combustible to to	tal combustible.	11—9383

Те	st No	DUST-	ANALYSIS REPORT	Lab.	No. A 66254
	mple of Rib & Re	dust (through 20	)-mesh screen).	Can	No. 24305
Op	erator Sunday	Creek Coal Co.	Mine	Sunday Creek	<b>#6</b>
Sta	ate Ohio	County Athens	Bed	Hooking #6	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
То	wn Millfield	<b>1</b>			
Lo	cation in mine	(ai n haulage (	n 19 West 350	ft. inby from	m main north
	thod of sampling		•		
	te of sampling 11,	7	<del>-</del> -		
Fo	r B. of M. section		<del></del>		<del>-,</del>
	Air-dry Loss 7.0	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	Coal (Moisture and ash free)
sis.	Moisture	3.2	10.0		
Proximate Analysis	кланикими Сомв		45.9	51.0	(a)
imate	Fixed carbon				
Pro	Ash	47.5			
	4801	100.0	100.0	100.0	
	Hydrogen				
•	Av. 00 m. ak				
Iltimate Analysis	thre 20 mesh				
nate A	oxygen of	mample .	991.0	74,0	
<u>1</u>				·	
	Sulphur			·	
	(Ash				
Cal	(			1	
	British thermal units_				Cumulative
Sc	reen test, through 20 m	esh			per cent.
	_	esh			
	_	nesh			
	through 200 r	nesh		· 	14,8
Ar	ea from which sample v	vas taken (sq. ft.)			
Dε	ite, Nov. 25, 1	.930	(Signed)	I. M. Cooper	, Chemist.
		a This figure is the ratio of			11—9388

Те	st No	DUST	T-ANALYSIS REPORT	Lab.	No. A 66255
Sa	mple of	dust (through 2	20-mesh screen).	Can	No. F 129
Op	erator Sunda	Creek Coal C	Mine	Sunday Creek	#6
	ate Ohio		Bed	Hocking #6	
То	wn M111fi	e14			
	cation in mine Ma		19 West, 250	Fooy inby fro	m main north
Μe	thod of sampling	gtå	Gross weight, lbs	Net wei	ght, gms. 1057.
D٤	te of sampling1	1/13/30 Date of I	ab. sampling 11/	19/50 Date of	analysis
Fo	r B. of M. section	Hine-	Ago Collec	tor ankery &	Burdelsky
	Air-dry Loss 5.5	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	Moisture	2.2	7.3		
Proximate Analysis	-Vokale and Comb		51.5	83.7	(a)
oximat	Fixed carbon				
ď.	Ash	64.9	61.4	66,3	
		100.0	100,0	100.0	
	Hydrogen		Grams	Per Cent	
. <b>:</b> :	on 20 me sh		335.8	37.8	
Analy	Nitara 20 mesh		721.2	68-2	
Ultimate Analysis	total wt. of	1	1057.0		•
5	Sulphur				
	Ash				
	Coked partiales	present: Tra	80	·	
	lorific Calories		Sample Mo	ist	
Sc	reen test, through 20 m	<u>.</u>			Cumulative per cent.
				4	
	through 100 i	mesh			21.8
	<del>-</del>	•			
Aı	ea from which sample	was taken (sq. ft.)			
$\mathbf{D}$	Nov.	25, 1930	(Signed)	H. M. Coope	, Chemist.

Test No.	DUS-	T-ANALYSIS REPORT	r Lab	. No. A 66256
Sample of	dust (through	20-mesh screen).	Can	No. X 187
Operator Sunday	Creek Coal Co	• Mine	hunday Creek #	
^ Ohio	County	1	Hocking #6	
State Will field Fown	·			
	West off 4 no	rth 500 ft. 1	inby	
Method of sampling	Sta	Gross weight, lbs	Net we	eight, gms. 60 7.
Method of sampling	13/30 Date of I	Lab. sampling	. <b> </b>	f analysis
For B. of M. section			ector Ankeny &	•
Air-dry Loss 9,7	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
•	4.2	13,5		
Moisture Comb Fixed carbon	80.8	75.0	84.4	(a)
Volatile matter				
	15.0	13.5	15.6	
t Ash	100.0	100.0	100.0	
	20080			
Hydrogen		Grama	Per Cent	
.		151.8	25.0	
thru 20 mesh		455.2	75.0	
total wt, of s		607.0		
- I				
Ash				
Coked partic	les present: I	arge amount		
Calorific Calories		Sample Mois	<b>: :</b>	
value {				
Screen test, through 20 r	nesh			Cumulative per cent.
. 0	nesh			
J	mesh			
· ·	mesh			o)h
Area from which sample	was taken (sq. ft.)	·	·	
Date, Nev. 25.				, Chemist.
		of volatile combustible t		11—9383

Lab. No. A 66257 **DUST-ANALYSIS REPORT** Test No. Can No. X 196 Sample of Rib & Regit dust (through 20-mesh screen). Operator Sunday Creek coal co. Mine Sunday Creek #6 State Ohio County Athens Bed Hocking #6 Town Willfield Location in mine 22 East off 5 north just inby from Smorth Method of sampling Std Gross weight, lbs. Net weight, gms. 621. Date of sampling 11/13/30 Date of Lab. sampling 11/19/30 Date of analysis For B. of M. section Collector Ankeny & Burdelsky COAL (Moisture free) COAL (As received) Air-dry Loss COAL (Air dried) COAL (Moisture and ash free) 10.8 3.8 WEISTING COMP. 17.7 17.0 15.8 100.0 100.0 100.0 Per Cent Grams on 20 mesh 22.7 141.2 thra 20 mesh 479.8 Oxygentotal wt. of sample Coked particles present: large amount Calorific Calories \_\_\_\_ value Sample moist British thermal units\_ Cumulative Screen test, through 20 mesh through 48 mesh ..... through 100 mesh \_\_\_\_\_\_\_ through 200 mesh \_\_\_\_\_ Area from which sample was taken (sq. ft.)

Date, Nev. 25, 1980

(Signed) **E. M. Cooper** , Chemist.

Te	st No		1-ANALISIS REPORT	Lab.	No. A 56258
	mple of	dust (through	20-mesh screen).	Can	No. I 186
Op	erator Suniay	Creek Coal Co	Mine	Sunday Creek	c-#6
Sta	ateOhio(	County	ens Bed	Hocking #6	
То	wn Millfie	la.			
Lo	cation in mine	West off 4 N	orth 500 feet	inby	
	ethod of sampling		•		
	ate of sampling 11				
	or B. of M. section		•	_	
_	Air-dry Loss 5.6	COAL (Air dried)	COAL (As received)		COAL (Moisture and ash free)
		4.0			
Proximate Analysis	Moisture	ł			(a)
ite An	жиналами Comb	77.9	73.5	81.2	
roxim	Fixed carbon	'	·		
₫	Ash	18.1	17.1	18.8	
		100.0	100.0	100.0	
	Hydrogen		Gram g	Fer Cent	
. 41	on 20 me sh		t .	87.4	
nalysi	thru 20 mesh Nitrogen		i		
Ultimate Analysis	total wt. of	l -			· •
5	Oxygen	· ·			
	Sulphur				
	Coked partic	les present:	Large amount	- not as much	
Ca	· · ·				
_ `		1	Annelo		
	British thermal units.				
Sc	ereen test, through 20 m	esh			per cent.
	•				
			*		
	_				
A	rea from which sample				
D	ate,Nov.	25_ 1930	(Signed)	н. и.	Cooper, Chemist.
_			io of volatile combustible t		11—9383

Test No		-ANALYSIS REPORT	Lab	. No. 4 66269
Sample of B1b	ROOTust (through 2	0-mesh screen).	Can	No
Operator Sunday			Sunday Creek	#6
State Ohio				
Town	Lf1e14		<del>} </del>	
Location in mine				
Method of sampling		-		eight, gms. 502.
Date of sampling11	/13/30 Date of L	ab. sampling 11/1	9/30 Date of	analysis
For B. of M. section				
Air-dry Loss 8.6		COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
		-12.9	,	
Moisture				(a)
Moisture		56.5	64.9	
Fixed carbon		XO A		
	100,0			
a enboro me ab		i	1	
thran 20 me sh		265.1	72.5	
total wt. of	smyle	502,0		
<del>-</del> 1				
Ash				
Coked partiel	es present: Non	• • • • • • • • • • • • • • • • • • •		
Calorific Calories				
value	ts_			
( Dittill off of the control of the		W 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	! 1) !	Cumulative per cent.
Screen test, through 20	mesh			
	mesh			
through 10	0 mesh	· · · · · · · · · · · · · · · · · · ·		34.
through 20	0 mesh			
Area from which sampl	e was taken (sq. ft.)			
Date, MCY 2	1980	(Signed)	H. M. Coope	T., Chemist.

Te	st No	רפטם	-ANALYSIS REPORT	Lab	. No. A 66260
Sa	mple of Floor	dust (through 2	20-mesh screen).	Can	No. <b>A 486</b>
	perator gunday Gr	_			
St	ate Ohio C	ounty Athe	Bed	Hoeking #6	
	wn Killfiel	_			
Lo	cation in mine	n north hauls	ge 65 ft. inby	16 east	
	ethod of sampling		<del></del>		eight, gms. 1090.
	ate of sampling 11/1		-		_ · · · <del>-</del>
Fo	or B. of M. section		Collect	or Ankony	- Burdelsky
	AIR-DRY LOSS 4.1	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
	1	•	7.5		
alysis	Moisture	<b>3.</b> 5	7.3		(a)
Proximate Analysis	Edwin X Comb	<b>30.</b> 5	29.3	517	
roxim	Fixed carbon				
<u>~</u>	Ash	66.0	63.2	68.3	
		100.0	100.0	160.0	
	Hydrogen	•	Grans	Per Cent	·
. <b>g</b>	en 20 mesh	·	851.5	52.2	*
Ultimate Analysis	thm 20 mesh				
mate	tetal wt. of se				
Ë			1090,0	·	
		<b></b>			
	Ash		****		
کست ادی	lorific	icles present	: Note		
Y	alue Calories		Sample	<b>dry</b>	
dete	mined British thermal units_				
Sci	reen test, through 20 mes	•			Cumulative per cent.
	through 48 mes	sh			58.7
			·		•
Ar	ea from which sample wa				
Dε	ite, <b> Nev.</b> 25.,	L980	(Signed)	M. Cooper	, Chemist.

Tea	st No	DUST	-ANALYSIS REPORT	Lab	No. A 66261
Sai	mple ofR1b_&	Recaust (through 2	20-mesh screen).	Can	No. X 184
	erator Sunda	y Creek Coal C	Mine	anday Creek	<b>#</b> 6
۔ Sta	ehio	County Ather	<b>B</b> ed	Hooking	#6
То	wn Kill£	Lold			· 
Lo	cation in mine On	5 north half w	ay betteen 20	& 21 east	
Me	ethod of sampling	Std	Gross weight, lbs	Net we	ight, gms. 568.
Dα	ate of sampling 11/1	Date of I	ab. sampling 11/1	9/80 Date of	analysis
Fo	or B. of M. section	Mine Aco	Collec	ctor_Ankeny&	Burdelsky
	AIR-DRY LOSS 8.5	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
_	[ ·	4.4	12.5		
Proximate Analysis	Moisture Comb	80.9	74.1	84.7	(a)
mate /	1				
Proxi	Fixed carbon	7.4 #	13.4	75.8	
	( Ash	100,0	100.0	100.0	
	(	2000		Per Cent	
	Hydrogen		Grams	Lat Adda	
Analysis	Carbon		230.5	40.6	
	thru 20 mesh Nitrogen total wt. of		_387 <u>.</u> 5	59.4	
Ultimate	Oxygen	Sambre		 	
Þ	Sulphur				
	Ash				
	Coked markial	es mesent: ne	3.0		
	dorific Colorina	1	Sample me		
			ODE DATE MO		
Sc	reen test, through 20 n			·	Cumulative per cent.
	through 48 p	nesh			41.5
		•			· ·
Ar	cea from which sample	was taken (sq. ft.)			
Ds	nte Nov. 2	5, 1980	(Signed) H. M	. Cooper	

Те	st No	DUST-	ANALYSIS REPOR	т Lab.	No. A 66262
	mple of Floor	dust (through 20	l-mesh screen)		No. X 182
	_	_		Sunday Creek	
	ate Ohio				
	* 1				
				20 & 21 east	
		į.		s Net weig	
				/19/20 Date of	
		*		lector Ankeny & E	
	AIR-DRY LOSS 11.2	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
eis	Moisture	3,8	16.6		
Analy	l'	1		70.9	(a)
Proximate Analysis					
ፎ	Ash	26.0	24.8	29.1	
	<del>,</del>	100.0	100.0		
	Hydrogen		Grans	Per Cent	
			And the second s	40.0	
Analys	thru 20 mosh			60.0	1
Iltimate Analysis	tatel at of a	am ple			
5					
	Ash				
	Coked particles	present: none			
Ca	lorific Colorios			.et	
_	rmined )				
Sc.				·	Cumulative per cent.
	<del>-</del>				
Aı					
Da	ate, <b>New25</b>	L930	(Signed)	H. M. Cooper	, Chemist
		a This figure is the ratio of	volatile combustible	to total combustible.	11—9383

${ m T}\epsilon$	st No.		DUST-ANALY	SIS REPORT	T.a.l	. No. A 66265
Sa	mple of	dust (thro	ugh 20-mesh	screen)		No. X 197
Or	perator Sunday (	reek Coal	Co.	Mine	Sunday Creek	
- 1	ateOhio					#6
	wn Millfi	old				Ÿ
Lo	cation in mine Cn 4	i north ju	st inby f	rom 20 w	est	
	ethod of sampling	24 15 69				
D۶	ate of sampling 11	/13/30 Date	of Lab sam	nling	11/19/30 <sub>Date of</sub>	analysis
		•				Ankeny & Burdel
_	Air-dry Loss 9.4	Coal (Air dried)	<del></del>	COAL s received)	COAL (Moisture free)	COAL (Moisture and ash free)
	1	(Air dried)		5, 5	(Moisture free)	(Moisture and ash free)
lysis	Moisture	. 14,7		<b>09 0</b>		
e Ana	Volatile matter Comb	80,0	7	8.4	63.5	(a)
Proximate Analysis	Fixed carbon					
£	1	15.8	1	4.5	16.5	
		100.0	10	0.0	100.0	
	ſ		Gr	206	Per Cent	
	on 20 me ah		3		28.5	
nalysi	Thra 20 mesh		49	50.0	71.7	
ate A	Nitrogen total wt. of	ample				
	Oxygen		<b>\$</b>	88.0		
	Sulphur					
	Ash		h			
	Coked partic	neserq ee.	el mmerr	was o centr		
	orific Calories					
	rminad			mant a Ha	1 st	
	1			amôra wo	4.8 v	Cumulative per cent.
Sc:	reen test, through 20 me	sh				100
	through 48 me	sh	·		·	49.8
	through 100 m	iesh		<del>-</del>		
	through 200 m	ıesh				-23.4
Ar	ea from which sample w	· -	.)			
D٤	te,	25, 1930	(Sig	ned)	N M Coore	c
		a This figure is the				11—9383

Tes	st No	DUST	-ANALYSIS REPORT	Lab	. No
	mple ofRead	dust (through 2	0-mesh screen).		No. X 195
Ор	erator Sanday C	reek Coal Cos	Mine	unday Creek	<del> </del>  6
Sta	ite <b>Ohio</b> C	ounty Athens	Bed	ocking #6	
	wn Millfield		·		
Lo	cation in mine	north just 1	oby from 20 we	st .	
Me	thod of sampling	Std	Gross weight, lbs	Net we	ight, gms. 1068.
Da	te of sampling 11/1	3/30 Date of L	ab. sampling 11	<b>19/30</b> Date of	analysis
	r B. of M. section				
=	AIR-DRY LOSS	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moisture	2.6	66		
Proximate Analysis	Internation Comb.	•	46,9	50.8	(a) ·
roximal	Fixed carbon				
4	Ash	48.5	46,5	49.7	<u> </u>
		100.0	100.0	100.0	
	Hydrogen		Grems	Per Cent	
iis	and mesh		262.7	25.0	
Analy	thre 20 mesh		789.8	75.0	
Ultimate Analysis	total wt. of s	mple	1052.0		
ם	Sulphur				
	Ash				
	Coked part	leles present	Fow		
	lorific Calories		Sample	Moist	
	rmined )				
Sci	reen test, through 20 me				Cumulative per cent.
	through 48 me	sh			43.6
	through 100 m	iesh			25.1
Ar	ea from which sample w	as taken (sq. ft.)			
	ate, <b></b>				per , Chemist.
		7	(~8~0		

<sup>&</sup>lt;sup>a</sup> This figure is the ratio of volatile combustible to total combustible.

T.	t No	DUST-A	NALYSIS REPORT	T.a.b.	No. A 66265
		Just (through 20	magh garaan)		No. 678
Sar	nple of <b>Rib &amp; Roof</b> erator <b>Sunday</b> (	dust (through 20-	-mesn screen).		
Ope	erator Sanday C	TOOK COST CO.	Mine . 32	aking #6	
Sta	te <b>Ohio</b> Co	unty A Control	Bed		
Tov	vn Millfield			<b></b>	
Loc	eation in mine 21 We	st off 4 nort	h, 500 ft. 11	<b>D Y</b>	616.
Me	thod of sampling	Std.	Gross weight, lbs	Net wei	ght, gms.
Da	te of sampling 11/	L3/30 Date of Lal	o. sampling 11/	19/30 Date of	analysis
For	B. of M. section	Mine Acc	Collect		
	Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
·ä.	· · · · · · · · · · · · · · · · · · ·	5.3	18.6	·	(a)
Proximate Analysis	Volatile matter		78/1	84.7	(4)
ag {	Volatile matter Comb				
Proxi					
	. Ash	14.5			
		100.0	100.0		
	Hydrogen		Grams	Per Ceat	
.g	com <sub>on</sub> 20 me sh		168.8	27.4	
Analy	Nthru 20 me sh		447 8	72.6	
Ultimate Analysis	otetal wt. of sa	mple	616,0		
5	Sulphur				
			·		
	Coked particle:	present: Re	ative small s	mount	
Cal			•		
V	alue Calories		· · · · · · · · · · · · · · · · · · ·		
dete	mined British thermal units				Cumulative
Sc	reen test, through 20 mes	sh			per cent.
	· · · · · · · · · · · · · · · · · · ·	sh			
		esh			and the second second
		esh			
Δ.	rea from which sample we				
73.1	ou ion annoi sampio ac		50 (Signed) B		

#### DUST-ANALYSIS REPORT

Test No	DUST	-ANALYSIS REPORT	Lab.	No. A 66266
Sample of	dust (through 2	0-mesh screen).		No. X 188
OperatorSunday Cre	or Cast Ca.	Mine _ Sul		
StateChicC	ounty Athers	Bed	Tooking #6	
Town				
Location in mine 21 Wes	t off 4 Worth	600 feet inby		
Method of sampling	242	Gross weight, lbs.	Net wei	ght, gms. 1105.
Date of sampling 11/13/	Data of I	ah sampling 11/19	/sa Date of	analysis
For B. of M. section	Date of L	Collecto	OrAnirany	Burdel sky
	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
AIR-DRY LOSS	(Air dried)	(As received)	(Moisture free)	(Moisture and ash nee)
Moisture	3.8	8.5		(a)
Moisture  Valotile matter Comb  Fixed carbon	GA_9	6.7	67.8	
Fixed carbon				
	31 - 5	<b>50.</b> 0	52.7	
( Ash			100.0	
	100.0		_	
Hydrogen		Grans	<u> </u>	
Nhore 20 me sh		369.4		
Nhow 20 mesh		735,6	66.4	
total wt. of a	ample	1105,0		
Sulphur				
Ash				
	R	lative small s	sount	
Caloritic Caloring	R hispann.			
value {		Sample Mo	i <b>es t</b> :	
(British thermal dimes-		Dotte Pro Tro	XD V	Cumulative per cent.
Screen test, through 20 m	esh			100
7				
Area from which sample v	was taken (sq. ft.)			
				Cooper , Chemist.
Date,	4 This forms is the ratio	of volatile combustible to te		11—9383

Tes	t No	DUST	-ANALYSIS REPORT	Lab.	No. A 56267
	nple of Rib & Rot			Can	No. I 194
	erator Sunday				
Sta	te_OhieC	CountyAthens_	Bed <b>B</b>	ecking #6	
Tov	wn Willfield				
Loc	eation in mine 21 E	et off 3 nort	h just inby fr	or 5 north	
	thod of sampling				
	te of sampling11,				
For	B. of M. section	Mine Acc	Collect	or Ankony &	Burdelsky
	Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
/sis	Moisture	4.7	11,1		
Proximate Analysis	Volatile matter Comb		75.5		
Proxim	Fixed carbon		l l		
(	. Ash	14.4	18.4		
		100*0			
	Hydrogen		A STATE OF THE PARTY OF THE PAR	Per Cent	
sis	Anon20 mesh		211.1	28.3	
Ultimate Analysis	Ninga 20 mesh		535.9	71.7	
Firmat	total wto of s	ample	747.0		
5	Sulphur			· 	
	Ash			, 	
		Coked park	cles prewent:	relative sm	all amount
	c. (		Sample M		
					Cumulative per cent.
Sci	reen test, through 20 me		•		
	O				
	_				
Δ	tnrougn 200 n ea from which sample v				16.
	- -				
Da	te,	a This figure is the ratio	(Signed)of volatile combustible to t	otal combustible.	11—9383

Tes	t No.		_		DUST	-ANALY	SIS REPO	RT		Lab.	No	A D	9298
		f Road		ust (th	rough 2	20-mesh	screen).			$\operatorname{Can}$	No	D 1	56
One	rator	mnday	Creek	Coal	Çø.		Mine	\$	muday	Creek	#6		
Sta	t.a	0hio	County		Athe	4.0	Bed -		lo ek ing	#6			
ጥላ፣		Millfield	1										
T .^.	ation	in mine	21 Bag	t of	13]	forth	just 1	nhy	from 3	nort	h		
Mai	hod 4	of sampling	Stá	Ļ		Gross	weight.	lbs		Net wei	ght, gr	ns <b>6</b>	88.
De	a of s	ampling 11/	L3/80	Da	te of I	ab. sam	pling	1/11	9/50	Date of	analys	is	
Da To	DE OIS	M. section		Mi	ne A	90	C	ollecto	r An	keny	b Bu	rdel	sky
		Air-dry Loss		Coal (Air dried			COAL as received)		Coai (Moisture			COAL	
		In-Dal Lions				-			(11101111111111111111111111111111111111				
.ge	Moist	ıre		4.2		-	8.9						(a)
Anal	Table 1	KENEK COM	<u> </u>	79.3	)		75.4		82.	7	<b></b>		
Proximate Analysis	Fixed	carbon										<del></del>	
Pro	Ach			16.5			15.7		17.	5			
. '	11911			100-0			100.0		100.	0			
							rams		Per Ce	nt			
	en.	zo mesh	į				294.2		33.	1			
Ultimate Analysis	thr	n 20 mesh			·		595.8		86.	, 9			
ate Ar	Nitro	el wt. of	sempl	<b>)</b>			988.0	•			1		
Ultim	Oxyg	en		·			99010						
	Sulph	ur			<b></b>				<del></del> -				
	Cel	ted partic	les pr	esent	; Re	lativ	e smal	lam	ount				
	orific	Calories						1					
_		British thermal u	nits				58	mple	moist				
			· · · · · · · · · · · · · · · · · · ·										Cumulative per cent.
Sc	reen t	est, through 20											100
		through 48											
		through 10											
		through 20											
Αı	ea fro	m which samp	le was tal	ken (sq	. ft.)							<b></b>	
D	te,	Nov.	, 25 <u>,</u> 1	930		(S	igned)	<b>]</b>	I. H. C	oope r			, Chemist
			a This	figure is	the ratio				tal combusti			11—93	

			_			
Tes	st No.		DUST	-ANALYSIS REPORT	Lab	. No. A 66269
Sar	nple o	f Rib & Rec	dust (through 2	O-mesh screen).	Can	No. B 502
				Mine		z <b>46</b>
-	te			Bed		
		Millfield				
				erth, 400 ft.		
		of sampling	2 / KA	Gross weight, lbs	Net We	eignt, gms
				ab. sampling 11/1		
For	r B. of	M. section	<del></del>	Collect		Burkklaky
		AIR-DRY LOSS 8,4	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
			4.1	12.2		
Proximate Analysis		ire				(a)
te An	Volavi	Comb	57.5	52.6	59.9	
oxima	Fixed	carbon	-			
ا تم	Ash		38.4	35.2	40,1	
			100.0-	100.0	100.0	
			·			
	•	OA was alle	-			
llysis		20 me sia Ta 20 me sia		149.5	20.9	
₽ V	Nitrog	en		<u>565.5</u>	79,1	
Iltimate Analysis	Oxyge	al wt. of	e ser hve	715.0		
5	Sulph	ur				j +
	-					
·	IIBN		cles present:	Relative smal	l amount	
 1.1						
	orific due (	Calories			was and	
deter	mined	British thermal units		DARPA	Moist	

			Cumulative per cent.
Screen test, through 20 mesh			per cent. 100
through 48 mesh			60.7
through 100 mesh			46.7
through 200 mesh			<b></b> 87.0
Area from which sample was taken (sq. ft.)			
Date,	(Signed)	HL Ms Coop	, Chemist.

Test N	o		-ANALYSIS REPORT	Lab.	No. A 66270
Sample	e of	dust (through 2	0-mesh screen).	Can	No. 93049
Operat	Sunday	AYARW GARE GOS	Mine		k #6
Ctoto	OHIG	County	ens Bed	Hooking #	6
Town	Hill fic	14			
Locati	on in mine	Bast off 3 No	rth 400 ft. 1	<b>d</b> by	
	d of sampling				ight, gms1024.
Detac	of sampling 11/1	<b>3/30</b> Date of L	ah sampling 11/	19/30 Date of	analysis
		Mine Ac			
FOI D.	Air-dry Loss 7.1		COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
		(All diled)		· (HOStare Hee)	(Mossuro and asin noc)
.≝ Mo	isture		10.0		
To Wo	AKKKKK Comb	38.6	35.9	39.9	(a)
<b>ਬ</b> )					
ğ   , ,		E0 #	54.1	80.1	
(As:	h	100.0	100.0	100.0	
ſ			Grams		
H	drogen Z <b>U me sh</b>		- GERLES	Per Cent	
Ca	rbon Ta 20 me sh		242.3	23.7	
Ni.	rogen tal wt. of s		781.7_	76.3	
XO E O	ygen OI 8	ampre	1024,0		·
_					
	•				
(As	Coked parti	cles present:	Aree emount		
Calorific	1				
value	Calories		Sa	mple Moist	
determine	British thermal unit	s.			
		•	•		Cumulative per cent.
Screen		mesh			
	J	mesh			
	0	mesh			-
	Ŭ	mesh			
	_	was taken (sq. ft.)			
Date,	Nov. 26.	1.930	(Signed)		. L. Coop Chemist
			of volatile combustible to		11—9383

Test No.		ANALYSIS REPORT	Lab	. No. A 66271
Sample of Rib & Rec	dust (through 2	0-mesh screen).	Can	No. <b>F 19</b>
Operator Sunday C	resk Coal Co.	Mine <b>\$1</b>	nday Creek #6	
State Ohio	CountyAthens	Bed	Hocking #6	
Town Millfle	14			
Location in mine Lowe	rend of side	track in 19 W	est off main	no rth
Method of sampling				
Date of sampling 11/1				
For B. of M. section	Nime Ac	Colle	ectorankeny_a	Bużdelsky
Air-dry Loss 2 & 5	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
Moisture	4.7	16.6		
-즐	64.0	56.0	67+2	(a)
Fixed carbon		·		
<b>Ĕ</b>   Ash	<u> </u>	27.4	32.8	
	100.0	100.0	100.0	
Hydrogen		Grans	Per Cent	
on 20 mesh		***************************************		
thru 20 me sh Nitrogen vt. of s		496.7		
total wt. of s	smple.	100 A		
		1	i .	i i
-				
	des present: L			
C.L.:e. (	W. U. W.			
value {		38	mple Moist	
,	8-			Cumulative per cent.
Screen test, through 20 1				
_	mesh mesh			
· ·	mesh			
Area from which sample				· · · · · · ·
Date, Nove 2				, Chemist.
	a This figure is the ratio			119383

Те	st No	DU	ST-ANALYSIS REPORT	Lab.	No
Sa	mple ofRead	dust (through	20-mesh screen).	Can	No. P 328
	perator Sunday C			Sunday Crae	k #6
	ate <b>Ohio</b> C				
	wn Hillfield		·		
Lo	cation in mine_Lows				
Me	ethod of sampling	Sta	Gross weight, lbs	Net we	ight, gms. 892.
	ate of sampling11.				
	or B. of M. section		•		
	AIR-DRY LOSS 8.0	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis	Moisture	3.2	10.9		
Proximate Analysis	Volatile matter - 3cmb	<b>77.1</b>	34.22	38.4	(a)
roxim	Fixed carbon	·~			
<u>~</u>	Ash	59.7	54.9	61.6	
		100.0	100.0	100.0	
	Hydrogen		Grama	Per Cent	
. <b>#</b>			202.0	33.9	
Analys	thm 20 mesh			66.1	
Ultimate Analysis	total wt. of se	m rola	692.0		
Ë	Sulphur				-
	-				
	Ash		1		
 C:	Coxed particles			· · · · · · · · · · · · · · · · · · ·	
1	value { Calories		Samp	10 MOIBE	
gere	ermined British thermal units.				
Sc	reen test, through 20 me	sh			per cent.
	through 48 me	sh			32.2
	through 100 m	esh	·		17.0
	through 200 m	esh			10.4
Aı	rea from which sample w	as taken (sq. ft.)			
D	ate.	1.990	(Signed)	H M Co	oper, Chemist.
_	ate,	This figure is the rat	io of volatile combustible to		11—9383

Τe	est No	DUST-A	NALYSIS REPORT	Lab	. No. A 66273
Sa	mple of Rib & Feet	dust (through 20	-mesh screen).	Can	No. 272
Oı	perator Sunday	Creek Coal Co.	Mine S	unday Creek	<del>#</del> 6
St	ate Ohio	CountyAthen	<b>8</b> Bed	Hocking #6	
To	own Willfie	u			· ,
L	ocation in mine Oa. 19				
M	ethod of sampling	Sta	Gross weight, lbs	Net we	ight, gms. 605.
D	ate of sampling $11/15/$	Date of Lal	o. sampling 11/1	9/30 Date of	analysis
Fo	or B. of M. section	Wine Ac	Collec	torAnkeny	& Burdelsky
	Air-dry Loss 6.8	COAL (Air dried)	COAL , (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
ysis	Moisture	4.3	10.8		
Proximate Analysis	Yskikumta Comb	45.0	42.0	< <b>47.1</b>	(a)
roxim	Fixed carbon		·	· · · · · · · · · · · · · · · · · · ·	
۵	Ash	50.7	49.2	52.9	
		100.0			
	Hydrogen		Grams	Por Cont	
sis	Carbon mesh				
Analy	thru 20 mesh		448.5	74.4	
Utimate Analysis	oxygen	smple		· · · · · · · · · · · · · · · · · · ·	
₽	Sulphur				
	Ash				
0	oba i jarti olea j	resent: None			
Ca	1				
_ `	1				i
- Sc	reen test, through 20 me	sh			Cumulative per cent. 100
	through 48 me	sh			65.9
		nesh			
	through 200 m	esh	- 		40.2
Aı	ea from which sample w	as taken (sq. ft.)	~- <del></del>		
D٤	ate,		(Signed)	. W. Cooner	, Chemist.

T	est No	DUST.	-ANALYSIS REPORT	Lab	No. A 66274
Se	mple ofRoad	dust (through 2	0-mesh screen).		No. = 03131
		Creek Coal Co.			
St	atehio	County _Athens	Bed	Hocking #6	·
	own N111ftel	<u> </u>			
L	ocation in mine on 1	9 West 12 feet			
M	ethod of sampling	Sta	Gross weight, lbs.	Net we	ight, gms. 700.
	4	Date of La			
F	or B. of M. section	Mine Acc	Collec	ctor Ankeny & F	urdelsky
_	Air-dry Loss . 6	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
sis.	Moisture	2.7	5.2		
Analy	Vehrenestan Comb		<i>37</i> .4	38.6	(a)
Proximate Analysis	Fixed carbon				
ď	Ash	59.7	59.4	61.4	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
sis	on 20 me sh		183.0	26.1	
Ultimate Analysis	thruen 20 mesh			75.9	
imate	total wt. of	a For man	700.0		
5	Sulphur				
	<b>-</b> .				
		s present: Tra	•		
Ca	lorific Calories	-			
. •	ande {	S	Sample Dry		
Sc		nesh			Cumulative per cent.
		nesh			
		mesh			
		mesh			
Ar		was taken (sq. ft.)			
	.te, <b>Nov.</b> 1	• •		W M Comen	

Те	st No.	_	DUST-	ANALYSIS REPOR	₹Т	Lab	. No
Sai	st NoRib & Rooman	duct	(through 20	-mesh screen).		Can	No. 52
	eratorSunda	7 Creek	Coal Co	Mine	Sunday	Creek	<b>#</b> 6
-	<b>61.</b> # a	County			Ho ekin		
	wn Millfiel	•		<b>D</b> ou		<u></u>	
	WII		f 4 nor	th half was	between	n 4 & 5	north
		Q+A					eight, gms. 639.
	ethod of sampling	/13/30		Gross weight, ll	1/19/80		analysis
	tte or sampung			b. sampling Co			y & Burdel sky
Fo	r B. of M. section				llector	COAL	COAL
	AIR-DRY LOSS 12.4	Co (Air c	iried)	COAL (As received)	(Mo	oisture free)	(Moisture and ash free)
.8	Moisture	3,8		15.7			
Inalya	Volatile matter	76.3		66.9	79.	<b>5</b>	(a)
Proximate Analysis							
Proxi	Fixed carbon	19.9		17.4	20.	 W	
	( Ash	-					
	<u> </u>	100.0		100.0	100.	0	
	Hydrogen	-		Grams .	Per C	ent	
- E	On 20 me sh Carbon			113.0	17.	7	
Analysis	thm 20 mesh			526.0	82.	8	
a t	otal wt. of say	ple		639.0			
5		1		,			
	Sulphur				•		
	Coked particle:		t. Tore	a a mare wit			
	· · · · · · · · · · · · · · · · · · ·	hranar		O 60 200-05-17-0			
	lorific Calories	1					
dete	emined British thermal units	-		Samy	le Mois	<u>t</u>	
_		. <sub>2</sub> 4.					Cumulative per cent.
Sc	reen test, through 20 m						
	•						A 45 590
	O			·			
	J						
Aı	rea from which sample		sq. ft.)				
D	Nov. 26, 19			(Signed)		M. Cood	• F Chemist.
_	<u> </u>		is the ratio of	volatile combustibl			11—9388

Te	est No	DUS	T-ANALYSIS REPORT	Lal	o. No
	ample of <b>Road</b>	dust (through	20-mesh screen).		No. 221
	perator <b>Surday Cre</b>				
	ate Ohio				
To	own Millfield				
L	ocation in mine20_	West off 4 No	rth half way	between 4 & 5	north
M	ethod of sampling	t.d	Gross weight, lbs.	Net w	eight, gms. 889.
D	ate of sampling 1/13/1	Date of I	Lab. sampling 11/1	9/80 Date o	f analysis
F	or B. of M. section	Kine Ace	Colle	ctor Ankeny &	urdelsky
_	AIR-DRY LOSS	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
is	Moisture	3.7	10.6		
Analysis	Welstile matter Comb	80.1	74.4	83.2	(a)
Proximate	Fixed carbon				
Pro	Ash	16.2	15.0	16.8	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
.22	on 20 mesh		241.0	27.1	
Analysis	thru 20 me sh Nitrogen		648.0	72.9	
Ultimate	tetal wt. of sa	nple	889.0		
5	Sulphur				
	Ash	,			
	•	ales present:	Small amount		
	dorific Caloring				
	raile		6	ample moist	
			<u>.</u>		Cumulative per cent.
Sc	reen test, through 20 m				
		esh			
	9	nesh			
	_	mesh			
	cea from which sample v	• •			•
Da	ate, Nov. 26	1930	(Signed)	H. M. Cooper	, Chemist.

#### DUST-ANALYSIS REPORT

Te	st No	,	ANALIOIO NEI OM	Lab.	No. A CORYY
Sa	mple of Rib & Ros	dust (through 20	-mesh screen).	Can	No. X 216
	erator Sunday C				46
St	ate Chie	County Athens	Bed	Hocking #6	
То	wn Millfle	14	***		
Lo	cation in mineIn 5	M. between 18 &	. 19 W		
Me	thod of sampling	sta	Gross weight, lbs	Net wei	ght, gms. <b>717.</b>
	te of sampling $11/1$	•			
Fo	r B. of M. section	Wine Age	Collection	ctor Ankeny &	Burdelsky
	Air-dry Loss	Coal (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
.2	Moisture	4.0	16.1		
Proximate Analysis	Existicanous Comb		69.1	82.4	(a)
oximat	Fixed carbon				
죠	Ash	16.9	14.8	17.6	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
	On 20 me an	,	347.6	48.5	
Analys	thre 20 mesh Nitrogen		369.4	51.5	
Ultimate Analysis	total wt. of s	emple	717.0		
5					
	•				
e	eked particles		·		
	orific Calories				
_	alue {		Sample Wet		
	reen test, through 20 m			1	Cumulative per cent.
DC.	_	iesh			
•	_	mesh			
		mesh			
Ar	ea from which sample				
	· -	v. 26, 1930			oper , Chemist.
_					

Test No.	
Test No. Lab. No. Lab. No. Can No. Zab.	
Operator Sunday Creek Ceal Co. Mine Sanday Creek #6	
State Ohio County Athens Bed Hocking #6	<del>.</del>
TownNillfield	<b></b> -
Location in mine in 5 N. between 18 & 19 W.	
Method of sampling Gross weight, lbs. Net weight, gms.	764.
Date of sampling 11/13/30 Date of Lab. sampling 11/19/30 Date of analysis	
For B. of M. section Nine Acc Collector Ankeny & Burdel	sky
AIR-DRY LOSS 12 COAL COAL (As received) (Moisture free) (Moisture and a	sh free)
Moisture 4.0 15.9	(a)
Moisture Volume Comb 66.1 57.9 68.9	
Fixed carbon	
Ash 29.9 26.2 51.1	
100.0 100.0 100.0	
Hydrogen Grams Per Cent	
on 20 mash	
thru 20 me sh 221.6 29.0 total wt. of sample Oxygen 764.0	
total wt. of sample	
Sulphur	
( Ash	
/ Coked particles present: None Sample Wet	
Calorific value Calories	
determined British thermal units	
C	umulative per cent. 100
through 48 mesh	, 8
through 100 mesh	.6
through 200 mesh	.7
Area from which sample was taken (sq. ft.)	
Date, Nev. 26, 1930 (Signed) H. M. Cooper ,	

Test	No		DUST	-ANALYSIS REPORT	Lab.	No. A 56279
-	ple of Rib &	·	_	•	Can	No. 10
Oper	ator Sur	day Creek	Coal	Go. Mine	Sunday C	reek #6
State	Ohio	County	Ather	Bed	Hocking #6	
Точи	Millfiel	La		•		
Loca	tion in mine	lain north	haula	ge 20 ft. in	by 7 West swit	eh
Meth	od of sampling	Std		Gross weight, lbs	Net wei	ight, gms. 361.
Date	of sampling 1/12	5/ <b>30</b> D	ate of I	ab. sampling 11	/19/30 Date of	analysis
For I	B. of M. section	N.	ine Ac	Coll	ectorAnk	eny & Burdelsky
	Air-dry Loss	COAL (Air drie	d)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
M	foisture	3.1	7	11.2		
le l	·		<u>)                                    </u>	49.6		(a)
Proximate E	ixed carbon					1
A A	ısh	42.1	5	39.2	44.1	
<del>,-</del>	····	100.0	0	100.0	100.0	•
В	fydrogen			Grams	Per Cent	
. <b>g</b>   C	on 20 mesh			105.1	29.1	
A B	high 20 mesh			255.9	70.9	
imate O	total wt. of	sample		361.0		
-				· ·		
Ì	-					
Calorifi	. [			ļ		
value determin	nori i	1		1	) <b>z</b> y	1
						Cumulative per cent.
ocree						•
	_				·	
Атдо					·	
_	-	· · · · · · · · · · · · · · · · · · ·	• 10•/			
T) - 1 -		AE TAMA		(Signad)		Thomas Thomast

Τz	est. No.	DUST-	ANALYSIS REPORT	Lab	. No
So	est NoFloor	dust (through 20	l-mach scraan)		No
O <sub>1</sub>	mple of	k Coal Co.	Mine	nday Creek	
-			Bed	ocking #6	
	Millfield	anoy			
	ocation in mine Main	orth haulage	20 feet inby	7 West swite	op
		R+A	Gross weight, lbs		995
	ate of sampling 11/13	/rzo		7 9 /20	analysis
	or B. of M. section		<b>-</b> • ,		•
=	Air-dry Loss 7.2	COAL (Air dried)	Coal (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
				(MODUMO 1166)	(Moisture and ash nee)
lysis	Moisture	2.9	9,9		(a)
e Ana	EXERCESSE Comb	41.3	38,5	42.5	(a)
Proximate Analysis	Fixed carbon				
Ę	Ash	55.8	51.8	57.5	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
•	on 20 meah		341.6	34.7	
Ultimate Analysis	thru 20 mesh		643.4	65.3	
nate A	total wt, of sam	p <b>le</b>	985.0	<del></del>	
	Oxygen	·	70060		
	Sulphur				
	Coked particle		AV A		
		se bracame: w	JH W		
	lorific Calories		Sample d:		
dete	ermined British thermal units		Sembra as	· y 	
Sc	reen test, through 20 mesl				Cumulative per cent.
	through 48 mesl	n	··		35.6
	through 100 mes	sh			15,7
	through 200 me	sh			8.4
Aı	rea from which sample was	s taken (sq. ft.)			
$\mathbf{D}_{i}$	Nov. 26,	1930	(Signed)	н. и. Въоре	<b>r</b> , Chemist.

Test No.	D	UST-ANALYSIS REPORT	Lab	. No. A 66281
Sample ofRe	dust (through	gh 20-mesh screen).		No. X 183
_		Mine		
	-	Bed	<u> </u>	**
Town				
Location in mine.	22 East off	3 north just in	by from 3 no:	rth
Method of samplin	g Std	Gross weight, lbs	Net we	ight, gms. 842.
Date of sampling		of Lab. sampling 11/1		
For B. of M. section	n	Acc Collec	torankenj	. & Burdelsky
Air-dry Loss		COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
		8, 9		
Moisture  Fixed carbon		72.3	72.3	(a)
Fixed carbon				
Ash		18.8	20.7	
( Asii	100.0	100.0	100.0	
Hydrogen		Grans	Par Cent	
on 20 mai	<b>}</b>	271.4	52.8	
Carbon Nitrogen 20 1  total wt. Oxygen Wt.		570.6	67.8	
total wt.	, of sample			
	·	842.0		
Sulphur				
( AshCoked pa:	rticles present:	larke smount		
Calacifa				
value Calories		Sample Meis	<b>t</b>	
British therm	nal units-			
Screen test, through	h 20 mesh			Cumulative per cent. 100
throug	h 48 mesh			51.9
throug	h 100 mesh			31.0
throug	h 200 mesh	·		25.3
Area from which sa	ample was taken (sq. ft.)			
Date,	Nov. 26, 1930	(Signed)	и. м. с	ooper , Chemist.
		tio of volatile combustible to t	otal combustible.	11—9388

$T_e$	st No	DUS	T-ANALYSIS REPORT	Lab	. No
	mple ofTipple	dust (through	20-mesh screen).	Can	No. X 205
Or	perator sanda v C	reak doal do.	Mine Su	nday Creek #	6
Sta	ate Ohio	County Athens	Bed	ocking #6	
To	wn Millfield	l			
	cation in mine Tipp		conveyors, shal	er screens	
Μe	ethod of sampling		Gross weight, lbs	Net we	eight, gms. 776.
D٤	ate of sampling 11/14	/30 Date of	Lab. sampling 11/1	.9/30 Date of	analysis
Fo	or B. of M. section	mine A	© Collec	tor Walk	e r
	Air-dry Loss	COAL (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
 :	Moisture	3.3	6.4		
Proximate Analysis	YelstileggetterComb	87.8	85.0	90.8	(a)
rimate	Fixed carbon	1			
Pro	Ash	8.9	8.6	9.2	
	•	100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
. <b>:</b>		•	35.2	4., 9	
Analya	thimer20 mesh			95.1	
imate	the encome short series of series.	ple	776.0	· · · · · · · · · · · · · · · · · · ·	
5	Sulphur			·	
	Ash	•			
	Comed particle				
	lavi6a		Seemale Dru		
	aue {				
 Sc	reen test, through 20 m				Cumulative per cent.
	•				**
	S				
Aı	rea from which sample	was taken (sq. ft.)			· 
	ate, <b>Kov. 26</b> ,		(Signed)	H W Coone	

		BUN.	EAU OF WITHES		
Te	est No	DUST-	ANALYSIS REPORT	Lab	. No. A 66283
Sa	mple of Grab sa	mploust (through 26	)-mesh screen).	Can	No <b>I 181</b>
	perator Sunday C				
	ate Ohio (				·
m	wn Millfield	JountlyA.W.A.			
	own	ross bars in ]		track annout	
	ethod of sampling				
	ate of sampling 11/13/		•	•	
Fo	or B. of M. section	Mine Acc	Colle	ctorAnkony	& Murdelsky
	AIR-DRY LOSS 8.8	Coal (Air dried)	COAL (As received)	COAL (Moisture free)	COAL (Moisture and ash free)
.=	1	<b>3.</b> 2	6.8		
Proximate Analysis	mosture				(a)
ate A	VERNIKAR, Comb	74.8	72.0	77.3	
roxim	Fixed carbon				
<b>P</b>	Ash		<b>£1.</b> 2	22.7	
		100.0	100.0	100.0	
	Hydrogen		Grams	Per Cent	
	Hydrogen 20 me sh				
Iltimate Analysis	three on march	.			
ite Ar	Nitrogen vt. of s	ample	1030.8	94.7	
Offine Clark	Oxygen		1088.0		
_	Sulphur			   <b></b>	
	Ash				
		es present: em			
Ca	lorific C-1				
	/aue				
_	British thermal units.	<u> </u>		ple Dry	
Sc	reen test, through 20 me	esh			per cent.
	through 48 me	esh		·	79.7
	through 100 n	nesh			63.5
	through 200 n	nesh		, 	
Aı	rea from which sample w	as taken (sq. ft.)			**
т.	- 	— *** *********************************	(Ciamad)		Ohamiak
	ate, <b>Nov.</b> _26	a This figure is the ratio of			, Chemist.

Te	est No. <b>Orab</b>	DU5	I-ANALTSIS REPORT	Lab	No. A 66284
Se	mple of	dust (through	20-mesh screen).	Can	No. X 207
0	mple of Sanday Cre	ek Moal Co.	Mine	Sunday Creek	6
St	ateNiliteld	County	ens Bed	Hocking #6	
To	wn				
L	ownIn	20 W. of 6 N.	in neck of r	00m 11	
			Gross weight, lbs.		
D	ethod of sampling 1/13 ate of sampling	/30 Date of I	ab sampling 11/1	9/30 Date of	analysis
Fo	or B. of M. section	Mine Ac	Colle	Walker -	Morgan
=	AIR-DRY LOSS 8. 9	Cour	COAT	COAL	COAL
_	1	(Air dried)	(As received)	(Moisture free)	(Moisture and ash free)
ysis	Moisture	<b>4.</b> 5	7.0		
Anal	Volatile matter	85.2	81,9	86.0	(a)
Proximate	Fixed carbon				
Prox	Ash	11.6	11.1		
	( Asti	100.0	100.0	100.0	
	<u> </u>		Grams	Per Cent	
	Judan mesh		564.		
lysis	Grier 20 me sia			59.5	
e Ana	Nitrogen vt. of sar	mla	384.	40.5	
Ultimate Analysis	Oxygen	1	948.		
5	Sulphur				
	Ash			,	
	Coked part	i des present	None		
Ca	lorife * A Prows	11 outtings i			
	ance				
_	British thermal units_				Cumulative
Sc	reen test, through 20 m	esh			per cent.
	through 48 m	esh			38.5
	through 100 r	nesh			19.4
	through 200 r	nesh			10.2
Ar	ea from which sample v	vas taken (sq. ft.)	*****	·	
	nte,	•		H. M. Cooper	
		**************************************	(Signou)		, Onemust.

APPRIDIX J.

Mine air enalyses reports.

Bottle No	274-262		ı	aboratory No.	9780-83787
Sample of	Nine Air				
Mine	<b>#6</b>		Operator sunday	Greek Soal (	<b>b.</b>
State	Chie	County	Athens	Tov	vnship
Town (distance and	direction from,	and railroad)		· 	
			•		
Name of coal bed			Sec	, T	, R,
	•				Hou <b>8:15 A.M.</b>
					18018
Barometer: Inside		,	Outside		·
Corrected to sea leve	d: Inside		Outsi	de	·
Bulbs: Wet		Dry		Humidity	·%
Collector		Mailed		Received	
Laboratory No.	53180	53151 243	Ethane $(C_2H_6)$		
Carbon dioxide (CO <sub>2</sub> )	274 14		Hydrogen sulphic	le (H <sub>2</sub> S)	
Oxygen (O <sub>2</sub> )	20. 18	20.16	Unsaturated hyd $(C_2H_4, \text{ etc.}).$	rocarbons	·
Hydrogen (H <sub>2</sub> )					
Carbon monoxide (CO)			Sulphur dioxide (		·
Methane (CH <sub>4</sub> )	14	.17	CONFIDENTIA	This repor AL NOT FOR PIL	BLICATION OR CIRCU-
Nitrogen (N <sub>2</sub> )	79.54	79.55	- the Bureau of	Mines, Not to be	is from the Director of cused in the emploiter
Total	100.00	100.00		ocess or product	
Remarks:		·		·	· 
Date	11/88/30	·	(Signed)	Yant	
Form 213 11—8890				·	Chemist.

Bottle No	683-684	•		Laboratory No.	(S)(S2-S3)(SS
Sample of	Nime Air				·
Mine	<u> </u>		Operator	y Greek Coal	<b>66.</b>
State	Ohio	County	Athen	Tov	wnship
•	•				
					, R
					100 feet laby.
				•	Hour _
Velocity		Area		Quantity	5776
Barometer: Inside	30.4		Outside .	·	30.78
Corrected to sea leve	el: Inside		Outs	ide	
Bulbs: Wet	- 58	Dry <b>55</b>		Humidity	%
Collector	A. J. Antony	Mailed		Received	11/13/30
•	• •				
Laboratory No		. Additional and			
Oxygen (O <sub>2</sub> )					
Hydrogen (H <sub>2</sub> )					
Carbon monoxide (CO	)		Sulphur dioxide	(SO <sub>2</sub> )	
Methane (CH <sub>4</sub> )		26	CONFIDENTIA	This report	HILLS TO SEE SEE
Nitrogen (N <sub>2</sub> )		70.96	LATION with of the Bureau of I	out special permi	t from the Director of
Total	100,00	100.00			
Remarks:					
				***************************************	
Date	* **		(Signed)	Limb	Chemist.

Bottle No	Laboratory No.			
Sample of			·	
Mine		Operator Sunday Gra	ek Goal Go	··
State	County	Athene	Towns	ship
Town (distance and direction from				
Name of coal bed				
Location in mine				
Method of sampling Tacasa	Date	sampled	·	Hour
Velocity	Area 45	Qua	ntity	4,290
Barometer: Inside		Outside		<b></b>
Corrected to sea level: Inside		Outside		; 
Bulbs: Wet	Dry	F	Iumidity	%
Collector	Mailed	R	Received	11/15/20
Laboratory No.	**************************************	Ethane $(C_2H_6)$	,	
Carbon dioxide (CO <sub>2</sub> )				
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarb $(C_2H_4$ , etc.).	ons	
Hydrogen (H <sub>2</sub> )	************************************	<del></del>		
Carbon monoxide (CO).		Sulphur dioxide (SO <sub>2</sub> )		
Methane (CH <sub>4</sub> )	·	OONFIDENTIAL		LICATION OR CIEC
Nitrogen (N <sub>2</sub> )		the Bureau of Min	es, Not to be	t from the Director of used in the exploite
Total 100.00				
Remarks:			- 	
Tota as the tea	<del>-</del>	(Signed)		
Date 11/88/30 Form 213 11-8890		(OTSTOCK)	<b>#</b>	Chemist.

Bottle No.			Laboratory No		
Sample of	- Mino Air				
Mine	- 14		Operator sunday 6	rock Goal G	<b>.</b>
State	6246	County		Town	nship
Town (distance and di					
Name of coal bed					
Location in mine					
Method of sampling					
Velocity	-50	Area		uantity	4,500
Barometer: Inside	<b>29.4</b>		Outside		89.75
Corrected to sea level:	: Inside		Outside .		· 
Bulbs: Wet	59	Dry		Humidity	%
Collector		Mailed		Received	11/13/20
Laboratory No.					
Carbon dioxide (CO <sub>2</sub> )	19		Hydrogen sulphide (	H <sub>2</sub> S)	
Oxygen (O <sub>2</sub> )	24.34		Unsaturated hydroca $(C_2H_4, \text{ etc.}).$	arbons	
Hydrogen (H <sub>2</sub> )		·			
Carbon monoxide (CO).			Sulphur dioxide (SO <sub>2</sub>	· )	
Methane (CH <sub>4</sub> )				This report is	
Nitrogen (N <sub>2</sub> )	79.88	· · · · · · · · · · · · · · · · · · ·	LATION without s	pecial permit fi s, Not t <del>o be un</del>	· · · · · · · · · · · · · · · · · · ·
Total	100.00		tion of any process	or product,	
Remarks:		·			
Date	11/28/30	·	(Signed)		Chemist.

Bottle No		Laboratory No
Sample of		
Mine	•	Operator Bunday Greek Coal Co.
State	County	Township
		Millfield
· .		Sec, T, R
	•	· · · · · · · · · · · · · · · · · · ·
		e sampled
Velocity	Area	Quantity 11366
Barometer: Inside		Outside
Corrected to sea level: Inside		Outside
Bulbs: Wet	`Dry	
Collector	Mailed	Received
Laboratory No.		
Carbon dioxide (CO <sub>2</sub> )	53 187 286	Hydrogen sulphide ( $ m H_2S$ )
Oxygen (O <sub>2</sub> )	ينس بين	Unsaturated hydrocarbons
Hydrogen (H <sub>2</sub> )	20.51	$(\mathrm{C_2H_4},\mathrm{etc.}).$
Carbon monoxide (CO)		Sulphur dioxide (SO <sub>2</sub> )
Methane (CH <sub>4</sub> )	.19	CONFIDENTIAL NOT FOR PUBLICATION
Nitrogen (N <sub>2</sub> )	79:16	LATION without special permit from the Director the Bureau of Mines. Not to be used in the supporta-
Total	100.00	process or product.
		·
Date		(Signed)  Chemist.

Bottle No	<del>-</del>	Laboratory No.		
Sample of				
Mine		Operator Sunday Greek Goal Co.		
State	County	Township		
Name of coal bed	<b>*</b>	Sec, T, R		
		***		
		sampled 11/11/20 Hour 11:46 A.K.		
Velocity	Area	Quantity		
Barometer: Inside		Outside		
Corrected to sea level: Inside .		Outside		
Bulbs: Wet	Dry	Humidity%		
		ReceivedReceived		
Laboratory No				
Carbon dioxide (CO <sub>2</sub> )				
Oxygen (O <sub>2</sub> )	<u>,</u>	Unsaturated hydrocarbons $(C_2H_4, \text{ etc.}).$		
Hydrogen (H <sub>2</sub> )	·			
Carbon monoxide (CO).		_ Sulphur dioxide (SO <sub>2</sub> )		
Methane (CH <sub>4</sub> )		This report is		
Nitrogen (N <sub>2</sub> )		LATION without special permit from the Director of the Bureau of Mines. Not to be used in the exploited tion of any process or product.		
Total 100.00				
Remarks:				
Date11 /24 /36	)	(Signed)		
Form 213 11—8890		COVERNMENT PREVINCE OFFICE		

Bottle No.		Laboratory No		
Sample of				
Mine		Operator Sanday Greek Seal Co.		
State	County	Township		
•		WillReld.		
•		Sec, T, R		
Location in mine	et eff 6 Bori			
Method of sampling Theorem	Date	sampled 11/11/30 Hour 12:05 7.1.		
Velocity	Area	Quantity		
Barometer: Inside		Outside		
Corrected to sea level: Inside		Outside		
Bulbs: Wet	Dry	Humidity%		
Collector	Mailed	Received		
Laboratory No.		Ethane ( $\mathrm{C_2H_6}$ )		
Carbon dioxide (CO <sub>2</sub> )				
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons		
Hydrogen (H <sub>2</sub> )		$(C_2H_4,  ext{ etc.}).$		
Carbon monoxide (CO)	· · · · · · · · · · · · · · · · · · ·	Sulphur dioxide (SO <sub>2</sub> )		
Methane (CH <sub>4</sub> )		This report is		
Nitrogen (N <sub>2</sub> )		LATION without special permit from the Director of		
		the Bureau of Mines, Not to be used to the employees thou of any process or product.		
Date11/38/30	•	(Signed)		

Bottle No.	<b></b>	Laboratory No.	55160
Sample of			
Mine		perator Sanday Grack Soci	l 60.
State	County	. Athens To	wnship
Town (distance and direction from			
Name of coal bed	•		
Location in mine			
Method of sampling	•		
Velocity	Area	Quantity	
Barometer: Inside		Outside	80.78
Corrected to sea level: Inside		Outside	
Bulbs: Wet	Dry <b>58.5</b>	Humidity	%
Collector	Mailed	Received	11/15/30
Laboratory No			
Carbon dioxide (CO <sub>2</sub> )		Hydrogen sulphide (H <sub>2</sub> S)	
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons	
Hydrogen (H <sub>2</sub> )		(C <sub>2</sub> H <sub>4</sub> , etc.).	
Carbon monoxide (CO)		Sulphur dioxide (SO <sub>2</sub> )	
Methane (CH <sub>i</sub> )		This ret	ortige
Nitrogen (N <sub>2</sub> )			rmit from the Director
		the Bureau of Mines, Not to	be used in the explosion
Remarks:			
Date11/28/30		(Signed)	

Bottle No.		Laboratory No			
Sample of	Kine Air		<del>-</del>		
Mine	<i>†</i> 6	C	perator	Greak-Geal-	<b>5</b>
State	Obto	County	Alberta-	Tow	nship
•				•	
				•	, R
	•				
	,	•	·		Hour 10:20 A.R.
Velocity		Area		Quantity	·
Barometer: Inside	30.4	***************************************	Outside		50.76
Corrected to sea level:	Inside		Outside	)	
Bulbs: Wet	-58.5	Dry		Humidity	·····%
Collector		Mailed		Received	11/13/30
					·
Carbon dioxide (CO <sub>2</sub> )					·
Oxygen (O <sub>2</sub> )			Unsaturated hydro	carbons	
${\rm Hydrogen}  ({\rm H_2})_{}$			$(C_2H_4, \text{ etc.}).$		
Carbon monoxide (CO)_		·	Sulphur dioxide (SC		
Methane (CH <sub>4</sub> )				This report	LIGATION OR CIRCU.
Nitrogen (N <sub>2</sub> )	79.47				t from the Director of
·	166-96		the nursely of any proce	es or product.	
Remarks:					·
Date			(Signed)		Chemist.

Bottle No.		Laboratory No.		
Sample of				
Mine	Opera	tor <b>Sunday</b> Cros	sk Coal Co.	<b>k</b>
State	County	Athens	Towns	ship
Town (distance and direction from				
Name of coal bed				
Location in mine on 4 Sorth	Just Laby 20 Test	· 		
	·			
Method of sampling	Date sampl	ed _11/11/30_		Hour 10:40 4.X.
Velocity	Area 🚒 .	Que	antity	10.942
Barometer: Inside		Outside	· .	
Corrected to sea level: Inside		Outside	·	
Bulbs: Wet	Dry <b>58.5</b>	I	Humidity	·····%
Collector	Mailed	I	Received	11/13/20
Laboratory No.	Eth:	ane $(C_2H_6)$		
Carbon dioxide (CO <sub>2</sub> )				
Oxygen (O <sub>2</sub> )				
Hydrogen (H <sub>2</sub> )	(0	$C_2H_4$ , etc.).		
Carbon monoxide (CO).				
	- -		This report,	E CATION OR CIRCU.
Methane (CH <sub>4</sub> )	L	ATION Without	pecial permit	from the Director of ised in the exploite-
Nitrogen (N <sub>2</sub> )		be Bureau of Mine	Mark O Da Dada a da d	sed to the exploite-
Total 100-00				
Remarks:				
Date11/38/30	(Sign			Chemist.

Bottle No. Laboratory No. 45145		<b></b>	
Sample of			· .
Mine	(	Derator Sanday Greek Coal Co	
State	County	Towns	hip
·		XIII SIOIA	
		, T	
		t inby from 4 Borth.	
		nampled	
Velocity	Area	Quantity	9,000
Barometer: Inside 30.4		Outside	20.75
Corrected to sea level: Inside		Outside	
Bulbs: Wet	Dry <b>59</b>	Humidity	<b>98.5</b> %
Collector	Mailed	Received	11/15/80
Laboratory No.	Ny Bagr.	Ethane (C <sub>2</sub> H <sub>6</sub> )	
Carbon dioxide (CO <sub>2</sub> )		Hydrogen sulphide (H <sub>2</sub> S)	
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons	·
Hydrogen (H <sub>2</sub> )			
Carbon monoxide (CO).		Sulphur dioxide (SO <sub>2</sub> )	
Methane (CH <sub>4</sub> )	· 	CONSTRUCTION PUBLICATION	MON ON ORDER
		LATION, without special permit from the Bureau of Misses, Not to be used	
Total100.00		tion of any process or product.	N Promise
Remarks:	·		
Date11/38/36		(Signed)	

Bottle No	267		La	boratory No	55164
Sample of	Nime Air				
Mine	<del>}6</del>	Ор	erator Sunday	Greek Goal	Ga.
State	Chie	County	Athens	Tov	vnship
	•		•		, R
Method of sampling	Yaqqua	Date sar	npled 11/11	[30	Hour 1:55 P. N.
Velocity	120	Area	78	Quantity	9360
Barometer: Inside	30.4	····	Outside		30.75
Corrected to sea level:	Inside		Outside	e	
					<b>%</b>
Collector		Mailed		Received	11/13/30
					· 
Carbon dioxide (CO <sub>2</sub> )					
Oxygen (O <sub>2</sub> )			Unsaturated hydro $(C_2H_4, etc.)$ .	ocarbons	
Hydrogen (H <sub>2</sub> )		~*************************************	******		
Carbon monoxide (CO)-			_	White band	ert is
Methane (CH <sub>4</sub> )	.13				JBLICATION OR CIPIOL mit from the Director of
Nitrogen (N <sub>2</sub> )	72.51		the Bureau of	Mines. Not to t	19 (1990) this cho character
Total	100.00		HOR OF WITH PAR	Other C. S. C.	
Date		(			Chemist.

Bottle No				La	boratory No	88799	
Sample of	Hine Air						
Mine			Operator .	Sunday	Greek Coal	Go.	
State	Ohio	County		Athens	Tov	vnship	
Town (distance and							
Name of coal bed	Booking #6		~				
Location in mine							
Method of sampling	Yaquum	Dat	e sampled .	11/11/	30	Hour 3:	10 P. H.
Velocity	205	Area		45	Quantity	9,	<b>325</b>
Barometer: Inside	30.4		Ot	ıtside		20	.75
Corrected to sea lev	el: Inside	·	· 	Outside	· •		
Bulbs: Wet							
Collector							
Laboratory No.							
Carbon dioxide (CO <sub>2</sub> ).	.06		Hydroge	n sulphide	(H <sub>2</sub> S)		
Oxygen (O <sub>2</sub> )			Unsatur	ated hydro, etc.).	carbons		
Hydrogen (H <sub>2</sub> )	~			<b></b>			
Carbon monoxide (CO	))		Sulphur	dioxide (So	D <sub>2</sub> )		
Methane (CH <sub>4</sub> )	.00		CONFIL	PATTAL	Tais report NOTFOR-PUB	-	R- <del>OIRCU</del>
Nitrogen (N <sub>2</sub> )	79,08		LATIO	without	special permit	from the Di	rector of
Total	100.00		tion of a	ny prose	se or product.		
Remarks:				·			- <del></del>
Date	11/28/20			¥. P.			
Form 213 11—8890	,		SOVERNMENT PRINTING	office			Chemist.

Bottle No.		Laboratory No. 53166			
Sample of	·				
Mine	vek# O	perator sunday Greek Scal Co.			
State	County	Athers Township			
		NULLIFICAL A			
	•	Sec, T, R			
•		3 H. after Explosion			
	•	ampled 13./5/50 Hour			
Velocity	Area	Quantity			
Barometer: Inside		Outside			
Corrected to sea level: Inside		Outside			
Bulbs: Wet	Dry	Humidity			
Collector	Mailed	Received			
		Ethane (C <sub>2</sub> H <sub>6</sub> )			
Carbon dioxide (CO <sub>2</sub> )		Hydrogen sulphide (H <sub>2</sub> S)			
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons $(C_2H_4, \text{ etc.})$ .			
Hydrogen (H <sub>2</sub> )	·	(C <sub>2</sub> H <sub>4</sub> , 666.).			
Carbon monoxide (CO).		Sulphur dioxide (SO <sub>2</sub> )			
Methane (CH4)		This report is			
		OONFIDENTIAL NOT FOR PUBLICATION OR GIR  LATION without special permit from the Director			
		the Bureau of Mines, Not to be used to the exploite			
Date11/28/2		(Signed) * P. Tank.			
Form 213 11—8890	607	ERATURNT PRINTING OFFICE			

The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s

Bottle No	597	Laboratory No
Sample of	Nime Air	
Mine	<b>30.</b> 6	Operator Sanday Greek Coal So.
State	County	Township
		Millfield
	•	Sec, T, R
		th just inside 20 west
		te sampled 11/11/30 Hour 13:50 P.M.
Velocity	40 Area	77 Quantity 3000
Barometer: Inside		Outside
Corrected to sea level:	Inside	Outside
Bulbs: Wet	<b>57.5</b> Dry	### Humidity
Collector	M. J. Ankeny, Mailed	Received11/13/30
Asst. M	TA SATATY TAST.	Ethane (C <sub>2</sub> H <sub>6</sub> )
Oxygen (O <sub>2</sub> )	20.39	Unsaturated hydrocarbons $(C_2H_4, \text{ etc.}).$
Hydrogen (H <sub>2</sub> )		
Carbon monoxide (CO)_		
Methane (CH <sub>4</sub> )		DOMESTICATION OF CONCURSOR
Nitrogen (N <sub>2</sub> )	7.20	LATION without special permit from the intector of the Bureau of Junes, Not to be used to the employee
Total	100.00	ston of any phonesis or profises.
Remarks:		
Date		(Signed)
Form 213 11-8890		GOVERNMENT PRINTING OFFICE

				•	
Sample of	Vine Air				
Mine	46	C	perator	it fool to.	
State	Date	County	Athens	Township	
•			X111f1414		
		·	Sec		
•			ampled <b>11/11/39</b>		
Velocity		Area	Quar	ntity	
Barometer: Inside	30.4	· · · · · · · · · · · · · · · · · · ·	Outside		30.75
Corrected to sea level	: Inside		Outside		
Bulbs: Wet	58	Dry	H	umidity	<b></b> %
Collector	N. J. Ankeny	Mailed	Re	eceived	11/13/80
Laboratory No			Ethane $(C_2H_6)$		
Carbon dioxide (CO <sub>2</sub> )	19		Hydrogen sulphide (H <sub>2</sub> S	)	
Oxygen (O <sub>2</sub> )	20.26		Unsaturated hydrocarbo (C <sub>2</sub> H <sub>4</sub> , etc.).	ns	
Hydrogen (H <sub>2</sub> )					
Carbon monoxide (CO).			Sulphur dioxide (SO <sub>2</sub> )		ON OR DESIGN
Methane (CH <sub>4</sub> )				A AOU DO BUTON	the Director
Nitrogen (N <sub>2</sub> )			Sulphur dioxide (SO <sub>2</sub> )	pecial permanent	in the
Total	100.00		CONFIDENTIAL CONTROL OF SHIP STORES	s of Prose	***************************************
Remarks:	:				,
Date			(Signed)		

Bottle No.	<b>M</b>	Laboratory No.	57169
Sample of	un Air		
Mine	<u>i</u> (	Operator Senday Greek Co.	1.69.
State	County	Athena To	ownship
		HILLSTOLE	
*	•	Sec, T	4
•		sampled 11/11/16	
Velocity	Area	64.8 Quantity	13,313
Barometer: Inside	0.4	Outside	50,28
Corrected to sea level: In	oside	Outside	
Bulbs: Wet	Dry .	Humidity	%
Collector	Mailed	Received	12/18/90
	<b>3 6 6 6 6 6 6 6 6 6 6</b>		
		Hydrogen sulphide $(\overline{\mathrm{H}}_2\mathrm{S})_{}$	
•	10.87	Unsaturated hydrocarbons $(C_2H_4, \text{ etc.}).$	
Hydrogen (H <sub>2</sub> )			
Carbon monoxide (CO)		Sulphur dioxide (SO <sub>2</sub> ) This repo	
Methane (CH <sub>4</sub> )		THE PROPERTY AT MOTHOR PI	IBLICATION OR CIRCU-
Nitrogen (N <sub>2</sub> )		LATION without special per-	e naed in the expense
Total	00.00	tion of any process or produc	
Remarks:			
Date	11/88/30	(Signed)	Chemist.

Bottle No.	500	Laboratory No.
Sample of	Hino Air	
Mine	*	Operator great feel fe.
State	County	Township
		ALLIE SOL
	•	Sec. , T. , R
		e sampled 11/12/80 Hour 9:55 4.X.
Velocity	Area	Quantity
Barometer: Inside	30.4	Outside
Corrected to sea level:	: Inside	Outside
Bulbs: Wet	-56 Dry -50	Humidity%
Collector	Mailed	Received
	65170	
•		
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons
	AV-41	$(C_2H_4, \text{ etc.}).$
Carbon monoxide (CO).		Sulphur dioxide (SO <sub>2</sub> )
		This report to
	79.08	LATION without special permit from the Director of
Total		tion of any process or product.
Date	13/28/30	(Signed)
Form 213 11—8890	सम्बद्धाः <b>सङ्क</b> ्षाः <del>स</del>	Chemisi.

Bottle No	685			Laboratory No	BELT1
Sample of	Kine Air				
Mine	146		Operator	r Greek Goal (	
State	- Ohio	County	Athen	Tow	nship
Town (distance and d	irection from, a	nd railroad)	NS-11.F	le14	·
					, R
	•	•			
					Hour -
Velocity	760	Area	<del>jo</del>	Quantity	4,500
Barometer: Inside		····	Outside _		\$0.75
			\$ ·		·
Bulbs: Wet		Dry		Humidity	%
Collector		Mailed		Received	11/13/30
Carbon dioxide (CO <sub>2</sub> )					
Oxygen (O <sub>2</sub> )	<del></del>		•		
			$(C_2H_4, \text{ etc.}).$		
Carbon monoxide (CO)					
				Mis remo	rs is
Methane (CH <sub>4</sub> )	-34		CONFIDEN	thout special per	THE TON ON CHICA
Nitrogen (N <sub>2</sub> )	79.25		the Bureau	of Mines, Not to b process or produc	6 thing to stop sense to the
Total	100.00		Mod of any		
Remarks:					•
Date		,			Chemist.
Form 213 11—8890			Dyenment printing creics		

Bottle No	686			Laboratory No.	<b>831.72</b>
Sample of	Line Alt				
Mine	- 16		Operator -	g Greek Coal	Go
State	Ohio	County		Tov	vnship
•					<u></u>
					, R.
	•		•		Hour 7130 4.1
Velocity	Tae.	Area	60	Quantity	4800
Barometer: Inside	80.4		Outside		50.76
Bulbs: Wet	<b>##</b>	Dry	<b></b>	Humidity	%
					11/12/80
Anna . S		Bear.			
Carbon dioxide (CO <sub>2</sub> )	16		Hydrogen sulph	ide (H <sub>2</sub> S)	
Oxygen (O <sub>2</sub> )			3	drocarbons	
Hydrogen (H <sub>2</sub> )	• •••••				
Carbon monoxide (CO)					rt is
Methane (CH <sub>4</sub> )	.15		OONFIDENT	HAL NOT FOR PU	JBLICATION OR URGOT
Nitrogen (N <sub>2</sub> )	79-34			of Mines, Nouto	70 (100)
Total			tion of way.	process or produc	
Remarks:				·	
Date	11/28/30		(Signed)	P. Yant,	Chemist.
Form 213 11—8890	e de l'elever de l'		COVERNMENT PRESTRIC COVICE	* *	<i>∪ 11€11€18€.</i>

Bottle No.		Laboratory No
Sample of	- A42	
Mine		Operator gasday Greek Coal Co.
State	County	Township
•	•	
		Sec, T, R
· · · · · · · · · · · · · · · · · · ·		s linte dany on surface.
		sampled Hours Hours
Velocity	Area	Quantity
Barometer: Inside		Outside
Corrected to sea level: Inside	·	Outside
Bulbs: Wet	Dry	
Collector	Mailed	Received
Laboratory No.		
Carbon dioxide (CO <sub>2</sub> )		Hydrogen sulphide (H <sub>2</sub> S)
Oxygen (O <sub>2</sub> )		Unsaturated hydrocarbons ( $C_2H_4$ , etc.).
Hydrogen (H <sub>2</sub> )		
Carbon monoxide (CO)		
Methane (CH <sub>4</sub> )		This report is  CONFIDENTIAL NOT FOR PUBLICATION OF CIRCU-
Nitrogen (N <sub>2</sub> )		without special permit from the Director of
Total		
Remarks:		·
Data		(Signed)Chemist.
Date		Chemist.

Bottle No	ottle No			Laboratory No.		
Sample of	Nine Air				·	
Mine	+6	(	perator	Crest Coal	- <del>00 .</del>	
State	- Chio Co	unty	Athens	Tox	wnship	
Town (distance and di	irection from, and rai	lroad)	Killft	eld		
					, R.	
Location in mine	Tage of \$1 Bas	off 3 1	lorth			
					Hour - 12:05	
Barometer: Inside	Outside					
Corrected to sea level	: Inside		Outside	)	i	
Bulbs: Wet		Dry	~~~~~~~~~~	Humidity	%	
					11/15/30	
***	a titura de diaber 12					
Carbon dioxide (CO <sub>2</sub> )			Hydrogen sulphide	(H <sub>2</sub> S)		
Oxygen (O <sub>2</sub> )				carbons		
Hydrogen (H <sub>2</sub> )						
Carbon monoxide (CO)	.00		Sulphur dioxide (SC	This report	BLICATION OF CIRCU-	
Methane (CH <sub>4</sub> )	.30		CONFIDENTIAL	NOT FOR	BLICATION OR CIRCU- hit from the Director of e used in the employee	
Nitrogen (N <sub>2</sub> )			the Buresu of	lines, Not to D	it from the Director	
Total	100.00		tion of says			
Remarks:						
Date	11/28/30		(Signed)	. Tant.	Chemist.	