



Reports

Dated

12/21/1951

Orient No. 2 Mine

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION VIII

FINAL REPORT ON MAJOR EXPLOSION DISASTER
ORIENT NO. 2 MINE
CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY
WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

December 21, 1951

By

M. J. Ankeny
Chief, Coal Mine Inspection Branch
James Westfield
Chief, Accident Prevention and Health Division, Region VIII
W. H. Tomlinson
Chief, Accident Prevention and Health Division, Vincennes Branch, Region VIII
F. J. Smith
W. R. Chick
C. L. South
Coal-Mine Inspectors

Originating Office - Bureau of Mines
201 Post Office Building, Vincennes, Indiana
W. H. Tomlinson, Chief, Vincennes Branch
Accident Prevention and Health Division

CONTENTS

| | <u>Page</u> |
|---|-------------|
| Introduction | 1 |
| General information. | 1 |
| Mining methods, conditions and equipment | 3 |
| Mining methods. | 3 |
| Ventilation and gases | 4 |
| Dust. | 4 |
| Table 1 - Results of analyses of air samples collected December 1951 | 5-6 |
| Haulage | 7 |
| Electric equipment. | 7 |
| Table 2 - Results of analyses of dust samples collected December 1951 | 8-18 |
| Table 3 - Location and condition of various pieces of mining equipment in affected sections. | 21-24 |
| Miscellaneous | 25 |
| Previous explosions at this or nearby mines. | 25 |
| Activities of Bureau of Mines personnel. | 26 |
| Story of explosion and recovery operations | 27 |
| Property damage. | 30 |
| Investigation of cause of explosion. | 31 |
| Mine conditions immediately prior to the disaster. | 32 |
| Figure 1 - Daily water gage | |
| Figure 2 - Weekly barograph | |
| Details of evidence. | 33 |
| Flame | 34 |
| Forces. | 36 |
| Methane as a factor in the explosion. | 39 |
| Factors that prevented the spread of the explosion. | 43 |
| Summary of evidence. | 45 |
| Cause of the disaster. | 47 |
| Recommendations. | 48 |
| Ventilation | 48 |
| Inspections | 49 |
| Ignition sources. | 49 |
| Coal Dust | 50 |
| Miscellaneous | 50 |
| Acknowledgment and commendations | 51 |
| Appendix | |
| Appendix A - Victims of explosion | |
| Appendix B - Map of the portion of mine affected by explosion | |
| Appendix C - Sketch of 3rd and 4th south 27 east north west | |
| Appendix D - Sketch of entries connecting new and old main north | |
| Appendix E - Sketch of 3rd and 4th north 28 west north west | |
| Appendix F - Sketch of 3rd and 4th south 27 west north west | |
| Appendix G - Sketch of 7th and 8th south 27 west north | |
| Appendix H - Sketch of 3rd and 4th north 28 west north | |

FINAL REPORT ON MAJOR EXPLOSION DISASTER
ORIENT NO. 2 MINE
CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY
WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

December 21, 1951

By

M. J. Ankeny
Chief, Coal Mine Inspection Branch
James Westfield
Chief, Accident Prevention and Health Division, Region VIII
W. H. Tomlinson
Chief, Accident Prevention and Health Division, Vincennes Branch, Region VIII
F. J. Smith
W. R. Chick
C. L. South
Coal-Mine Inspectors

INTRODUCTION

A widespread gas and coal-dust explosion occurred in the Orient No. 2 mine about 7:40 p.m., December 21, 1951, causing the death of one hundred and nineteen men. Two hundred and fifty-seven men were in the mine when the disaster occurred of which number one hundred and thirty-three escaped to the surface uninjured and unaided, four were rescued and hospitalized and one, who survived, was rescued 58 hours after the explosion. Of the four injured men, one died later in the hospital. The names of the men who were killed, their ages, marital status, number of dependents, and social security numbers are shown in Appendix A of this report. The explosion originated near the junction of 3 south off 27 east north west and No. 3 stub entry off 3 south when a moving body of gas was ignited by an electric arc or spark. The explosion was propagated throughout a large part of the mine and into adjoining working sections by coal dust and possibly by the ignition of other bodies of gas.

GENERAL INFORMATION

The Orient No. 2 mine is located at West Frankfort, Franklin County, Illinois, and is served by the Illinois Central, Missouri Pacific, Chicago and Eastern Illinois, and The Chicago, Burlington and Quincy railroads. The mine was opened by the Chicago, Wilmington and Franklin Coal Company in 1922. The main office is located in Chicago, Illinois, and the officials of the company are as follows:

| | | |
|-------------------|-----------------------------|--|
| G. B. Harrington | President | 332 South Michigan Avenue Chicago, Illinois |
| H. A. Treadwell | Vice President | 332 South Michigan Avenue Chicago, Illinois |
| F. Earle Snarr | General Superintendent | Benton, Illinois |
| John R. Foster | Superintendent | Benton, Illinois |
| Thomas Garwood | Chief Engineer | West Frankfort, Illinois |
| Charles Pullen | Underground Supt. | West Frankfort, Illinois |
| Charles Walker | Safety Engineer | West Frankfort, Illinois |
| Arlie Cook | Day Shift Mine Manager | West Frankfort, Illinois |
| Wilford McDaniels | Night Shift Mine Manager | West Frankfort, Illinois |

The mine employed 1,127 men, of which number 258 worked on the surface and 869 worked underground on two producing shifts and one maintenance shift, and produced an average of 10,000 tons of coal a day. Four shaft openings are provided, the main hoisting shaft being 500 feet deep, the No. 3 air shaft being 526 feet deep, and the auxiliary shaft being 488 feet deep. The No. 4 shaft through which recovery operations were conducted is 565 feet deep. According to U. S. Geological Survey elevations, the bottom of the 500-foot main shaft is 100 feet below sea level.

The workings are in the Illinois No. 6 coal bed, which has an average thickness of 110 inches and lies flat except for local undulations. From 12 to 24 inches of top coal is left to form the immediate roof and this is overlain with a weak shale. The floor is a medium hard fire clay. A sample of coal cut from the face of 27 west north west entry on February 24, 1951, was analyzed as follows:

| | |
|-----------------|---------------|
| Moisture | 9.31 percent |
| Ash | 6.79 percent |
| Volatile Matter | 33.09 percent |
| Carbon | 50.81 percent |
| | <u>100.00</u> |
| Sulfur | 1.08 percent |
| B.t.u. | 12,134 |

Numerous tests by the U. S. Bureau of Mines have shown that coal having a volatile ratio of 0.12 is explosive and that the explosibility increases with any increase in the volatile ratio. The volatile ratio of the coal in the explosion area of this mine, as determined by a comparatively recent analysis, was 0.39, indicating that dust from this coal is highly explosive.

MINING METHODS, CONDITIONS AND EQUIPMENT

Mining Methods

A panel, room-and-pillar method of mining was employed, with panel entries being driven in sets of 2, 3, and 4 at 572-foot intervals. Cross entries were turned off the main entries in sets of 5 at intervals of 1,608 feet. Barrier pillars 30 feet thick are left between rooms driven off adjacent panels, 50-foot barriers are left between the ends of panel entries, and 150-foot barriers are maintained along cross and main entries.

Room or stub entries in pairs or sets of 3 are turned off the panel entries about every 200 feet and the rooms are then driven parallel with the panel entries. Entries are driven 12 feet wide on 40-foot centers, rooms are driven 24 feet wide on 40-foot centers, and crosscuts are generally 60 feet apart. Room pillars are "slabbed" to the extent that the area caves and is inaccessible for inspection, and the pillars along the cross entries are partly recovered when retreating. All coal is loaded mechanically.

A systematic method of timbering has been established, but was not always followed where safety posts were required at the working faces. Wooden and steel beams were used for support along most haulage roads, and roof bolts were used in a few experimental installations. It was obvious that bolts installed in parts of the zones of extreme violence prevented the roof from falling and hampering rescue or recovery operations.

Blasting of rock and some coal faces was done on the off shift with permissible-type explosives, but all coal in the explosion area was loosened and broken down on shift with compressed air. The air compressors were installed on the surface and the air was forced to the working faces through 1-inch steel pipes tested to withstand internal pressure equivalent to 20,000 pounds per square inch. The coal was undercut and sometimes was undercut and sheared. Fire clay was used where stemming was required and a wooden bar was provided for tamping the charges.

Ventilation and Gases

The mine is classified as gassy by the Illinois Department of Mines and Minerals and by the U. S. Bureau of Mines. Ventilation is provided by an electrically driven centrifugal fan located at the main shaft and an electrically driven axial-flow fan at the No. 3 air shaft. Both fans are installed in fireproof structures on the surface and are operated continuously and blowing. The fans are offset properly from the shafts and are provided with fireproof air ducts, explosion doors, and recording pressure gages. They are also equipped with devices to deenergize the mine electrical circuits when the fans slow down to any great degree or

stop. About 400,000 cubic feet of air a minute is circulated through the mine and from 7,200 to 21,000 cubic feet a minute was passing through the last open entry crosscuts during the last Federal inspection of the mine in July 1951. Permanent stoppings, overcasts, and seals are constructed substantially of incombustible material, and where single doors are used on main or cross entries they are attended. Single doors, however, are not attended in the working sections. The analyses of 20 air samples collected in return-air currents in various parts of the mine during the last Federal inspection showed methane ranging from 0.13 percent to 0.74 percent, and the total liberation of methane for a 24-hour period at that time was 1,570,770 cubic feet.

Pre-shift, on-shift, and weekly examinations are made for gas and other hazards by the mine examiners, unit foremen, and assistant foremen, and "safety-first men" are stationed in the working sections to keep a constant check on the accumulated gas in the "old ends." These so-called "old ends" are abandoned sections in which pillars have been partly extracted and the entrances to the sections caved so that they can neither be inspected nor ventilated with any degree of certainty. Gas accumulates extensively in these areas and in many instances the air current sweeping along the caves is used to ventilate active working places. This method of ventilation relies on the pressure of the ventilating current to prevent the gas that has accumulated in the "old ends" from bleeding into the active workings. This has not proved to be a reliable means for preventing gas from seeping out of the old workings into active workings, however, as the gas has been found on numerous occasions to flow back and forth freely with the movement of transportation units or by the opening and closing of doors. There is also the constant danger of heavy falls in the abandoned workings forcing the gas out into the active workings and the slowing or stopping of the fan relieving the pressure of the ventilating current from the static atmospheres in the abandoned areas. The results of analyses of air samples collected during the investigation are shown in Table No. I. The caves at the entrances to old ends precluded the possibility of collecting air samples in the abandoned areas, but sample bottles No. A-2175, C-5480, and C-5533 collected where the air current flowed by the edges of the caves contained 8.00, 4.80, and 4.90 percent of methane, respectively. The sample of mine air collected at the main north off 27 west, after it had been bratticed during recovery operations, was found to contain 11.40 percent of methane.

Numerous oil wells penetrating the No. 6 coal bed at the mine are protected by a 150-foot barrier pillar of coal at each location. Booster fans were not used in the mine, but blower fans with tubing were used in conjunction with the McKinley entry driving machines.

Dust

The mine was dry and was rock-dusted to within 80 feet or less of all working faces at the time of the last Federal inspection. It was

TABLE 1 - RESULTS OF ANALYSES OF AIR SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Bottle No. | Date | Time | Location in Mine | Carbon Dioxide | Oxygen | Carbon Monoxide | Methane | Nitrogen |
|------------|----------|------------|---|----------------|--------|-------------------|---------|----------|
| A-2175 | 12-27-51 | 10:18 a.m. | Lip of cave, old end D entry 3 and 4 south, 27 east, north west | 0.03 | 17.10 | 0.02 | 8.00 | 74.58 |
| B-9833 | 12-27-51 | 10:18 a.m. | do. | 0.03 | 17.10 | 0.02 | 8.00 | 74.58 |
| AX-100 | 12-27-51 | 10:50 a.m. | At main north off 27 west inby 7 north | 0.06 | 17.10 | 0.38 | 11.40 | 70.52 |
| A-112 | 12-27-51 | 12:45 p.m. | At entrance of 3rd entry of 5 south, 27 west, north | 0.23 | 19.70 | 0.05 | 1.70 | 78.32 |
| C-5499 | 12-27-51 | 8:50 a.m. | Mouth 25 west north | 0.23 | 19.78 | less than 0.01 | 0.79 | 79.19 |
| C-5500 | 12-27-51 | 9:45 a.m. | Inby first crosscut on No. 1 north off 25 west, north | 0.28 | 19.76 | do. | 1.06 | 78.89 |
| C-5549 | 12-28-51 | 3:00 p.m. | No. 1 west, No. 1 south, 27 west, north abandoned area | 0.26 | 19.31 | 0.01 | 1.33 | 79.09 |
| C-5480 | 12-27-51 | 9:00 a.m. | Mouth No. 1 east, 3 south, 27 west, north abandoned area | 0.48 | 17.35 | 0.11 | 4.80 | 77.26 |
| A-2880 | 12-28-51 | 11:05 a.m. | Inby temporary stopping, 27 west, north, C entry, old main north | 0.02 | 19.40 | 0.06 | 4.80 | 75.54 |
| A-2881 | 12-29-51 | 9:30 a.m. | At 4th crosscut, 2 south off 27 east, north west | 0.37 | 19.43 | 0.02 | 0.96 | 79.22 |

TABLE 1 (Continued) - RESULTS OF ANALYSES OF AIR SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Bottle No. | Date | Time | Location in Mine | Carbon Dioxide | Oxygen | Carbon Monoxide | Methane | Nitrogen |
|------------|----------|------------|--|----------------|--------|-----------------|---------|----------|
| C-5489 | 12-27-51 | 11:35 a.m. | At crib in 9 south 25 west north | 0.76 | 16.69 | Trace | 2.10 | 80.45 |
| C-5490 | 12-27-51 | 12:50 p.m. | Mouth 25 east, north west, return air | 0.17 | 20.19 | do. | 0.32 | 79.32 |
| A-2376 | 12-29-51 | 9:50 a.m. | At 3rd crosscut in 2 south off 27 west north west | 0.27 | 18.96 | Trace | 3.56 | 77.20 |
| A-2754 | 12-29-51 | 9:45 a.m. | In 2 north at 4th crosscut, 27 east north west | 0.12 | 20.05 | do. | 1.52 | 78.30 |
| A-2795 | 12-29-51 | 10:10 a.m. | At 4th crosscut in 3 south off 27 west, north west | 0.23 | 18.59 | 0.03 | 2.68 | 78.47 |
| A-2873 | 12-29-51 | 10:00 a.m. | At 4th crosscut in 2 north off 27 west north west | 0.11 | 20.58 | Trace | 0.30 | 79.01 |
| C-5518 | 12-27-51 | 10:30 a.m. | Inby mouth 4 east, 3 north, 28 west north | 0.16 | 18.97 | 0.03 | 2.90 | |
| C-5533 | 12-27-51 | 2:30 p.m. | Inby first crosscut, No. 1 air course, 2nd north, 28 west, north | 0.59 | 16.82 | 0.03 | 4.90 | |

apparent, however, during the investigation that coal dust had accumulated excessively along roadways and the amount of rock dust applied was not sufficient to prevent propagation of the explosion. Water sprays were installed on the cutting machines and water was used to some extent on the coal piles before loading to allay coal dust. The holes drilled for the compressed air blasting shells were also washed out before the shells were inserted, and calcium chloride was spread on the shuttle-car roadways. Watering methods employed at this mine are inadequate, however, by reason of the fact that water is not supplied and used in sufficient quantity to control the dust in face regions. Mine-dust samples were collected during the investigation from the area involved in the explosion and from unaffected areas, and the results of the analyses are shown in Table No. 2. A discussion of these analyses is contained in the part of this report entitled "Factors That Prevented the Spread of This Explosion."

Haulage

Shuttle cars, elevating conveyors, belt conveyors, and cable-reel locomotives were utilized in gathering operations in the working sections, and the coal was hauled to the hoisting shaft in 4-1/2-ton capacity steel mine cars pulled by trolley locomotives. The rolling stock and main-line track were kept in good condition. Clean shelter holes were available at frequent intervals along the haulageways, but the clearance space was not always kept free of obstructions. Men were transported in regular mine cars hauled by trolley locomotives and they rode on both sides of the cars. Suitable man-trip stations were provided and the trolley wire was either guarded at these stations or the power was cut off the wire while men loaded and unloaded.

Electric Equipment

Electric power is purchased as 33,000 volts alternating current and is reduced to 4,160 and 2,300 volts alternating current to operate the motor-generator sets and rectifiers. The armored power cables entered the mine through the shafts and boreholes drilled at convenient locations, and the underground substations are in well-constructed fireproof rooms. The underground electric equipment and haulage locomotives were operated from the 275-volt direct-current system, and the surface equipment was operated by 440- and 220-volt alternating-current power.

Bureau of Mines representatives, Mr. R. S. James, mechanical engineer, Pittsburgh, Pennsylvania, and Mr. F. J. Gallagher, mining-electrical engineer, Mt. Hope, West Virginia, made an inspection of electrical equipment in the explosion area on December 26 and 27, 1951, and reported as follows:

Since no attempt had apparently been made to maintain the electrical face equipment in permissible condition, machines were not moved or taken to a shop for complete inspections as might have been necessary if one particular machine, in

TABLE 2 - RESULTS OF ANALYSES OF DUST SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Can No. | Sample of Dust From | Location in Mine | Amount of Coke | As--Received Basis Percent | | | Incomb. |
|--------------------------------------|---------------------|---|----------------|----------------------------|------|------|---------|
| | | | | Moist. | Ash | Comb | |
| <u>Section A.A. - Explosion Area</u> | | | | | | | |
| L-780 | Rib & Roof | No. 1 entry No. 1 crosscut 3 N, 27 W. N.W.N. | Very large | 5.0 | 28.5 | 66.5 | 33.5 |
| K-792 | Floor | do. do. | Very large | 4.4 | 34.6 | 61.0 | 39.0 |
| Q-71 | Rib & Roof | No. 2 entry No. 1 crosscut | Very large | 4.3 | 30.6 | 65.1 | 34.9 |
| J-16 | Floor | do. do. | Very large | 4.9 | 29.6 | 65.5 | 34.5 |
| R-605 | Rib & Roof | No. 3 entry No. 1 crosscut | Very large | 4.7 | 31.8 | 63.5 | 36.5 |
| F-952 | Floor | do. do. | Large | 6.4 | 35.9 | 57.7 | 42.3 |
| Q-201 | Rib & Roof | No. 4 entry No. 1 crosscut | Large | 4.9 | 30.5 | 64.6 | 35.4 |
| M-565 | Floor | do. do. | Small | 5.2 | 31.1 | 63.7 | 36.3 |
| <u>Section B.B. - Explosion Area</u> | | | | | | | |
| L-94 | Rib & Roof | No. 1 stub, 3 S. across from #4 room 27 E, N.M.N. | None | 7.8 | 28.8 | 63.4 | 36.6 |
| G-635 | Floor | do. do. | None | 6.7 | 23.3 | 70.0 | 30.0 |
| J-297 | Rib & Roof | No. 2 stub | Small | 2.9 | 67.4 | 29.7 | 70.3 |
| W-823 | Floor | do. do. | Small | 8.1 | 32.1 | 59.8 | 40.2 |
| R-656 | Rib & Roof | No. 3 stub. | Large | 3.2 | 43.9 | 52.9 | 47.1 |
| K-955 | Floor | do. do. | Small | 6.7 | 27.9 | 65.4 | 34.6 |
| V-282 | Rib & Roof | Gobs only. On 3 B entry, 3 S. last crosscut outby old end cave | Small | 4.7 | 23.9 | 71.4 | 28.6 |

TABLE 2 (Continued) - RESULTS OF ANALYSES OF DUST SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Can No. | Sample of Dust From | Location in Mine | Amount of Coke | As--Received Basis, Percent | | | |
|---------------------------------------|---------------------|--|----------------|-----------------------------|------|-------|---------|
| | | | | Moist. | Ash | Comb. | Incomb. |
| <u>Section C. C - Explosion Area</u> | | | | | | | |
| B-552 | Roof & Rib | 25 Ft. inby 27 W. D entry 7 & 8 So. | None | 5.4 | 30.5 | 64.1 | 35.9 |
| V-929 | Floor | do. do. | None | 5.5 | 25.7 | 68.8 | 31.2 |
| R-321 | Roof & Rib | 25 Ft. inby 27 C entry 7 & 8 So. | Small | 5.5 | 42.4 | 52.1 | 47.9 |
| Q-75 | Floor | do. do. | Small | 5.6 | 25.5 | 68.9 | 31.1 |
| K-509 | Roof & Rib | 15 Ft. inby 27 W. B entry 7 & 8 So. | Small | 5.4 | 31.5 | 63.1 | 36.9 |
| R-751 | Floor | do. do. | None | 5.5 | 24.6 | 69.9 | 30.1 |
| M-700 | Roof & Rib | 25 Ft. inby 27 W. A entry 7 & 8 So. | Small | 10.3 | 25.4 | 64.3 | 35.7 |
| H-905 | Floor | do. do. | Small | 13.2 | 21.6 | 65.2 | 34.8 |
| <u>Section D. D. - Explosion Area</u> | | | | | | | |
| M-23 | Floor | Opposite Entrance #4 Room 3 E, 3 N, 27 W.M.N. | None | 6.6 | 17.4 | 76.0 | 24.0 |
| G-574 | Rib & Roof | do. do. | None | 4.3 | 53.6 | 42.1 | 57.9 |
| E-484 | Rib & Roof | Opposite Entrance #4 Room 2 E, 3 N, 27 W.M.N. | None | 4.8 | 41.9 | 53.3 | 46.7 |
| M-123 | Floor | do. do. | None | 6.8 | 22.3 | 70.9 | 29.1 |
| G-211 | Floor | Opposite Entrance #4 Room 1 E, 3 N, 27 W.M.N. | None | 6.1 | 19.1 | 74.8 | 25.2 |
| V-915 | Rib & Roof | do. do. | None | 6.2 | 34.4 | 59.6 | 40.4 |

TABLE 2 (Continued) - RESULTS OF ANALYSES OF DUST SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Can No. | Sample of Dust From | Location in Mine | Amount of Coke | As--Received Basis, Percent | | | |
|---------------------------------------|---------------------|---|----------------|-----------------------------|------|-------|---------|
| | | | | Moist | Ash | Comb. | Incomb. |
| <u>Section E. E. Explosion Area</u> | | | | | | | |
| B-264 | Floor | Inby 2 N. off 27 W. old Main N. No. 1 (outby) entry | None | 5.9 | 29.4 | 64.7 | 35.3 |
| K-933 | Rib & Roof | do. do. do. | None | 8.4 | 29.1 | 62.5 | 37.5 |
| G-727 | Rib & Roof | Inby 2 N. off 27 W. old Main N. No. 2 entry haul. | None | 5.0 | 33.5 | 61.5 | 38.5 |
| F-355 | Floor | do. do. do. | None | 4.5 | 36.2 | 59.3 | 40.7 |
| K-619 | Floor | Inby 2 N. off 27 W. old Main N. No. 3 entry | None | 2.8 | 55.3 | 41.9 | 58.1 |
| M-634 | Rib & Roof | do. do. do. | Small | 4.7 | 30.8 | 64.5 | 35.5 |
| R-339 | Rib & Roof | Inby 2 N. off 27 W. old Main N. No. 4 entry | None | 5.7 | 16.0 | 78.3 | 21.7 |
| U-316 | Floor | do. do. do. | None | 3.5 | 24.0 | 72.5 | 27.5 |
| <u>Section F. F. - Explosion Area</u> | | | | | | | |
| X-330 | Rib & Roof | 28 E. air course 100' west of 3 Sq. 45° angle | Large | 5.4 | 33.3 | 61.3 | 38.7 |
| K-825 | Floor | do. do. do. | Large | 5.5 | 27.3 | 67.2 | 32.8 |
| L-334 | Rib & Roof | 27 E. air course do. do. do. | Very Large | 5.1 | 26.4 | 68.5 | 31.5 |
| H-464 | Floor | do. do. do. | Large | 5.2 | 28.6 | 66.2 | 33.8 |
| G-827 | Rib & Roof | 28 E. ontry do. do. do. | Small | 4.3 | 28.7 | 67.0 | 33.0 |
| H-944 | Floor | do. do. do. | Large | 4.4 | 25.9 | 69.7 | 30.3 |
| E-559 | Rib & Roof | 27 E. entry do. do. do. | None | 5.0 | 25.1 | 69.9 | 30.1 |
| R-680 | Floor | do. do. do. | None | 4.4 | 30.1 | 65.5 | 34.5 |
| U-600 | Rib & Roof | Parting Entry 27 E. N. M. N. do. do. do. | Small | 5.0 | 25.0 | 70.0 | 30.0 |
| H-348 | Floor | do. do. do. | Small | 5.7 | 29.9 | 64.4 | 35.6 |

TABLE 2 (Continued) - RESULTS OF ANALYSES OF DUST SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Can No. | Sample of Dust from | Location in Mine | Amount of Coke | As--Received Basis, Percent | | | |
|---|---------------------|---|----------------|-----------------------------|------|-------|---------|
| | | | | Moist. | Ash | Comb. | Incomb. |
| <u>Section G. G. - Outside Explosion Area</u> | | | | | | | |
| H-301 | Rib & Roof | N.M.N. 500' inby 23 W. junction No. 1 entry | None | 4.6 | 56.7 | 38.7 | 61.3 |
| C-72 | Floor | do. do. | None | 4.2 | 56.7 | 39.1 | 60.9 |
| R-139 | Rib & Roof | N.M.N. 500' inby 23 W. junction No. 2 entry | None | 5.8 | 42.1 | 52.1 | 47.9 |
| M-518 | Floor | do. do. | None | 3.7 | 63.2 | 33.1 | 66.9 |
| C-228 | Rib & Roof | N.M.N. 500' inby 23 W. junction No. 3 entry | None | 7.4 | 17.3 | 75.3 | 24.7 |
| S-173 | Floor | do. do. | None | 8.5 | 32.3 | 59.2 | 40.8 |
| <u>Section H. H. - Explosion Area</u> | | | | | | | |
| V-229 | Floor | 300' inby 26 W. N.M.N. No. 1 entry | Small | 6.3 | 32.7 | 61.0 | 39.0 |
| L-411 | Rib & Roof | do. do. | Small | 5.9 | 23.6 | 70.5 | 29.5 |
| J-699 | Floor | 300' inby 26 W. N.M.N. No. 2 entry | None | 4.6 | 23.0 | 72.4 | 27.6 |
| T-864 | Rib & Roof | do. do. | None | 3.5 | 30.1 | 66.4 | 33.6 |
| E-338 | Floor | 300' inby 26 W. N.M.N. No. 3 entry | Small | 3.9 | 29.5 | 66.6 | 33.4 |
| W-806 | Rib & Roof | do. do. | Small | 4.0 | 27.2 | 68.8 | 31.2 |
| Q-93 | Floor | 300' inby 26 W. N.M.N. No. 4 entry | Small | 3.5 | 32.4 | 64.1 | 35.9 |
| R-912 | Rib & Roof | do. do. | Small | 3.4 | 22.4 | 74.2 | 25.8 |
| R-63 | Floor | 300' inby 26 W. N.M.N. No. 5 entry | Large | 5.0 | 23.2 | 71.8 | 28.2 |
| C-625 | Rib & Roof | do. do. | None | 3.3 | 23.7 | 73.0 | 27.0 |

TABLE 2 (Continued) - RESULTS OF ANALYSES OF DUST SAMPLES COLLECTED DECEMBER 1951

ORIENT NO. 2 MINE, CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY

WEST FRANKFORT, FRANKLIN COUNTY, ILLINOIS

| Can No. | Sample of Dust From | Location in Mine | Amount of Coke | As--Received Basis, Percent | | | |
|--|---------------------|----------------------------------|----------------|-----------------------------|------|-------|---------|
| | | | | Moist. | Ash | Comb. | Incomb. |
| <u>Section I.I. - Outside Explosion Area</u> | | | | | | | |
| S-693 | Rib & Roof | Outby 17 S. on 21 W. No. 1 entry | None | 10.6 | 35.9 | 53.5 | 46.5 |
| C-578 | Floor | do. do. | None | 6.8 | 42.6 | 50.6 | 49.4 |
| Q-922 | Rib & Roof | Outby 17 S. on 21 W. No. 2 entry | None | 2.1 | 74.0 | 23.9 | 76.1 |
| U-857 | Floor | do. do. | None | 0.7 | 89.6 | 9.7 | 90.3 |
| U-968 | Rib & Roof | Outby 17 S. on 21 W. No. 3 entry | None | 11.3 | 27.4 | 61.3 | 38.7 |
| B-56 | Floor | do. do. | None | 5.2 | 10.7 | 84.1 | 15.9 |
| G-153 | Rib & Roof | Outby 17 S. on 21 W. No. 4 entry | None | 10.3 | 31.5 | 58.2 | 41.8 |
| B-444 | Floor | do. do. | None | 8.7 | 19.7 | 71.6 | 28.4 |
| R-637 | Rib & Roof | Outby 17 S. on 21 W. No. 5 entry | None | 6.0 | 24.4 | 69.6 | 30.4 |
| C-225 | Floor | do. do. | None | 6.6 | 19.9 | 73.5 | 26.5 |
| <u>Section J.J. - Outside Explosion Area</u> | | | | | | | |
| R-528 | Rib & Roof | Outby 7 N. on 21 W. No. 1 entry | Small | 12.3 | 18.5 | 69.2 | 30.8 |
| W-117 | Floor | do. do. | None | 18.4 | 21.9 | 59.7 | 40.3 |
| S-580 | Rib & Roof | Outby 7 N. on 21 W. No. 2 entry | None | 3.5 | 61.2 | 35.3 | 64.7 |
| M-852 | Floor | do. do. | None | 1.1 | 92.3 | 6.6 | 93.4 |
| P-490 | Rib & Roof | Outby 7 N. on 21 W. No. 3 entry | None | 11.5 | 24.9 | 63.6 | 36.4 |
| L-524 | Floor | do. do. | None | 13.3 | 27.3 | 59.4 | 40.6 |
| S-884 | Rib & Roof | Outby 7 N. on 21 W. No. 4 entry | None | 11.2 | 19.6 | 69.2 | 30.8 |
| U-286 | Floor | do. do. | None | 14.6 | 19.4 | 66.0 | 34.0 |
| C-681 | Rib & Roof | Outby 7 N. on 21 W. No. 5 entry | None | 6.4 | 28.0 | 65.6 | 34.4 |
| G-952 | Floor | do. do. | None | 7.4 | 25.1 | 67.5 | 32.5 |

