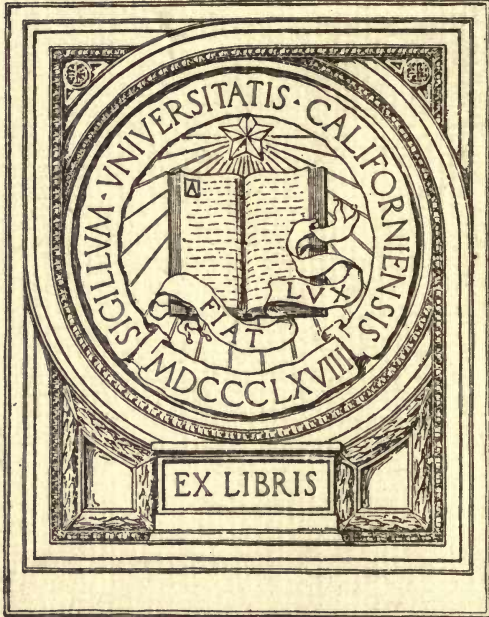




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DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES  
JOSEPH A. HOLMES, DIRECTOR

# THE SAMPLING OF COAL IN THE MINE

BY

JOSEPH A. HOLMES



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TN1



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By JOSEPH A. HOLMES.

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## GENERAL STATEMENT.

In connection with the fuel investigations that were begun by the United States Geological Survey about six years ago, the question of whether or not to publish all known authentic analyses of American coals was considered. It was decided not to publish them, because, with respect to by far the greater number of analyses, either no reliable record of the samples was available or else the purpose and method of collecting the samples had been such as to render the analyses, however carefully made, of little or no value to the public.

In planning the fuel investigations of the Geological Survey, the committee having the matter in charge, Messrs. E. W. Parker, M. R. Campbell, and the writer, decided upon a plan of sampling coal in the mine that, it was believed, would satisfy the following requirements: (1) Each group of mine samples submitted for analysis to represent fairly the commercial shipments of coal from the mine in which they are collected; (2) the complete history of each sample to be known and recorded; and (3) each sample to be analyzed promptly and by the best standard method.

This plan of collecting mine samples was initiated during 1904, largely under the personal supervision of Mr. Campbell. With various modifications it has been continued from that time up to the present by those geologists of the survey, who, under Mr. Campbell's direction, have been examining the coal deposits on or near the public lands, and by those engineers of the Survey and the Bureau of Mines, who, under the direction of the writer, have continued the work of analyzing and testing the coal from the various fields in the United States.

The following statement of the system of mine sampling in use by the Geological Survey and the Bureau of Mines has been revised by Messrs. M. R. Campbell and David White, of the Geological Survey, and Mr. G. S. Rice, of the Bureau of Mines.

## NEED OF CARE IN SAMPLING.

In dealing with coals no less than in dealing with ores, the taking of the sample requires fully as much care as does the making of the analysis or assay. And the difficulties in the way of obtaining, at reasonable cost, a sample of coal that fairly represents the commercial product as found in the mine or, more especially, as loaded

in cars or in ships, have seriously retarded the movement for the sale or purchase of coal on a rigid specification basis.

The purpose of this paper is to describe briefly the method now followed by the Bureau of Mines and United States Geological Survey in an endeavor to take mine samples that fairly represent the beds of coal that are examined and that show, for the places sampled, the commercial possibilities of these beds. It is of the utmost importance that the sampling be done in a systematic manner, according to a prearranged plan, and that the same procedure always be followed where circumstances permit. Wherever it is possible, unless special samples are desired for a particular purpose, only clean, fresh coal should be sampled, and all dried, weathered, or long-exposed coal should be avoided. When weathered coal, either in the outcrop or in pillars, or other special samples are collected, the particular characteristics of each sample should be clearly described.

#### COLLECTING OUTFIT OR SAMPLING KIT.

The coal-mine sampling outfit (fig. 1) used by the Bureau of Mines comprises the following articles: Carrying bag, sampling cloth (heavy oilcloth), portable mortar and pestle, spring balance, screen, sampling scoop, brush, measuring tape, sample cans, adhesive tape, pick, and shovel.

*Carrying bag.*—The bag used for carrying the sampling outfit and the collected samples is of leather, has a shoulder strap, and measures 13 by 12 by 3 inches.

*Sampling cloth.*—For collecting the cuttings chipped from the face of the coal a stout sheet or blanket of waterproof material is used. The heavy enamel cloth known as buggy cloth gives good service. The cloth should measure not less than 6 by 7 feet. The enameled side of this cloth should be laid next to the ground to keep out moisture and to prevent fragments of the enamel from getting into the coal sample.

*Portable mortar.*—A piece of  $\frac{3}{4}$ -inch board, 10 inches square, covered on the upper side with heavy galvanized sheet iron, forms the bottom of the portable mortar. The collapsible sides are of stout duck, and are fastened at the top to a strap-iron band that is held up by collapsible strap-iron posts fastened by set screws. The sides are 5 inches high, making the contents of the mortar about 500 cubic inches.

*Pestle.*—The pestle for crushing samples consists of a steel head, 1 inch thick and 3 to 4 inches square, with a screw socket to receive a wood handle about 14 inches long.

*Spring balance.*—A good spring balance of 50-pounds capacity, graduated preferably to one-half pound, is used for weighing the samples.

*Screen.*—The screen is of galvanized-iron wire and has a  $\frac{1}{2}$ -inch, or preferably  $\frac{3}{8}$ -inch, mesh. It is about 10 inches square and has a wood frame.

*Sampling scoop.*—The scoop recommended is made of heavy galvanized sheet iron, with flat bottom and vertical sides, and is 8 inches long, 2 inches deep, and  $1\frac{1}{4}$  inches wide. If such a scoop is not available, a bricklayer's trowel or even a wooden shingle will answer the purpose.

*Brush.*—A stiff brush or whisk broom is useful for brushing off loose pieces of coal, stone, or dirt from the face or roof at the place where the sample is to be taken and for removing the rejected quarterings of coal from the sampling blanket. If such a brush is not available, a piece of cloth or an old coat may be used as a substitute.

*Measuring tape.*—For measuring coal-bed sections a 20-foot waterproof tape graduated to one-fourth inch is used. A steel tape graduated to one-sixteenth

inch, though more accurate, is less convenient, since the figures are more difficult to read by the poor light available in mines.

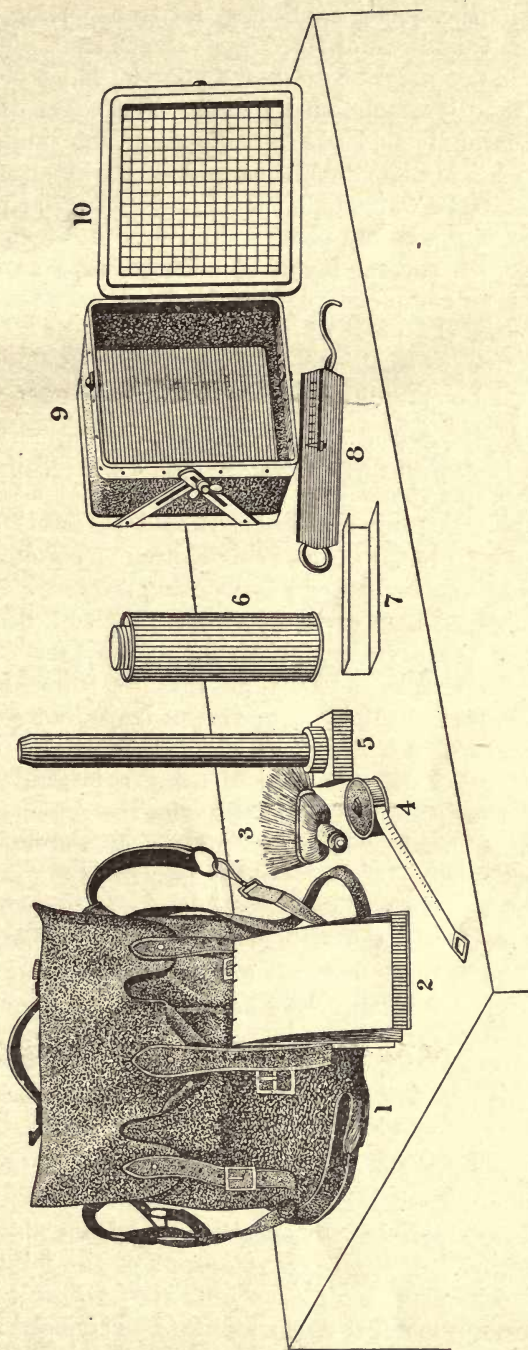


FIGURE 1.—Sampling outfit: 1, carrying bag; 2, notebook; 3, brush; 4, measuring tape; 5, pestle; 6, sample can; 7, spring balance; 8, portable mortar; 9, sampling scoop; 10, screen.

*Sample can.*—The vessel ordinarily used by the Bureau of Mines and by the Geological Survey for transporting coal samples is a 9 by 3-inch round can of No. 27 galvanized iron. The can filled with coal should not weigh more than 4 pounds, which is the limit of weight for ordinary transmission by mail. The edges of the can are crimped and carefully soldered to make them tight and strong; the screw top (2 inches in diameter) has a gasket or washer of rubber or other flexible material to exclude the air. As a further protection, the outside of the cap, when in place and screwed down tightly, is wrapped carefully with several layers of adhesive tape so that the first layer of this tape completely covers the joint between the lower edge of the cap and the neck of the can. It is not advisable to use solder, paraffine, or sealing wax of any kind. Before being filled each can should be carefully inspected as to tightness and freedom from rust.

*Adhesive tape.*—For sealing the connection of the cap and sample can, bicycle or electrician's adhesive tape of the best quality is used.

*Pick and shovel.*—Nothing is better than a miner's pick for cutting samples. A miner's shovel should be taken along for cleaning up the floor, etc. Pick and shovel are not regularly included in the kit, as they can be had at any working mine.

The field men of the Geological Survey, because they often work long distances from a base of supplies and travel by horseback, usually carry a simpler outfit than that described above, consisting of a waterproof blanket, a measuring tape, adhesive tape, a screen, a geologist's pick, an improvised shovel, and the necessary number of sample cans. Instead of using a portable mortar and pestle, a man thus equipped must pulverize the coal with his pick, on a board or other hard surface, and instead of a scoop he must use a trowel or shingle. He does not weigh the coal; and instead of using a brush or broom, he removes loose coal, etc., from the face and roof, and cleans the quarterings off the sampling blanket with his coat or a piece of cloth. He will ordinarily use a miner's pick, if found in the mine, instead of his geologist's pick for cutting down the coal.

#### PRELIMINARY DETAILS.

##### PROCURING A MAP OF THE MINE.

A map of the mine to be examined should be obtained from the company's office for use in the preliminary examination of the mine and for indicating the exact location from which each sample is to be collected. If the tonnage output of the mine is known, the places for collecting samples should be determined tentatively before entering the mine, the locations to be changed as the work progresses, if such changes prove to be desirable.

## METHOD OF SAMPLING.

### EXAMINATION OF THE MINE.

To determine exactly where and how it may be best to collect samples that will satisfactorily represent the character of the coal bed and to ascertain what portion of the bed is excluded in mining and loading, the collector with map in hand should make a preliminary examination of the mine in company with a guide who is familiar with the workings. This examination will enable the collector to select the exact places for collecting samples and to indicate them on his map.

### NUMBER OF SAMPLES TO BE COLLECTED.

From any mine shipping coal the number of samples should not be less than four for a daily production of 200 tons or less, and the number should increase at the rate of one sample for each additional 200 tons of coal mined per day. The number should be greater from mines in which the quality of the coal varies greatly. Where only a part of a bed is being mined and the remainder (1 foot or more in thickness) is being left under ground, separate samples should be collected at each sampling place of both the worked and the unworked parts or benches of the bed. In sampling coal beds exposed in ordinary prospect openings, where the coal is usually more or less weathered, one sample from each opening is considered sufficient, unless the openings are far apart; in that case occasional second or check samples are highly desirable.

### SELECTING PLACES FOR SAMPLING.

Having decided upon the probable number of samples to be collected and approximately where they are to be taken, the collector during his preliminary examination of the mine should decide upon the exact location from which each sample is to be collected, so that it will represent the coal mined in that part of the workings. Furthermore, certain of the samples should be taken from places in the remoter parts of the mine, so that the samples will indicate the character of the coal available for future as well as for present shipments. Exceptional features, such as faults, etc., should be avoided unless special studies of the coal at these places are thought desirable. Where it is possible, wet places should be avoided, as samples from such places may not represent the coal as shipped. Where wet coal must be collected, the surplus moisture should be drained off the sampling cloth before mixing the sample.

### METHOD OF SAMPLING.

#### CLEANING OFF THE FACE OF THE COAL.

At each selected point, before a sample is cut, the face of the bed should be cleared of burned powder, dirt, or loose coal from roof to floor for a width of about 5 feet. This is done to prevent any loose



fragments or foreign matter from falling off the face of the coal onto the sampling cloth. Insecure pieces of the roof should also be taken down in advance for the same reason. In the middle of this cleared area on the face, the coal should be cut away with the pick from the roof to the floor for a width of 1 foot and a depth of at least 1 inch, with a view to removing any discolored, altered, or otherwise inferior coal that might be near the surface, and also to square up this portion of the face in preparation for the sampling cut.

#### WHAT TO INCLUDE IN THE SAMPLE.

There should go into the sample as it is cut from the face all the material that ordinarily goes into the daily shipments of coal. There should be omitted from the sample only such material as is ordinarily discarded by the miner. Usually partings more than three-eighths of an inch thick and lenses or concretions of "sulphur" or other impurities more than 2 inches in maximum diameter and one-half of an inch thick are excluded, if in the judgment of the sampler they are being excluded by the miner from the coal as loaded out of the mine or as shipped. If such impurities, or other impurities, are not generally excluded by the miner, they should be included in the sample. If pillars are being "pulled," careful note should be made not only of partings, but of materials from the roof that are not rejected by the miner. Where the impurity to be rejected, like bone or slaty coal, does not show conspicuously, it is advisable to outline the impurity with chalk before cutting the sample, to prevent its being overlooked when the sample is being cut.

Imitating the miner in excluding impurities is the best method, but this requires care and judgment, especially where the partings are soft and crumble. No two miners can be relied on to discard the same partings to the same extent, even at mines where the most rigid regulations for cleaning the coal are in force. Since it is desired to obtain samples that represent as nearly as possible the coal that is produced commercially from the mine under examination, this method should be followed as closely and as uniformly as possible. The carrying out of this method demands the exercise of judgment and experience on the part of the sampler, and he must familiarize himself with the impurities in the coal bed and their relation to the coal as shipped.

Where the coal is washed before being shipped, duplicate samples of the washed coal and the tailings should be collected and mailed to the Bureau of Mines with the mine samples.

#### COLLECTING AND PREPARING THE SAMPLE.

The collector should smooth and clean the floor and spread the sampling cloth on it close to the face of the coal. Then he should make a perpendicular cut 2 inches deep and 6 inches wide (or 3 inches deep

and 4 inches wide in the softer coals) from the roof to the floor down the middle of the foot-wide cut previously made in the coal face. He should be careful to make this cut uniform in width and depth and should chip off enough coal to make a sample weighing at least 6 pounds for each foot of the thickness of the bed; so that the sample collected on the blanket from a 6-foot bed will weigh not less than 36 pounds. Inexperienced collectors should weigh their samples (by spring balance or otherwise) as a check on the accuracy of their work.

As soon as the cutting of the sample has been completed, if the full outfit previously described is available, the finer portions of the sample should be put through the  $\frac{1}{2}$ -inch or  $\frac{3}{8}$ -inch screen and the lumps should be broken in the mortar until all the sample passes through the screen. The sample should then be thoroughly mixed by two men grasping the opposite corners of the blanket and rolling it diagonally by raising one corner at a time. When the larger pieces of coal are evenly distributed throughout the mass, the sheet should be laid on the floor and the top of the pile flattened with a clean dry shovel, trowel, or board. The sample is then quartered and two opposite quarters are discarded and brushed off. The remainder is mixed as before, and if the sample is still too bulky for convenient handling it is again quartered down. The material finally remaining is spread into a circular mass about 2 inches deep on the sheet, and the sampling scoop is used to fill the sample can compactly with portions from opposite quarters. The entire operation described above from the cutting of the sample to the sealing of the can should be done in the mine, so as not to expose the coal to the outside atmosphere.

#### THE CAN SHOULD BE COMPLETELY FILLED.

It is important that the coal be well packed in the can, so as to occupy as much of the space as possible, since in this way the air is more nearly excluded. This is best accomplished by crushing fine a considerable proportion of the coal and by shaking or jarring the can repeatedly and vigorously while filling it.

#### SEALING THE CAN.

As soon as the can has been filled and the label (described below) placed inside, the cap should be screwed on so that the top of the screw fits tightly into the rubber or other flexible material in the cap; adhesive tape should then be carefully wrapped around the lower outer edge of the cap in such a manner as to cover the joint and increase the thoroughness of the sealing.

#### LABELING.

Each sample can when sent out should have a number printed on it. This number is to be used by the collector as the field number

for the sample placed in that can for analysis, and is to be recorded in his notebook and on his cards. Before the can is sealed, a label should be placed in it on the top of the coal. This label should bear the field number, the name and location of the mine, the exact location from which sample was taken, the name of the collector, and the date, and should be sealed in a small envelope to prevent obliteration of the writing. Around the outside of the can a second label should be attached, bearing the same field number, the name of the collector, the date of the collection, and the address of the Bureau of Mines at Pittsburg.

#### NOTES.

To facilitate the gathering and recording of data concerning the samples of coal and the mines from which they are taken, blank forms have been prepared for the use of collectors. These forms can be had upon application to either the Director of the Bureau of Mines or the Director of the Geological Survey. The forms,<sup>a</sup> which are of convenient size for the pocket, indicate what information is desired concerning the nature and operations of the mine, the number, depth, and character of the beds of coal, the specific location from which each sample was taken, and the exact character of the bed at the point of sampling, and make specific mention of bands of "sulphur" (pyrite, etc.), shale, or other objectionable material that should be excluded in shipment.

The record of the coal-sample section should be made in the mine from actual measurements, immediately after the collection of the sample and the sealing of the sample can.

#### PROMPT FORWARDING AND ANALYSIS OF SAMPLES.

The cans containing the samples should be delivered by the collector in person to the nearest post office for forwarding by the first mail to the Bureau of Mines laboratory at Pittsburg.

It is expected that each sample on its receipt at the laboratory will be placed in a dark, cool place, and that the analysis will be completed within two weeks.

#### SENDING NOTIFICATION CARDS.

The cards, supplied in advance to each collector, are arranged in three sections, A, B, and C. After entering certain data (his own name, the number and date of the sample, etc.) called for in the blank forms printed on each of these three section cards, the collector forwards, in sealed envelopes, for each sample, card A to the headquarters of the chief of party, and cards B and C to the Bureau of Mines chemical laboratory at Pittsburg. As soon as these cards

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<sup>a</sup> Copies of the forms are appended to this circular.



and the corresponding sample are received at Pittsburg, a statement of the receipt of sample is entered on cards B and C; card B is retained in the chemical laboratory files, and card C is then sent to the chief of the field party, in order to give notice of the arrival of the sample.

Special attention should be given to filling out and promptly forwarding these cards. Failure to fill out a card properly or to forward it promptly may cause indefinite delay in making the analysis of a sample.

### BLANK FORMS FOR COLLECTORS.

Copies of the blank forms carried by the engineers of the Bureau of Mines for recording the information desired regarding a sample of coal and the mine from which it is taken are given herewith. These forms are printed on separate sheets that are perforated, and are intended for use with a loose-leaf binder. They make a notebook measuring about  $4\frac{1}{2}$  by  $7\frac{1}{2}$  inches. (See following pages.)

#### DEPARTMENT OF THE INTERIOR,

#### BUREAU OF MINES,

#### A.—Physical features of the mine.

Name of collector.....

Mine..... Date.....

State..... County.....

Township..... S..... T..... R.....

Mine location (distance and direction from nearest railway station).....

.....

Mine railway connections.....

Operator of mine.....

    Address of operator.....

    Address of mine.....

Superintendent.....

Pit boss.....

Selling agent.....

    Address.....

Trade name of coal.....

Coal-bed name..... Geologic formation.....

Kind of coal.....

Average thickness of coal bed..... feet..... inches.

Dip of bed..... ° Direction of dip.....

Has coal "faces"?..... Direction of.....

Faults.....; frequent?.....

Rolls or horse backs.....; frequent?.....

Does mine make methane?..... from coal, roof, or floor.....

Quantity evolved..... maximum in return..... per cent.

Entrance to mine: Drift, cross-drift, slope, shaft.....

Elevation of entrance above sea, barometric reading..... Actual..... feet.

Vertical depth to bed (below entrance)..... feet.

System of mining.....

Is mine laid out with reference to "butts" and "faces"?.....  
 Entry width, main..... feet; side entry..... feet; stub..... feet.  
 Pillar width, main..... feet; side entry..... feet; stub..... feet.  
 Room pillar width..... feet; barrier pillar width..... feet.  
 Room width..... feet; room length..... feet.  
 Room pillars pulled?..... Entry pillars pulled?.....  
 Proportion of coal taken in advance work.....  
 Per cent recovery excluding roof coal..... per cent including..... per cent.

B.—*Mine equipment.*

Equipment of.....mine. Date....., 191  
 Capacity per day..... tons. Actual average..... tons.  
 Number of men underground..... Above.....  
 Steel or wood tippie.....  
 Cage, type.....  
 Hoisting or slope engines.....  
 Boilers, number..... Horsepower.....  
 Fan, type of..... Average water gage..... inches.  
 How driven.....  
 Number of splits air.....  
 Miner's lamps, open or closed..... Kind.....  
 Oil used..... Smoky or bright.....  
 Lighting system on main roads..... Voltage.....  
 Mine water, gallons per minute..... Pump driven by.....  
 Coal-cutting machines, type.....  
 Number of..... Voltage..... D. C. or A. C.  
 Haulage system.....  
 If electric, voltage..... Number locomotives.....  
 Cars, weight..... pounds. Capacity..... pounds.  
 Rails, weight, in entries..... pounds. Rooms.....  
 Track gage..... inches.  
 Ties, kind of wood..... Size.....  
 Props, kind of wood..... Props per ton.....  
 Stoppings, material; main entries....., side entries.....  
 Room-mouth stoppings, if any.....

C.—*Station humidity report (1).*

Mine.....  
 Date....., 191 ; hour.....  
 Station.....  
 Distance from entrance or shaft..... feet.  
 Dry bulb.....°; wet bulb.....°; barometer..... inch.  
 Depression ( $t-t'$ ).....°; relative humidity..... per cent.  
 Passage: Width..... feet; height..... feet; area..... square feet.  
 Velocity air per minute, reading..... feet; corrected..... feet.  
 Volume air per minute..... cubic feet.  
 Intake or return.....  
 At station, is floor dry or moist?.....  
 At station, are ribs dry or moist?.....  
 At station, is roof dry or moist?.....  
 Method of sampling air..... Sample No.....

D.—General humidity report (2).

General humidity condition of ..... mine.  
 Is the coal naturally dry or moist?.....  
 Are the working places dry or moist?.....  
 Are goaves dry or moist?.....  
 In entries is floor clean or dusty?.....  
 Is dust pure or mixed with rock dust or clay?.....  
 In entries, is floor dry or moist?.....  
 Are ribs and roof coated with dust?.....  
 Is the above dust dry or moist?.....  
 Are timbers, if any, coated with dust?.....  
 Method of humidifying:  
     (a) Sprinkling by cars ..... How often?.....  
     (b) Sprinkling by hose ..... How often?.....  
     (c) Are ribs and roof sprinkled?.....  
     (d) Water sprays ..... Number.....  
         How located?.....  
         Kind or manufacture?.....  
     (e) How many hours do sprays run?.....  
     (f) Exhaust steam sprays .....  
         Where located?.....  
         Design of spray?.....  
     (g) How far does steam fog the air? .....

How much water, by any of above methods, is artificially introduced, in gallons per minute?.....; per 24 hours?.....

General humidity notes:  
 .....  
 .....  
 .....

E.—Explosive report.

Mine ..... Date ..... , 191  
 Blasting methods.....  
     (a) By battery..... By fuse..... By squibs.....  
     (b) By shotfirers..... Number of.....  
         Time of shooting..... After miners out.....  
     (c) By miners..... Time of shooting.....  
     (d) By electricity when all men out of mine.....  
 Detonators, kind and strength.....  
 Explosives used.....  
     For coal.....  
     For brushing roof or floor.....  
 Amount used per day in coal..... In rock..... pounds.  
 Coal per keg of powder..... tons.  
 Explosives (exclusive of brushing) per ton (2,000 pounds) of coal..... pounds.  
 What is the maximum amount one miner can have in his possession under ground? ..... pounds.  
 In what receptacle is explosive carried into mine?.....  
 Does miner carry explosive to face?.....  
 Is explosive kept in box or loose?.....  
 What is maximum diameter of drill hole?..... inches.

What is maximum size of charge?.....pounds.  
 If powder, is it put in loose, or in paper cartridges?.....  
 What tamping material is used?.....  
 Is it dug or sent into mine?.....  
 What kind of tamping bar is used?.....  
 Is this mine subject to "windy" shots?.....  
 Has this mine experienced any explosions?.....

(Give dates and particulars on a blank sheet.)

F.—*Mining conditions.*

Range in thickness of coal as mined: From.....feet.....inches  
 to.....feet.....inches. Average.....feet.....inches.  
 Variability of partings or other impurity in character and thickness?.....  
 Roof (a) Draw slate (coming down with coal).....thickness.  
 (b) Shale, quality, color, etc.....  
 (c) Roof coal..... Quality..... Thickness.....  
 (d) Sandstone or limestone.....  
 Is immediate roof smooth or does coal stick?.....  
 Does immediate roof fall in rooms?.....  
 Is there a cap rock or main roof above?.....  
 Height of cap rock, etc., above coal.....feet.  
 Do particles of roof get mixed with coal in loading?.....  
 Vertical height to nearest workable coal above.....feet.  
 Vertical depth to nearest workable coal below.....feet.  
 Floor or underclay:  
 Kind.....  
 Softness.....  
 Smooth or rough.....  
 Do particles get mixed with coal?.....  
 Is coal undercut in clay floor or in coal?.....  
 Undercut by hand or machine?.....  
 Are machine cuttings loaded with coal?.....

FUTURE OUTPUT AND PRODUCTION.

Approximately what unmined area is to be taken out from present opening?....acres.  
 What is probable lifetime of mine?.....years.  
 Is the tonnage to be derived from advance work or pillars?.....  
 In what proportions?.....  
 Present average daily output of mine.....tons (2,000 pounds).  
 Maximum day's run.....  
 To what extent is daily output to be increased or diminished in future?.....  
 .....

G.—*Preparation for market.*

Proportion of output shipped as "run of mine".....  
 What percentage of coal going to screens passes through?.....  
 .....

Type of lump screens, bar, shaking, etc.:

Size of opening .....

(a) Bar, length ..... feet,  
 Spaces, width ..... inches,  
 (b) Shaking screen, area ..... feet by ..... feet,  
 Diameter of holes ..... inch.

Type of small-coal screens, if any:

(a) Bars, length .....  
 Space, width ..... inches,  
 (b) Shaking screens, area ..... feet by ..... feet,  
 Diameter of holes ..... inch,  
 (c) Revolving screens, length ..... feet,  
 Diameter of holes ..... inch,  
 Diameter of mesh ..... inch.

Is coal picked on belt or on car? .....

Number of pickers (or trimmers who pick) .....

Are screenings washed? ..... Maximum size washed ..... inch.

Sizes produced by washing .....

Type of washery .....

Average daily tonnage ..... tons (2,000 pounds).

Are screenings coked? ..... Are they crushed? .....

Average daily tonnage coal coked .....

What storage-bin capacity? ..... tons.

Appearance of lump coal on cars .....

Lumps, large or small? .....

Appearance of screenings on cars .....

Loading tracks, number of .....

Track capacity for empty railway cars .....

Track capacity for loaded railway cars .....

REMARKS:

.....  
 .....  
 .....

*II.—Coal sample section.*

Mine..... Date,....., 191...

State..... Can No.....

County..... Township.....

Name of bed of coal.....

Location of mine.....

Total (vertical) depth from surface at point of sampling..... feet.

[In describing the beds and character of the members note any member that is rejected by the miner. Note all clay and sulphur partings, whatever their thickness. Exclude from sample all clay and sulphur partings  $\frac{3}{8}$  inch thick or over (and even those of less thickness) if they are rejected at mine or tipple.]

*Section of bed at point sampled.*

Description.		Feet.	Inches.
Roof (main).....			
Roof (immediate).....			
No.			
1	.....		
2	.....		
3	.....		
4	.....		
5	.....		
6	.....		
7	.....		
8	.....		
9	.....		
10	.....		
11	.....		
12	.....		
13	.....		
14	.....		
Total.....			
Floor.....			

Is coal sample wet or dry?.....

Time exposed..... hours..... minutes.

Weight..... gross..... net.

What are the impurities and how do they occur? .....

.....

What impurities are shipped with the coal?.....

What impurities are excluded from the sample?.....

Collector.....

**PUBLICATIONS ON FUEL TESTING.**

The following publications, except those to which a price is affixed, can be obtained free by applying to the Director of the Bureau of Mines, Washington, D. C. The priced publications can be obtained by sending the price, in cash, to the Superintendent of Documents, Government Printing Office, Washington, D. C.

**PUBLICATIONS OF THE BUREAU OF MINES.**

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TECHNICAL PAPER 2. The escape of gas from coal, by Horace C. Porter and F. K. Ovitz. 1911.

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BULLETIN 261. Preliminary report on the operations of the coal-testing plant of the United States Geological Survey at the Louisiana Purchase Exposition, in St. Louis, Mo., 1904; E. W. Parker, J. A. Holmes, M. R. Campbell, committee in charge. 1905. 172 pp. 10 cents.

PROFESSIONAL PAPER 48. Report on the operations of the coal-testing plant of the United States Geological Survey at the Louisiana Purchase Exposition, St. Louis, Mo., 1904; E. W. Parker, J. A. Holmes, M. R. Campbell, committee in charge. 1906. In three parts. 1492 pp., 13 pls. \$1.50.

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