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COAL FATAL

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DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DISTRICT B

BUREAU OF MINES
ACCIDENT INVESTIGATION
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REPORT OF FATAL ROOF-FALL ACCIDENT

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OLGA MINES
OLGA COAL COMPANY
COALWOOD, McDOWELL COUNTY, WEST VIRGINIA

September 23, 1965 ✓

By

Morris E. Bragg
Federal Coal-Mine Inspector

Originating Office - Bureau of Mines
Mount Hope, West Virginia 25880
W. R. Park, District Manager
Health and Safety District B

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301-21g.

William Deak Ruesake, Tolson

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INTRODUCTION

This report is based on an investigation made in accordance with provisions of the Federal Coal Mine Safety Act (66 Stat. 692; 30 U.S.C. Secs. 451-483).

A roof fall causing fatal injury to an employee occurred at 9:30 a.m., Thursday, September 23, 1965, just outby the entrance to No. 4 pillar lift, 5 left 4 east pillar section off 4 north of the Olga mines (No. 2 portal - Caretta side), Olga Coal Company. Multiple injuries to William Dock Rasnake, regularly employed as a brattice man but performing as a timberman on the day of the accident, resulted in his instantaneous death. Rasnake, age 53, had 33 years mining experience, all at this mine. He is survived by his widow and two dependent children.

The writer, while conducting a ventilation study in the mine, was notified of the accident by Homer Hickam, mine superintendent, at 10:15 a.m., September 23, 1965, and an investigation was started the same day.

GENERAL INFORMATION

The Olga mines, at Coalwood, West Virginia, is operated in the No. 4 Pocahontas coal bed, which is entered through several shafts, ranging in depths from 445 feet to 870 feet. The coal bed ranges from 56 to 96 inches in thickness. In the accident area, the coal bed measured 60 inches. Total employment is 397 men, 301 underground and 96 on the surface. Production averages 7,500 tons of coal on a double shift basis, 5 days a week, and is loaded with continuous miners and 11 and 14BU Joy loading machines into shuttle cars.

The mine is developed by a multiple entry system, and pillar extraction follows a block room-and-pillar method of development. Pillars are extracted by the alternate open-end pillar lift method in the 5 left 4 east section. The natural conditions in this section are conducive to coal outbursts or bumps. A fatal coal outburst accident occurred on September 2, 1965, in the No. 8 pillar in the same row, but 4 pillars to the right of the scene of the roof-fall accident described herein.

The immediate roof in the accident area was dark gray shale, ranging from 8 inches thick on the left side of No. 4 entry to 18 inches in thickness on the right side of the entry. The main roof was sandstone 27 feet in thickness.

Variable thickness of the immediate shale roof and its complete absence at some locations in the 5 left 4 east section, resulted in lenticular roof formations with a wide differential in resistance to deformation. Where the immediate roof structure was more massive (thicker), its influence was more apparent and extensive at places where the structure was comparatively thin (12 inches or less in thickness).

The shale roof at some locations along one or more ribs of the Nos. 4 and 5 pillars (scene of accident) was crushed and fractured from tension and compression forces. Results of these forces over several days caused the thicker shale formations to shift, en masse, as much as 5 inches along its bedding plane toward the weaker shale areas. This movement or shifting of the immediate roof stratum subjected the roof bolts to accumulative shear and tension. These forces in combination resulted in ultimate failure of 14 roof bolts and collapse of a section of the immediate roof. Each of the bolts failed within its stock section and at the existing horizon of the bedding plane of the immediate shale and the overlying sandstone formations.

From Sketch No. 2, it will be noted that the Nos. 4 and 5 pillars were being mined simultaneously by a single open-end lift. The Nos. 4 and 5 pillars, as will be noted from Sketch No. 2, were the last in the row being extracted and were in zones of high abutment pressures from flanking goafs. Furthermore, a roof fall in the mined-out area on the day prior to the accident terminated inby and to the left of the No. 4 pillar. Reaction from the delayed and then partial caving of the roof in the immediate inby mined-out area could have accelerated the onset of a critical roof deformation.

The adopted roof-support standards incorporated use of posts, 3-piece timber sets, cribs, and roof bolts. In the 5 left 4 east pillar

section, the roof in entries and crosscuts was supported with roof bolts installed on 4-foot centers. The roof in the pillar lifts was supported with crossbars on 4-foot centers and by at least 2 rows of posts on 4-foot centers, or less, along the gob side of the lifts during extraction.

Cribs, constructed of 5- by 5- by 24-inch wooden blocks, are used supplementary to the breaker and gob-line timbers in mining the pillar lifts and "push-outs." Cribs and posts are also used to supplement the roof-bolt support along the roadways leading to the pillar lifts when roof conditions warrant.

The roof in the accident area was primarily supported by bolts installed on 4-foot centers crosswise and lengthwise. The bolts were high-tensile steel, 5/8-inch in diameter, and 48 inches in length. These bolts were installed on an approved plan, according to company records, in December 1958.

Pull tests and investigation conducted by the Bureau of Mines roof control section on September 27, 1965, revealed that some bolts, for a distance of 100 feet outby the extraction line, had broken or had been distorted to varying degrees, thus decreasing their effectiveness and their ability to afford the desired degree of safety.

As a result of this investigation, management decided that the cost of resupporting the roof in the area involved would be prohibitive; therefore, mining was abandoned in the area, and a new pillar line will be established about 300 feet outby the fault shown in Sketch No. 2.

Members of the investigating committee were:

Company Officials

D. C. Ridenour	General Superintendent
Martin Valeri	Assistant General Superintendent
H. H. Hickam	Mine Superintendent
Clarence King	Acting Mine Foreman
R. W. Wotring	Safety Director
James Parrott	Safety Inspector

United Mine Workers of America

C. H. Phillips	District No. 29 Representative
George E. Whitt	Chairman, Mine Safety Committee

West Virginia Department of Mines

Harry Harman
Andrew J. Wiley

Inspector-at-Large
District Mine Inspector

United States Bureau of Mines

Morris E. Bragg

Federal Coal-Mine Inspector

The preceding Federal inspection was completed July 28, 1965.

DESCRIPTION OF ACCIDENT

On the day of the accident, the 5 left 4 east day-shift crew, consisting of the section foreman, 5 regularly assigned employees, and Rasnake, the deceased, arrived on the section at 7:30 a.m. After conferring with his men and making assignments, Fred Beavers, section foreman, proceeded to make his routine examination of the working places and roadways, including the specific area involved in the accident. Rasnake had been assigned to install supplementary roof supports (posts and cribs) at specific areas of bolted roof that were fractured and considered doubtful. The section foreman stated that Rasnake's first specific assignments the morning of the accident were to move crib blocks to a more convenient locations, so as to expedite loading and transportation by shuttle car, then to build cribs outby the face of No. 4 pillar lift and to set 4 posts on the left side of No. 4 entry in the accident area. The section foreman further stated that the roof in the accident area was fractured and its stability was questionable; however, no unusual movement or further changes were noted or determined to have taken place since his examinations of the area the previous day. The lift in the No. 4 pillar had not been worked on the preceding night shift.

Estil Kennedy and Esau Boeman, timbermen, were instructed to timber the No. 4 pillar lift (inby the scene of the accident) to the company's standards, then to assist Rasnake with his assignment outby. The two men assisted Rasnake in setting the 4 posts on the left side of the No. 4 entry (see Sketch No. 1), and then they proceeded to the "supply hole" to obtain additional timbering materials. While Kennedy and Boeman were in the supply hole, they heard a noise (light bump). Kennedy called to Rasnake and asked him if he was all right; Rasnake reportedly replied in the affirmative. After an interval of about 3 minutes, Boeman heard a noise and saw

Rasnake's cap lamp fall. The foreman stated that a light "bump" did occur in the No. 3 pillar, and it is believed that this was the "bump" that the timbermen reportedly heard a few minutes prior to the collapse of roof that struck and killed Rasnake.

During interrogation of the two timbermen, it was stated that they heard a "bump" in the No. 4 or 5 pillar without coal being expelled from the ribs, about 15 minutes before the fatal accident.

The roof rock that caught Rasnake was 22 feet long by 15 feet wide, and varied in thickness from 8 to 18 inches. The victim was removed from under the rock in about 30 minutes, and then was transported to the surface, where he was pronounced dead by a physician.

CAUSE OF ACCIDENT

The primary cause of this accident was the progressive displacement of roof strata by a concentration of stresses within the working area (abutment zone), which subjected the supporting roof bolts to accumulative tension and shear forces that resulted in their ultimate failure and the consequent collapse of a section of roof. The unawareness and the failure to detect the extent of the lateral movement in the immediate roof in the working area contributed materially to the cause of the accident. The area involved was subjected to high stresses from flanking goafs and progressive convergence was evident 200 feet outby the extraction line.

RECOMMENDATIONS

Compliance with the following recommendations may prevent accidents of a similar nature:

1. Periodic examinations of installed roof bolts in pronounced stressed pillar extraction areas should be made at spot locations in the active areas where men work or travel to determine possible bolt damage from movements of the roof.
2. Temporary safety posts should be set until permanent support is provided at locations where roof of an unstable conditions is encountered.

ACKNOWLEDGMENT

The cooperation of company officials, employees, members of the United Mine Workers of America, and representatives of the West Virginia Department of Mines during this investigation is gratefully acknowledged.

Respectfully submitted,

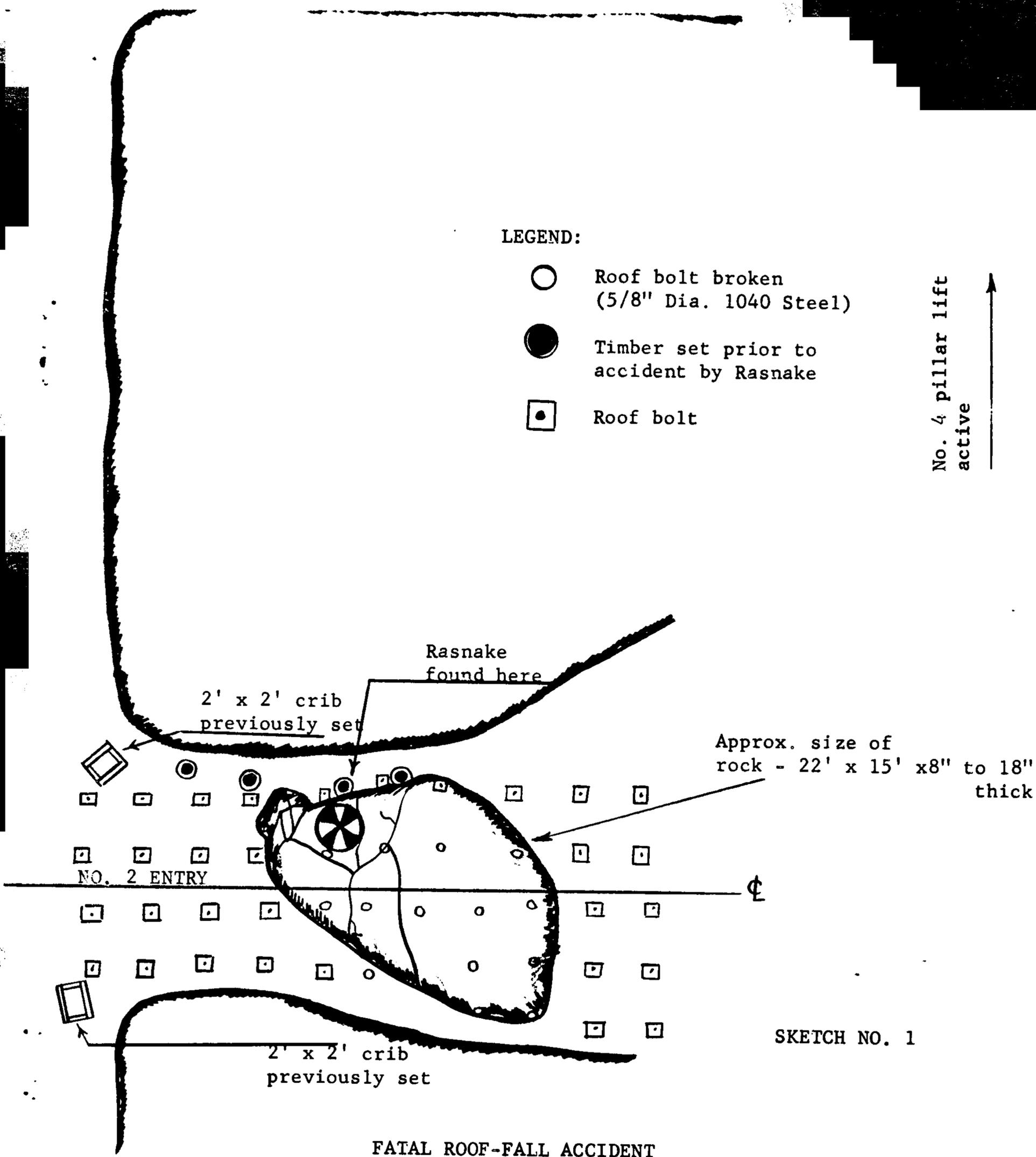
/s/ Morris E. Bragg

Morris E. Bragg
Federal Coal-Mine Inspector

LEGEND:

- Roof bolt broken (5/8" Dia. 1040 Steel)
- Timber set prior to accident by Rasnake
- ◻ Roof bolt

No. 4 pillar lift active ↑

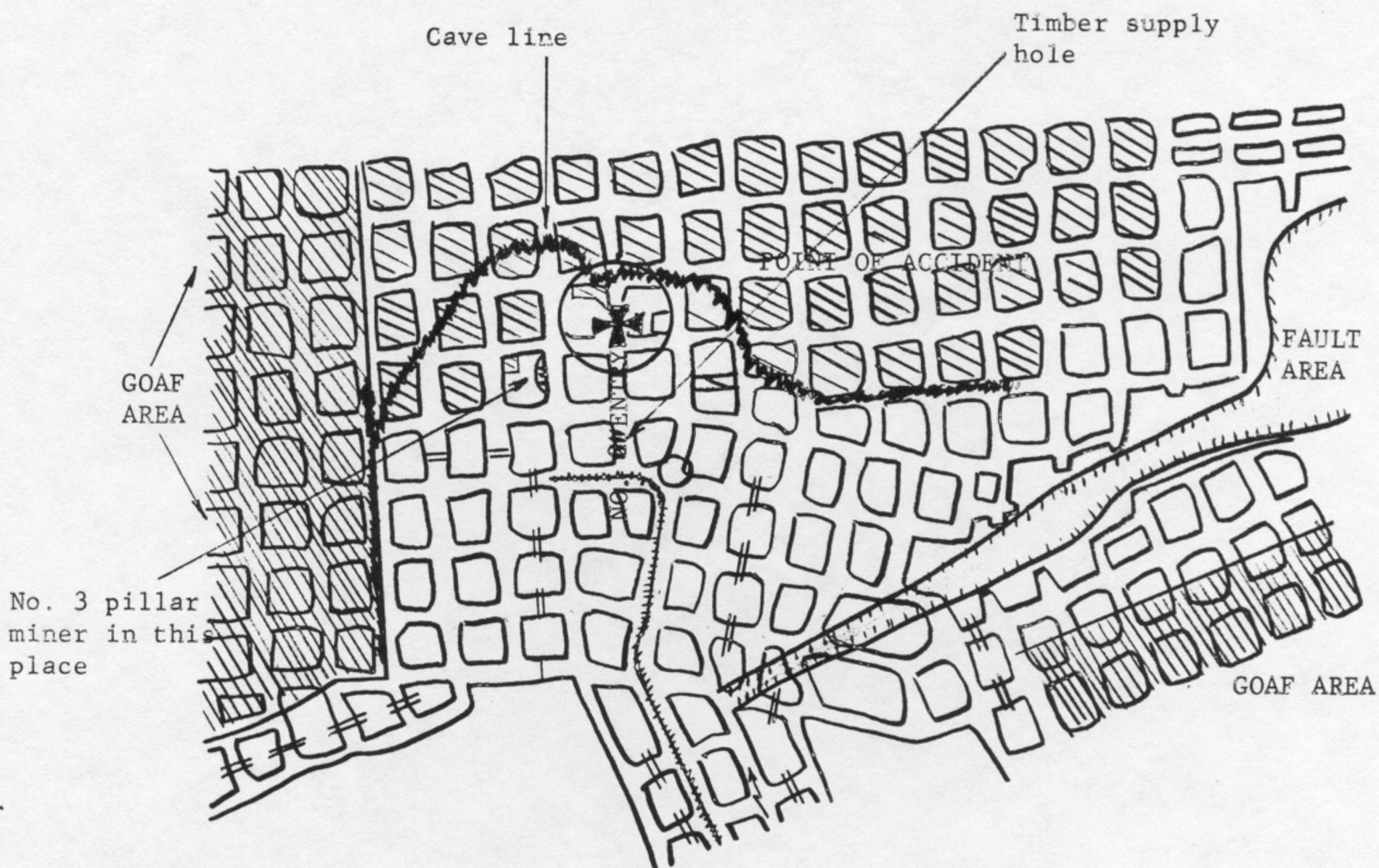


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Scale 1" = 10'



SKETCH NO. 2

Scale 1" = 200'