Bump files

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

November 1, 1954
I. M. 4273

TO MEMBERS OF THE HEALTH AND SAFETY DIVISION:

Subject: Coal outburst
Marathon No. 1 mine
Harlan-Wallins Coal
Corporation, Verdo,
Harlan County, Kentucky
October 14, 1954.

A coal outburst or bump which resulted in the instant death of two men and injuries to the three others in the section occurred about 11 a.m., October 14, 1954, in the Marathon No. 1 mine, Harlan-Wallins Coal Corporation. Two men were seriously injured, the third remained in the hospital for 3 days.

The mine is opened by several drifts into the high-volatile Darby coal bed, which averages 36 to 40 inches in thickness in this locality. The coal, which has a compressive strength of more than 3,000 pounds per square inch, is of firm structure and contains distinct face-and-butt cleavage planes. One of the characteristics of this coal is that a large amount of latent energy can be stored in comparatively small coal pillars. Coal outbursts, which resulted in fatalities have occurred in this mine and in other mines operating in the Darby coal bed in this locality.

A total of 150 men, of whom 20 worked on the surface and 130 men worked underground, was employed on two shifts daily in the production of 1,000 tons of coal.

The immediate roof in the affected area in 8 right comprised a 1- to 2-inch stratum of soft shale, which came down with the coal, overlain by 10 feet or more of strong thick-bedded fine-grained sandstone and thinly laminated sandy shales. This formation was overlain

by about 2 feet of hard shaley sandstone, which in turn was overlain by 42 feet of gray massive sandstone. This massive sandstone is distinctive in that it possesses extraordinary tensile and compressive strength. The maximum depth of cover encountered on this property was 1,500 feet and the cover over the coal-mine bump area ranged from 500 to 700 feet. According to the logs of drill holes in the Harlan area, the cover over the Darby coal bed is largely of massive sandstone. The floor in the affected area was composed of about 2 feet of very firm, dense sandy shale that approaches sandstone in compressive strength. This stratum is underlain by 2 to 4 feet of sandstone. The floor in the 8 right section showed little indication of heaving.

The mine was developed by a room-and-pillar method. Main and cross entries were driven in pairs and room entries, also in pairs were turned at 500-foot intervals. Entries were 16 to 20 feet in width. Rooms, turned at 90 degree angles on 40- and 80-foot centers, were 22 to 70 feet wide. Pillars were being recovered in various parts of the mine, including the 8 right section. Crosscuts were about 60 feet apart. The adopted plan for systematic roof support required that permanent posts be set on 4-foot centers on each side of the tracks to within 8 feet of the faces and sufficient safety posts be set close to each working face. Cribs were set at various intervals along each side of the roadways in 8 right. In the wide rooms (walls), a safety post was required between each worker and the face. During the last inspection, this plan was not complied with in some of the working places.

The mine is classed gassy as a result of an air sample collected on October 29, 1952 contained 0.31 percent methane. The mine ranged from wet to dry. Rock dust had been applied and no dangerous accumulations of coal dust were observed in the area investigated.

The coal outburst occurred in an open-end pillar pocket being driven into the remnant of the last outby pillar block of No. 12 room off 8 right air course, 1 main. This block was originally about 50 feet square and was developed during first mining, however, at the time of the outburst the block has been reduced to approximately 16'x 40'. The 8 right section was on full retreat and the work was confined to the extraction of some room pillars and entry chain pillars by a group of men working on a "gang-work" basis. On the day of the accident five men, consisting of the two deceased and the three injured, were working in the 8 right section which had been idle for about four months, but in which production work had been resumed 3 weeks prior to the accident.

On the day of the accident the five men had loaded 12 cars of coal, 3 out of No. 14 pillar off the 8 right heading and 9 out of the No. 12 pillar. Three of the men drilled and fired three boreholes, two in the

inby end and one in the outby end of the block. When the outburst occurred, the five men were loading coal into three cars in the No. 12 pillar. The outrush of coal and the force produced derailed the two outby loaded mine cars and threw the men against the mine cars, killing two of them instantly and injuring the others.

This outburst was caused by a combination of existing conditions as follows:

1. The improper system of development and pillar extraction used in 8 right.

2. The entire working section in the vicinity of the outburst projected into an area that had been practically worked out during first mining.

3. A "pillar pocket" was being driven toward the gob in a highly stressed coal pillar approximately 16 feet by 40 feet in size.

4. Blocks of coal of decidedly unequal dimensions were formed during development of the 8 right section with resultant unequal pressures.

5. Although outbursts of lesser or greater magnitude had occurred repeatedly in this section, even resulting in injuries, apparently a study had not been made and no precautions taken or the section shut down until after two fatalities had occurred.

6. Apparently no effort had been made to extract pillars in 8 right in a systematic manner so as to establish a break line and thus alleviate to some extent impingement of forces on individual pillars.

The following recommendations were offered in the belief that, if followed, the number and the severity of coal outbursts at this and other mines operating in the same coal bed will be minimized in the future:

1. A system of mining should be adopted that will result in the least number of critical areas during second or retreat mining.

2. Pillar extraction should not be attempted in an area such as in 8 right where large percentages of the coal have been mined during development or first mining, especially, under conditions favorable or conducive to coal outbursts.

3. Under no circumstances should pillar pockets be driven toward the gob in overstressed areas within the abutment zone.

4. Where pillar mining is done, the blocks of coal should be mined in proper sequence so as to establish and maintain straight, clean break lines close to the line of extraction.

5. The pillaring system should require that the coal pillars be developed as nearly uniform as practicable so as to minimize overloading of individual pillars.

6. To facilitate roof caving, complete extraction should be the goal, and pillar remnants that tend to retard caving should not be left in the gob.

7. In pillar recovery in areas where the roof is massive and resists caving, and where the floor is hard, every precaution should be taken to extract the coal pillars in a manner that will permit orderly distribution of the load.

8. Any unusual disturbance, such as the coal outburst which occurred on the day before the accident, or evidence of impending danger from over-stressing such as existed throughout the 8 right section, should be thoroughly investigated before proceeding with further mining within the area.

9. Mining practices throughout this mine should be reexamined and anything that could induce an outburst should be eliminated.

The information in this memorandum was obtained from the report on the investigation of the accident by J. L. Gilley, Chief, Norton (Va.) Office, Accident Prevention and Health Division; Henry E. Basinger, Federal coal mine inspector, and Frank L. Gaddy, Federal health and safety engineer.

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Approved:

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