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COAL FATAL

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

15-18

District E

4 fatalities

15-001

0502359

REPORT OF FATAL (MULTIPLE) ROOF-FALL ACCIDENT
SOMERSET MINE
UNITED STATES STEEL CORPORATION
WESTERN DISTRICT-COAL
SOMERSET, GUNNISON COUNTY, COLORADO

September 19, 1968

By

I. J. Ratliff
Roof Control Investigator

and

Don W. Snow
Federal Coal Mine Inspector

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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) as amended.

A roof fall which occurred in the face area of No. 2 entry, 4 west "C" seam, in the Somerset mine, about 12:40 pm, Thursday, September 19, 1968, resulted in the death of A. M. Morrison, superintendent, V. K. Piccioni, general mine foreman, J. F. Burem, mine foreman, and E. L. Bailey, continuous-mining-machine operator.

Morrison, age 42, is survived by his widow and seven dependent children. He was employed continuously from 1952 by the United States Steel Corporation in various positions in the Geneva mine, Dragerton, Carbon County, Utah, and was appointed mine superintendent of the Somerset mine in 1960.

Piccioni, age 37, is survived by his widow and three dependent children. He was employed by the United States Steel Corporation at Geneva mine, Dragerton, Carbon County, Utah, from 1955 to 1959. He was transferred to the Somerset mine in 1960 as a section foreman and was promoted to general mine foreman in 1966.

Burem, age 54, is survived by his widow and two dependent children. He had 27 years' mining experience, 20 of which was with the United States Steel Corporation. He was the mine foreman at this mine since October 16, 1967.

Bailey, age 46, is survived by his widow and two dependent children. He had 21 years' mining experience, 6 at this mine, and was employed as a continuous-miner operator since February, 1967.

The Denver, Colorado office of the Bureau of Mines was notified of the accident by telephone by Warren Clark, mine clerk, about 1:45 pm, the day of the accident. A joint investigation with Colorado State coal mine inspectors was started the day of the accident. The investigation was completed September 21, 1968.

Information for this report was obtained from observations at the scene of the accident; statements by company officials, and by John W. Southerland and Roxie Ungaro, eye witnesses; and testimony given at a coroner's inquest.

GENERAL INFORMATION

Access to the mine is by five slopes. Development is in the "B" and "C" coalbeds, which range from 20 to 25 and 5 to 9 feet in thickness, respectively. The coalbeds are separated by 40 to 50 feet of rock strata and are interconnected by two rock tunnels and two shafts. A total of 187 men, 154 underground and 33 on the surface, is employed on two coal-producing and one maintenance shifts, 5 days a week. Average daily production of 3,700 tons of coal was mined with continuous-mining machines loading directly into shuttle cars.

The mine was developed by a room-and-pillar method. Pillar extraction was by splitting, and mining out fenders left on each side. Main and room entries were driven three and four abreast; crosscuts were not more than 80 feet apart. The 4 west entries and crosscuts in the vicinity of the accident were about 19 feet wide. Mining height was 7 feet 6 inches in the area. From 12 to 18 inches of top coal is left as immediate roof.

Roof overlying the "C" coalbed consists of 5 to 10 feet of strata grading from sandy shale to laminated sandstone and coal bearing shale. This roof contains slips, pots, and slickensides, which are hidden by the top coal, and tends to separate from overlying strata when exposed. Roof support in the "C" coalbed consisted of installing roof bolts in accordance with revised roof-bolting plan No. 4 approved by the Bureau of Mines June 29, 1962. Roof bolts were 3/4-inch diameter, 5 feet in length, anchored with expansion shells and bearing was afforded by 1/4-inch embossed steel plates. Bolts were spaced 4 feet apart or less, lengthwise and crosswise, where the accident occurred. Wide steel sheets (16 gage minimum) were used for continuous support between bolts, where deemed necessary. Torque tests, made of roof bolts in the vicinity of the accident area, revealed that bolts were tightened properly. Reportedly, roof at working faces was tested at frequent intervals by officials and workmen.

The fall of roof was bounded on one side by a fault plane with slickensides, along the right rib of No. 2 entry. Transverse slips and bedding-planes were also noted. This created an abnormal roof and rib condition where the accident occurred. The fault plane extended from the face of the entry outby for a distance of about 180 feet. The fireboss report of September 18, 1968, revealed that a "bad slip" along the right rib was supported; wide steel sheets in combination with bolts were installed

to within 4 feet of face, and timbers were set to support the slip in No. 2 entry where the fall occurred. The bolting plan was followed. The 4 west entries were developed by slanting three entries off 3 west entries, because of faults encountered in the main 3 dip entries. The 4 west entries would normally have been developed off the 3 dip entries. After advancing the slant entries far enough to turn 4 west at an angle for developing on the strike, a fault was encountered in No. 2 entry. Driving a crosscut between Nos. 1 and 2 slant entries, and then turning No. 2 entry to the strike at the intersection of the crosscut and No. 2 entry resulted in an excessive width, ranging up to 41 feet, where abnormal conditions existed. See sketches.

The general superintendent stated that plans are to reduce the width of mine workings to 16 feet and to increase the distance between crosscuts in an effort to prevent a similar occurrence.

The investigating committee consisted of:

Company officials

R. M. von Storch, general superintendent
W. G. Talman, chief inspector, coal operations
E. C. Olsen, chief mine inspector
James Cassano, superintendent, Geneva mine, Utah
George Dunham, mine foreman, second shift
Ted Self, industrial engineer

United Mine Workers of America

Earl Stucker, field representative, District 15
John C. Colletti, safety committeeman

Colorado State Coal Mine Inspection Department

Donald Haske, chief mine inspector
Oscar T. Rice, district mine inspector

United States Geological Survey

✓ Archie L. Carver, mine development and production engineer
Monford P. Turner, mine development and production engineer

United States Bureau of Mines

I. J. Ratliff, roof control investigator
Don W. Snow, Federal coal mine inspector

C. J. Miller, coroner, and Lynn French, deputy district attorney, 7th Judicial District, Gunnison County, Colorado, conducted an inquest in the superintendent's office at the mine September 20, 1968. Bureau of Mines investigators attended the inquest.

The last Federal inspection of this mine was completed July 24, 1968.

DESCRIPTION OF ACCIDENT AND RECOVERY OPERATIONS

A. M. Morrison, superintendent, and V. K. Piccioni, general mine foreman, arrived in No. 2 entry, 4 west "C" seam about 12:35 pm on the day of the accident. It was not unusual for Morrison and Piccioni to travel together. John W. Southerland, continuous-mining machine helper, arrived in the face area shortly thereafter. Eugene L. Bailey, continuous-mining machine operator, was seen testing for gas with his flame safety lamp. Joe F. Burem, mine foreman, Morrison, and Piccioni were standing between the continuous miner and right rib covering their lights during the gas test. After completing the test, Bailey entered the cab of the continuous miner. Officials apparently were discussing mining of a fault encountered in the right rib and face of the entry. Southerland remarked to Piccioni that it would be feasible to mine coal on the left side of the face and then blast rock on the right side of face. Piccioni started to say something to Bailey who, by this time, was operating the continuous miner. Mining of coal was in progress and, as Southerland turned to watch the miner cable, the roof collapsed without warning about 12:40 pm. Roxie C. Ungaro, shuttle-car operator, was in the cab of the shuttle car, which was almost loaded, when Morrison and Piccioni entered the place. He did not speak to the officials when they arrived in the place and could not hear what was being discussed because of noise created by mining. He believed the officials were starting to leave the place when the roof fall occurred.

When the dust from the fall had subsided, Ungaro crawled out through the back end of the shuttle car. He cut power off the equipment and notified a track crew of the accident. Ted R. Self, industrial engineer, telephoned for help and, with available men, entered the place and started to set timbers to make the place safe to recover the buried men. Recovery work was directed by Self until E. C. Olsen, chief mine inspector, and James Cessano, superintendent of the corporation's Geneva mine, Dragerton, Utah, arrived at the scene about 1:15 pm.

Southerland was trapped under the fall between the miner and shuttle car. His left leg was caught between the mine floor and Morrison's body. Releasing his leg, he crawled along the side of the shuttle car trying to escape. He was trapped for about 45 minutes before being rescued. Southerland was transported to the surface and taken to a clinic in Paonia, Colorado, for examination and X-rays. He received a bruised left knee and pulled ligaments. He was not hospitalized.

A mobile-loading machine and shuttle car was used to load and remove fallen material. Crossbars and timbers were set in the crosscut between Nos. 1 and 2 entries, and straight props were set in No. 2 entry as the material was removed. Some large boulders had to be drilled and blasted during recovery work.

Burem's body, found alongside the shuttle car, was recovered about 6:50 pm. Piccioni's body, found near the outby end of the boom of the miner, was recovered about 10:25 pm. Morrison's body was located opposite the cage of the miner and was recovered about 11:15 pm. Bailey's body, in the cab of the miner was recovered at 8 am, Friday, September 20, 1968. Dr. Don N. Ridgway said that deaths were caused by massive gross trauma, massive abrasions and contusions, fractures, crushing injuries, and suffocation.

The mine foreman on the second shift stated that the 4 west crew entered the mine at 8 am and arrived in 4 west section at 8:15 am. Mining operations proceeded as usual. At the start of the shift, No. 2 strike entry was advanced a continuous miner run of 22 feet. The continuous miner was moved into No. 1 slant entry, and a run of 22 feet was completed in this entry, while the roof-bolting crew was installing roof bolts in No. 2 strike entry. It was about lunch time when the continuous miner was trammed to the face of No. 2 slant entry, and four shuttle cars of coal had been mined when the roof fall occurred.

The rock that fell measured 48 feet long, 25 feet wide at the widest point at the roof line, and 15 feet wide at the top. It was 10 feet thick. There were slickensides along the right side and at the top.

The continuous miner was a 45E Lee-Norse, United States Bureau of Mines approval number 2F-2003A-5 with controls on the right side. It was 35 feet long, 8 feet 7 inches wide, and 49 inches high. The shuttle car was a 10-SC Joy super, United States Bureau of Mines approval number 2F-1974A-7. The shuttle car was 27 feet long, 9 feet wide, and 5 feet high. Damage to the equipment was negligible. Only the cage on the miner was damaged.

CAUSE OF ACCIDENT

This accident was the result of an accumulative process, and factors that contributed to the cause include:

1. Turning No. 2 entry to the strike where abnormal conditions existed.
2. Presence of hidden slickensides in the strata.
3. Excessive width at intersections.
4. Not appraising accurately roof and rib conditions where abnormal conditions were evident.

RECOMMENDATIONS

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

1. Where faults or other disturbances are encountered, engineering projection changes should be made.
2. Employees and officials should be extremely careful in faulted roof areas, as this mine roof is known to contain numerous hidden slips, pots, and slickensides.
3. Width of mine openings at intersections should be kept to a minimum to avoid abnormal stress of the mine roof.
4. When mining in the vicinity of faults or other abnormal areas, roof and rib conditions should be appraised carefully and proper precautions taken such as installing additional support.

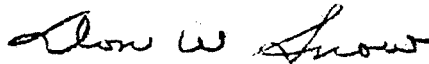
ACKNOWLEDGMENT

Cooperation of company officials and employees, union officials, State mine inspectors, and representatives of the United States Geological Survey is gratefully acknowledged.

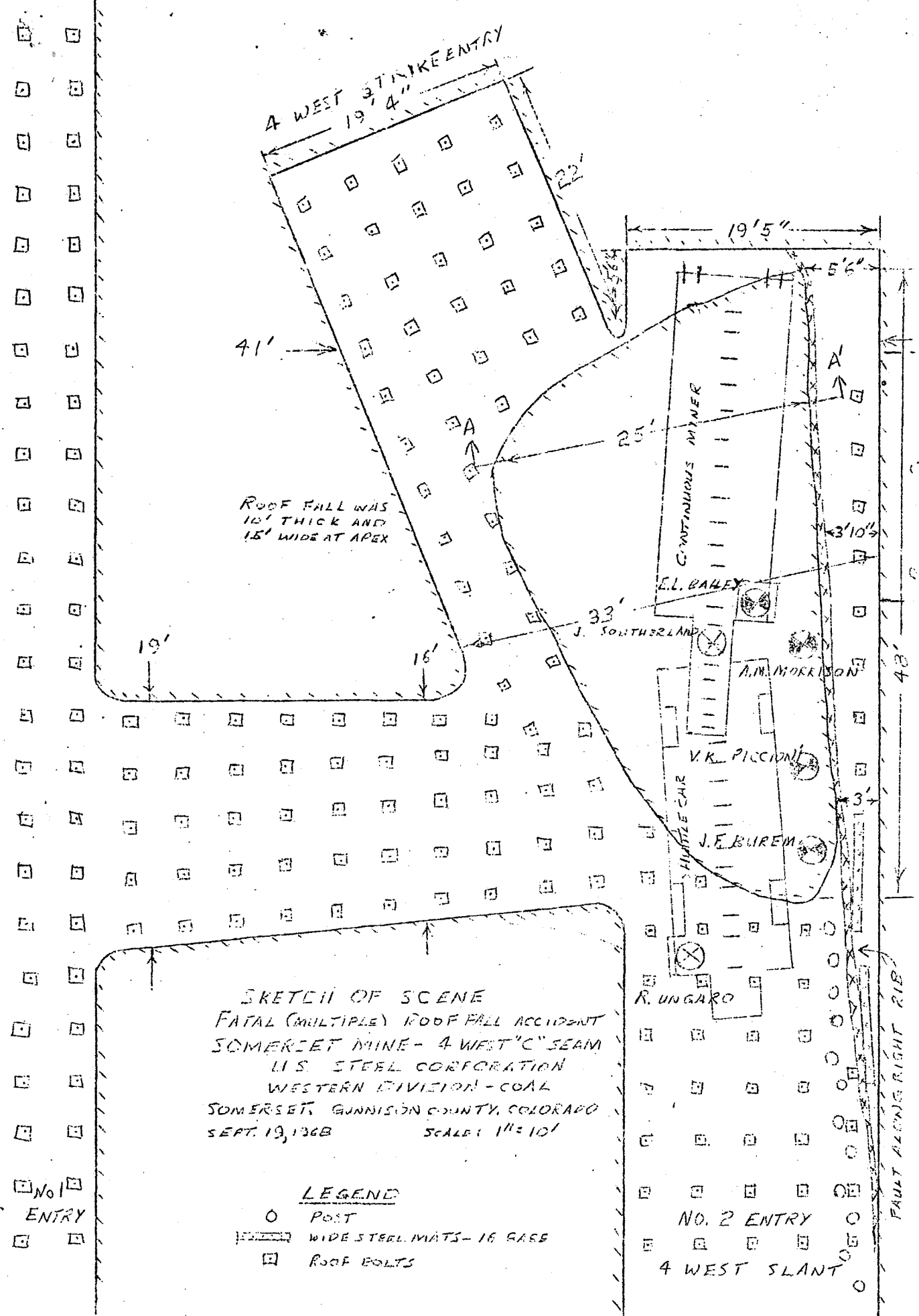
Respectfully submitted.



I. J. Ratliff
Roof Control Investigator



Don W. Snow
Federal Coal Mine Inspector



SKETCH OF SCENE
 FATAL (MULTIPLE) ROOF FALL ACCIDENT
 SOMERSET MINE - 4 WEST "C" SEAM
 U.S. STEEL CORPORATION
 WESTERN DIVISION - COAL
 SOMERSET, GUNNISON COUNTY, COLORADO
 SEPT. 19, 1968 SCALE: 1" = 10'

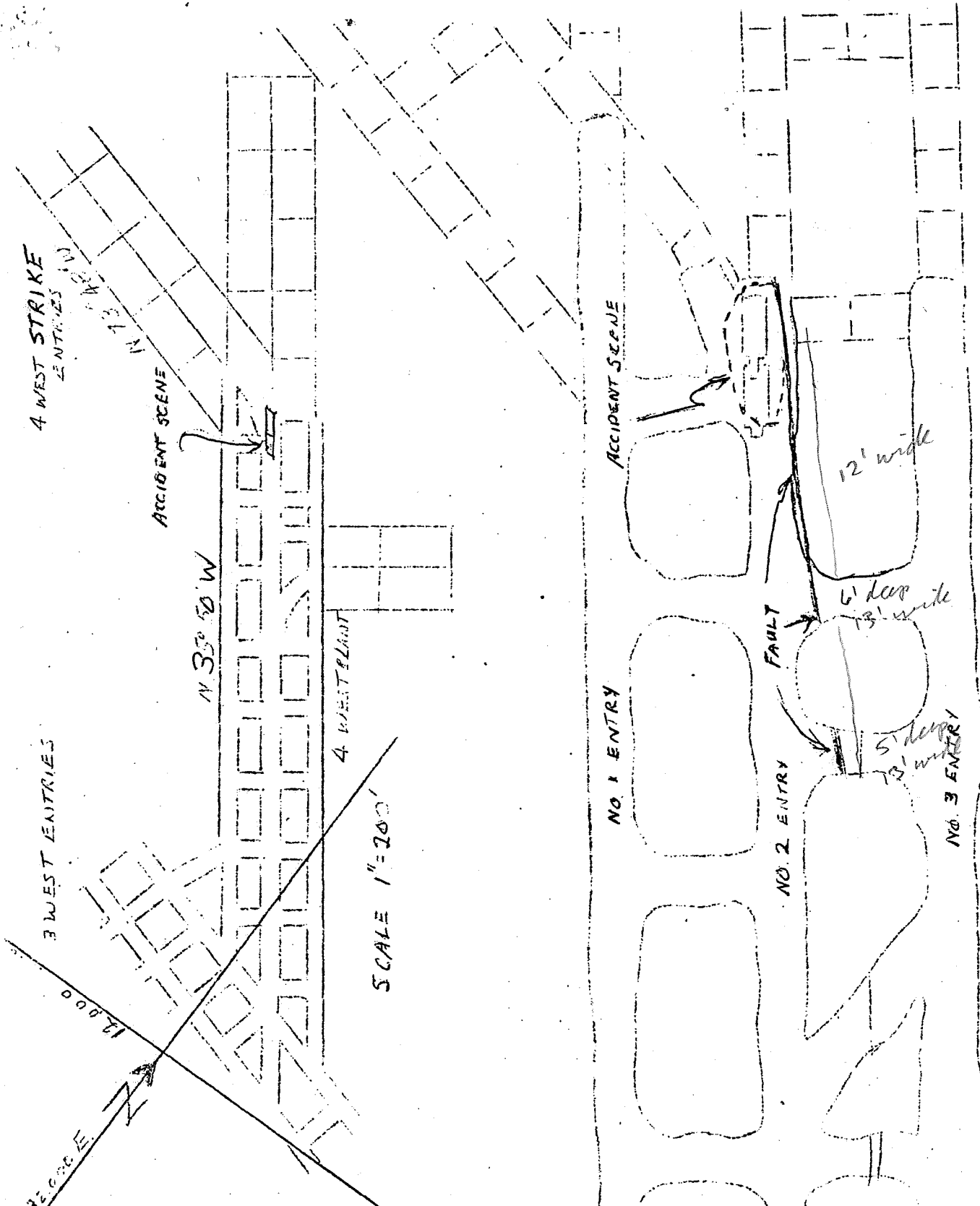
LEGEND

- POST
- ▭ WIDE STEEL MATS - 16 GAGE
- ROOF BOLTS

No. 1
 ENTRY

NO. 2 ENTRY
 4 WEST SLANT

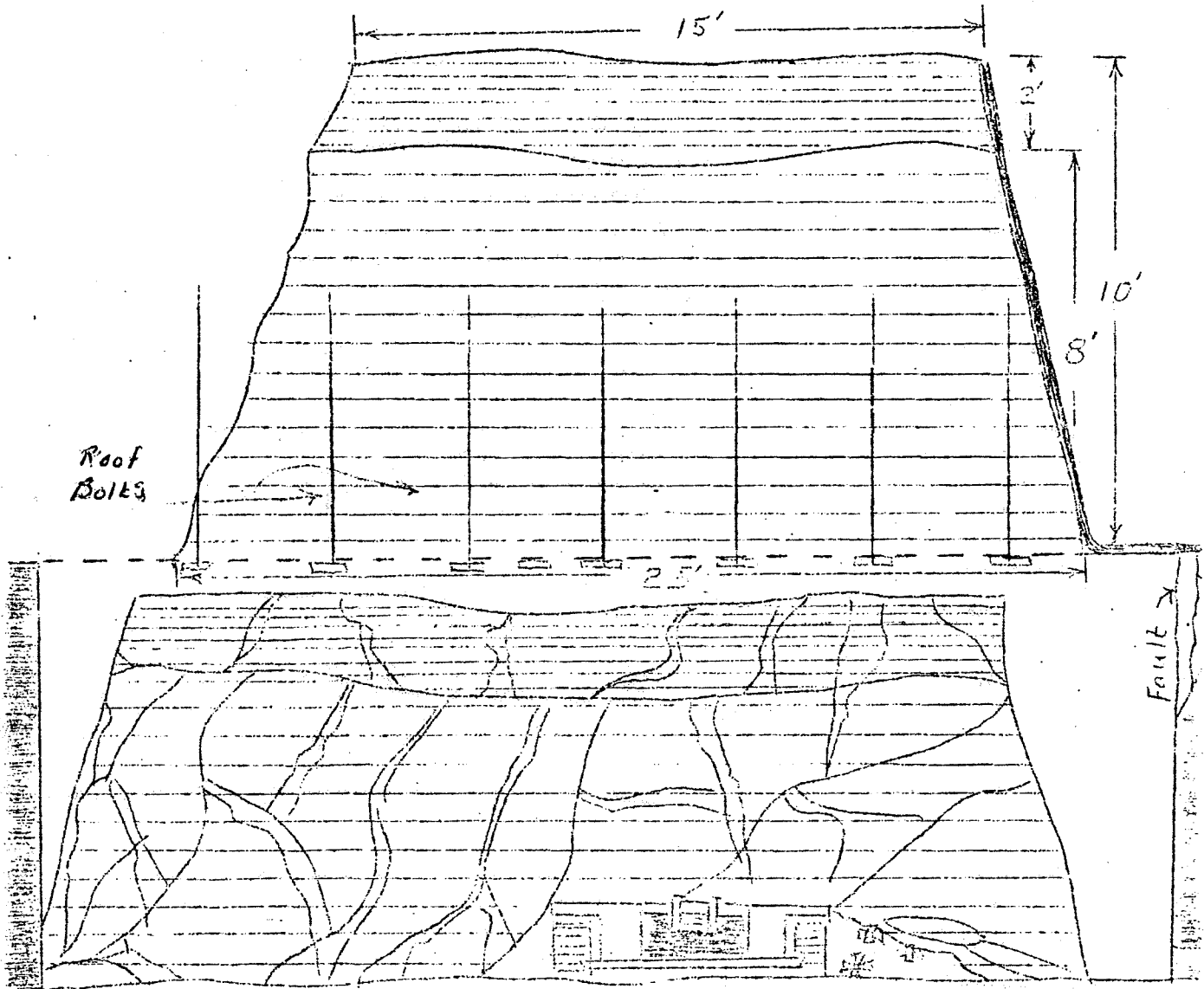
FAULT ALONG RIGHT RIB



Scale 1"=50'

SKETCH OF AREA
 FATAL (MULTIPLE) ROOF FALL
 SOMERSET MINE - 4 WEST "C" SEAM
 U.S. STEEL CORPORATION
 WESTERN DISTRICT - COAL
 SOMERSET, GUNNISON COUNTY, COLORADO
 SEPT. 19, 1968

SECTION A-A'



CROSS-SECTIONAL VIEW
FATAL (MULTIPLE) ROOF FALL ACCIDENT
SOMERSET MINE - 4 WEST "C" SEAM
U.S. STEEL CORPORATION
WESTERN DIVISION - COAL
SOMERSET, GUNNISON COUNTY, COLORADO
SEPT. 19, 1968 NOT TO SCALE