

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES

DISTRICT C

BUREAU OF MINES

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Mount Hope, W. Va.

REPORT OF MULTIPLE FATAL ROOF-FALL ACCIDENT

WHARTON NO. 2 MINE  
EASTERN GAS AND FUEL ASSOCIATES, COAL DIVISION  
BARRETT, BOONE COUNTY, WEST VIRGINIA

May 28, 1958

By

D. L. Brown, Jr.  
Federal Coal-Mine Inspector

and

W. M. Cordray  
Federal Coal-Mine Inspector (Roof Control)

Originating Office - Bureau of Mines  
Mount Hope, West Virginia  
W. R. Park, District Supervisor  
Health and Safety District C

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INTRODUCTION

A roof fall occurred in No. 1 entry 12 butt right off 2 south in the Wharton No. 2 mine at Barrett, West Virginia, about 1:15 p.m., Wednesday, May 28, 1958. The fall extended 10 feet outby the No. 31 room to immediately inby the No. 32 room, a distance of about 62 feet.

Six men were caught underneath the fallen material; four were killed instantly, one escaped uninjured and unassisted, and one employee, pinned against an air compressor, was released 5 hours and 15 minutes after the fall occurred. This injured employee was hospitalized with internal injuries. Four other employees were in the immediate vicinity of the fall, but they were not injured and assisted in the initial recovery operations.

The names of the victims, ages, marital status, occupations, and the number of their dependents are listed in Appendix A of this report. The names and occupations of the injured and uninjured employees working in the vicinity of the roof fall at the time of the occurrence are also listed.

An official of the company notified D. L. Brown, Jr., of the occurrence about 1:45 p.m., May 28, when he arrived at the Wharton No. 1 mine on a routine investigation. Brown notified other Bureau of Mines personnel of the occurrence and then proceeded to the roof-fall area.

Work of recovering the injured man and the bodies of the victims was directed by company officials and representatives of the West Virginia Department of Mines and the Bureau of Mines and was completed about 11:20 p.m., May 28, 1958. An investigation was made May 29, 1958. Bureau of Mines representatives assisting in recovery operations included W. R. Park, district supervisor, and Brown, Cordray, Matsko, Griffith, DeWeese, Puskas, and Fumich, coal-mine inspectors.

## GENERAL INFORMATION

The Wharton No. 2 mine, at Barrett, West Virginia, and served by the Chesapeake and Ohio Railway, was opened in 1948 by the present operating company. Explosions or other disasters have not occurred underground. Access into the mine was through several drifts into the high-volatile bituminous Hernshaw coal bed, which averaged 40 inches in thickness locally. The coal dust is explosive. A total of 445 men, 84 on the surface and 361 underground, was employed on 3 shifts a day, 3 days a week, and produced a daily average of 3,664 tons of coal, all loaded mechanically. The life of the mine was estimated by the superintendent to be 40 years.

The mine was developed by a room-and-pillar method, but pillars were not recovered. Between 65 and 70 percent of the coal is recovered under present mining conditions. Main and room entries were driven in sets of 4 and 3, respectively. Entries, 16 feet wide, were driven on 40- and 60-foot centers and the room entries were turned on 470-foot centers. Crosscuts were 80 to 85 feet apart. Rooms, 24 feet wide on 32-foot centers, were turned right and left in sets of 3 or 4 off the entries and driven to a depth of 200 feet. On the day of the occurrence, a set of rooms turned right off 12 butt entries was driven to their projected limits, and Nos. 31, 32, 33, and 34 rooms were being started off the No. 1 entry (left side). Complete mining is not done, but the main roof does not break to any extent in the mined-out area and as a result, weight from the overburden, ranging from 500 to 600 feet in thickness in the roof-fall area, is transferred to the unmined coal; however, excessive weight on the pillars and timbers in the fall area was not noticeable. Some coal that had sloughed off the left rib in the accident area had been loaded out before the cuts were placed in the coal.

The electric face equipment consisted of an 11 RU Joy mining machine, a 14 BU Joy loading machine, a hand-held electric drill, 2 shuttle cars, and a compressor to operate the roof-bolting equipment (stoper).

The immediate roof was variable but was generally comprised of 2 to 84 inches of dark (grey) stratified shale, unconsolidated slickensided plates, and laminated sandy shales containing a 2-inch coal rider seam in irregular areas. The main roof was sandstone (massive) which contacted the coal bed at irregular intervals. In the roof-fall area, the immediate roof was loose, unconsolidated shale that averaged 44 inches in thickness and contained slickensided plates and pots ("kettlebottoms").

The adopted system of timbering in areas where the sandstone contacted the coal bed required permanent posts to be set on 4-foot centers (lineal) and to within 12 feet of the faces in rooms and entries. Safety posts or jacks were required at the faces at all times, but safety posts or jacks were not being used in some face areas during the last Federal inspection (February 1958). Furthermore, during this Federal inspection, materials of proper size were not provided in several sections and the roof

near the faces was not secured sufficiently, in that many of the posts were not set straight, were without cap wedges and were set with 4 to 8 wedges on the bottom or top of the posts.

In several sections where sandstone roof did not contact the coal bed, roof-bolting was being done. The bolting recommendations for development of entries, rooms, and crosscuts (entire mine) approved by a roof-control representative of the Bureau of Mines October 22, 1957, and April 14, 1958, were as follows: In entries, crosscuts and rooms driven a maximum width of 16 and 25 feet, respectively, expansion-type steel rods, 5/8 inch in diameter and a minimum of 30 inches in length, were to be installed with a minimum torque of 150 foot-pounds on 4-foot centers lengthwise and crosswise to within 48 inches of the faces before cutting. When the bolts were installed through a 2- by 8-inch by 14-foot wooden crossbar, the side bolts were to be installed 6 feet crosswise from the center bolt with posts set near the end of each crossbar to maintain a 14-foot wide roadway. Bearing plates, 6- by 6- by 1/4-inch (embossed) and 4- by 4- by 1/4-inch (against wood), were to be used. In rooms, 2 rows of posts on 4-foot centers were to be set on each side of the roadway. The bolting plan also stipulates that the following safety precautions be taken: (1) A minimum of 2 (3 in rooms) safety posts or jacks to be set for protection of drill crews while drilling and installing bolts and during loading operations; line posts, as advanced according to plan, would also serve as additional safety posts. (2) Line posts to be installed on 4-foot centers (lineal) on each side of the roadway and to be kept to within 12 feet of the face and advanced as loading progresses. (3) The entrances to intersections, crosscuts, etc., not used for haulage or the moving of supplies should be timbered. (4) Additional row of 5 bolts to be installed within 18 to 24 inches of ribs before intersections are turned. If bolts were installed in the laminated sandstone sections of the mine, the same procedures were to be followed.

During the investigation, it was observed that several of the provisions of the bolting plan were not complied with, as many of the crosscuts not used for haulage or the moving of supplies were not timbered, entries at locations were 18 to 20 feet wide, rooms ranged from 24 to 31 feet wide, roadways in rooms were generally 20 to 21 feet wide, line posts knocked out by equipment had not been replaced, bolts in laminated sandstone areas were not installed on pattern, in some areas sufficient breaker posts were not set, and in some areas torque readings were less than the required 150 foot-pounds.

*and in some areas torque readings were less than the required 150 foot-pounds and additional row of 5 bolts were not installed within 18 to 24 inches of ribs before intersections were turned.*

The roof fall occurred on No. 1 entry of 12 butt right off 2 south at the entrance of Nos. 31 and 32 rooms and extended 10 feet outby No. 31 room to immediately inby No. 32 room, a distance of 62 feet. The immediate roof in this area was loose, unconsolidated shale that averaged about ~~44~~ 37 inches in thickness and contained slickensided planes and pots. The roof in No. 1 entry as it was driven had been supported with roof bolts, 5/8 inch by 36 inches, placed 6 feet apart in 2- by 8-inch by 14-foot crossbars that were installed on 4-foot centers. Line posts were set under the crossbars at each end.

The torque on the roof bolts installed in No. 1 entry and the adjoining places was between zero and 420 foot-pounds; however, 5 bolts tested had a torque reading of zero and 22 bolts tested had a torque reading of less than 150 foot-pounds as indicated in Appendix C. A fall of bolted roof had occurred in an adjacent intersection in No. 2 entry, April 30, 1958, and another in a nearby intersection in No. 3 entry during the first week in May 1958. The rock that fell was from 34~~4~~ to 45 inches in thickness, and the roof failure was generally above the anchorage of the 36-inch length bolts. 30

During the working shift previous to the accident, it was evident that the working places (right rooms) were near their projected limits, and the section foreman had several members of the crew moved to No. 1 entry of 12 butt right to prepare the area to turn 4 new rooms off No. 1 entry. Line timbers were removed from under the ends of the crossbars adjacent to the left rib of No. 1 entry for a distance of about 100 feet to permit the left rib to be cleared of loose coal and rock for the turning of the 4 new rooms (left). This area of No. 1 entry was cleaned during the shift previous to the accident, and conventional timbers were not used to replace the line timbers knocked from under the crossbars. The officials and employees mentioned that the afore-mentioned was the usual method of cleaning entry ribs to begin new rooms. However, bolts were installed between and near the ends of some of the crossbars from which line timbers had been removed (see Appendix B).

In the accident area, about 10 inches of the immediate roof was being taken by blasting as the faces were advanced. Permissible explosives (Dupont Monobel (C) and Gelebel (AA)) in 1-1/8- by 8-inch cartridges were used to blast the immediate roof in the accident area. The shots were connected in series and fired in multiples of 4. Permits for multiple blasting had been issued by the West Virginia Department of Mines. The last series of shots charged with Gelebel (AA) "rock powder" were fired in No. 32 room approximately 1 hour before the roof fall occurred.

The underground investigation of the cause of the roof fall was conducted May 29, 1958. The investigation committee consisted of:

West Virginia Department of Mines

S. J. Tawney

District Inspector (Roof Bolt)

Company Officials

H. A. Quenon

Assistant Production Manager

D. B. Shupe

Superintendent

R. R. Snyder

Resident Engineer

C. L. Mynhier

General Mine Foreman

R. J. Marrs

Division Safety Inspector

A. J. Sleboda

Plant Safety Inspector

United States Bureau of Mines

D. L. Brown, Jr.	Federal Coal-Mine Inspector
A. J. Fumich	Federal Coal-Mine Inspector (Roof Control)
W. M. Cordray	Federal Coal-Mine Inspector (Roof Control)

Crawford L. Wilson, chief of the West Virginia Department of Mines, conducted an official inquiry and investigation of the roof-fall accident by interrogating a number of officials and employees of the company in the company office at Barrett, West Virginia, June 10. The purpose of the inquiry was to hear and record all testimony relevant to roof conditions and practices in the mine prior to and on May 28, 1958, and to determine therefrom, if possible, the cause of the roof fall. Some of the information thus obtained is contained in this report. Representatives of the operating company, United Mine Workers of America, West Virginia Department of Mines, and Bureau of Mines questioned the officials and employees during the inquiry. The following men represented the several organizations during the inquiry:

West Virginia Department of Mines

Crawford L. Wilson	Chief
L. M. Morris	Assistant Chief

Eastern Gas and Fuel Associates, Coal Division

Joshua Smith	Safety Director
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United Mine Workers of America

Charles Ferguson	Safety Director
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United States Bureau of Mines

W. R. Park	District Supervisor
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The preceding Federal inspection of this mine was completed February 12, 1958.

DESCRIPTION OF ACCIDENT

At the beginning of the first coal-producing shift, William B. Bain, section foreman, and his crew prepared and loaded several cuts of coal from the right rooms off No. 3 entry 12 butt right off 2 south, and as these rooms were driven to their projected limits the equipment was moved to the No. 1 entry (left side) where Nos. 31, 32, 33, and 34 rooms were to be started. Bain had supervised another crew of men on the preceding (midnight) shift and

had the loose coal along the left rib loaded with the loading machine in the area where the new rooms were to be started.

About 10:00 a.m., Bain sent Hollie Drennen, Cecil Ball, and Cecil Brown to install roof bolts between the crossbars and to set posts under the ends of the crossbars in the crosscut between the Nos. 1 and 2 entries opposite No. 31 room and to set breaker posts in No. 1 entry inby No. 34 room. After the crosscut was bolted and timbered, Ball replaced line timbers under the right end of crossbars on No. 1 entry opposite the new rooms. The bolting crew spotted additional bolts between the crossbars as indicated in Appendix B. The bolting crew also bolted No. 1 room after the cut of coal was loaded. All employees stated they examined the roof in No. 1 entry on their arrival and found it "heavy"; they mentioned further that roof conditions in No. 1 entry were normal for the area and nothing unusual was noted until the cut of coal in No. 31 room was being loaded. These men were followed to No. 1 entry by the mining-machine crew (Albert Gore, operator, and Luther Gunnoe, helper) and the shot firer (Ed Walters) who drilled 4 boreholes, placed the first cut into the coal and blasted the coal at the face of No. 31 room. The preparation crew moved to the inby No. 32 room and the coal-loading crew (James Stone, loading-machine operator, Harry Hartman, loading-machine operator's helper, and Goff Vance and George Walls, shuttle-car operators) then moved to No. 31 room. While the loose coal was being loaded in No. 31 room, James B. Jarrell, mechanic, arrived and he observed a pot in the roof and a slip that was loose; Jarrell cautioned Stone about these roof conditions. Later Bain approached Jarrell and instructed him to spray water on the coal and ribs. Jarrell did not talk to Bain about the roof conditions observed because he thought Bain knew of the roof condition in this place.

After the boreholes were drilled in the immediate roof and the cut placed in the coal in No. 32 room, each shot hole was charged with 4 cartridges of Dupont Gelebel (AA) "rock powder," and the leg wires of the detonators were connected in series and attached to the blasting cable. About 12:15 p.m., Walters gave Bain the cable to fire the shots at No. 32 room while he (Walters) was having lunch.

The roof fall occurred about 1:15 p.m., a short time after Jarrell had finished repairing the roof-bolting equipment stationed at No. 31 room; other employees were stationed and engaged in work as follows: Brown was drilling a hole for a roof bolt near the end of a crossbar being installed at the intersection; Drennen was preparing a roof bolt assembly at the compressor; Ball was setting posts under a crossbar at the face of No. 31 room; Bain was standing in the No. 1 entry at No. 31 room; Stone was prying down a piece of rock at No. 32 room, and Hartman was watching Stone nearby; Gore, operating the mining machine, had cut across two-thirds of the 24-foot wide face that had been marked off for No. 33 room and Gunnoe was shoveling dust back of the mining machine and Walters was standing near the right rib of the No. 1 entry opposite No. 33 room. Bain, Brown, Stone, and Hartman were killed instantly when caught by the rock fall, Jarrell escaped uninjured, and Drennen was injured.

45  
The rock that fell was 62 feet long, 16 feet wide, and a maximum of 48 inches thick. The roof fall extended above the length of the 36-inch bolts; about 2 inches of the roof-bolt holes at several locations remained intact in the sandstone above the shale; however, most of the roof bolts installed in the fall area did not reach the sandstone. The roof caved suddenly and with very little warning; Ball, Jarrell, and another employee saw a small piece of rock fall from the roof and shouted a warning to the other men but none of the men in the roof-fall area, except Ball, were able to get in the clear.

In discussing measures to prevent such occurrences, after the roof fall, different methods of turning rooms were explored by the interested parties, and company officials worked out plans to prevent room entrances from being directly opposite entry crosscuts. These plans eliminate the necessity of having several pieces of face equipment and numerous men congregating in small areas; only one room will be turned off an entry at a time and this procedure will become part of the normal developing cycle. Complete adoption of the above measures should prevent similar disasters.

#### CAUSE OF ACCIDENT

The Federal investigators are of the opinion that this roof fall was caused by a combination of conditions as follows:

1. Removal of line timbers from under ends of crossbars adjacent to the new rooms.
2. Failure to provide conventional timbering in the area to compensate for the removal of the line timbers.
3. Disturbance of roof and ribs by removal of loose coal and rock in cleaning the left rib of the entry for the new rooms.
4. Disturbance of roof by cutting, blasting, and installing roof bolts in the area.
5. Failure of officials to comply with the provisions of the roof-bolting permit, which required that a row of 5 bolts be installed within 24 inches of the rib before rooms were turned.
6. Failure of officials and employees to take more than ordinary precautions to prevent a sudden roof collapse in No. 1 entry, after 2 such roof falls occurred previously in the adjacent Nos. 2 and 3 entries.

#### RECOMMENDATIONS

The following recommendations, if properly applied, might prevent accidents of a similar nature in the future:

1. Permanent supports in active working places should not be removed unless equivalent protection is provided, only those supports at intersections should be removed that are necessary for the operation of the face equipment, and supports knocked out accidentally should be replaced promptly. These requirements are particularly needed where weight from the overburden in the mined-out area is transferred through the roof strata to the coal being mined.

2. At least 8 inches of the bolt should be anchored in the main roof (sandstone) with a minimum torque of 150 foot-pounds. Where this provision cannot be complied with, every effort should be made to prevent room entrances from being directly opposite entry crosscuts, and mining methods should be changed sufficiently to eliminate the necessity for large numbers of the employees congregating. The turning of only one room at a time will eliminate congregation and provide better roof-support opportunities.

3. The provisions of the roof-bolting permit should be complied with and roof bolts should be installed on recommended centers lengthwise and crosswise in rooms, entries, and crosscuts. The width of entries should not exceed 16 feet and rooms 25 feet, a row of 5 bolts should be installed to within 24 inches of ribs before intersections are turned, and line posts should be set in all working places and such line posts, if knocked out accidentally by moving equipment, should be replaced promptly.

4. Officials should make a careful investigation of areas where falls have occurred previously at intersections to determine if roof supports were adequate and whether or not bolts used were of sufficient length to anchor satisfactorily. If it is determined that the falls occurred because of inadequate roof support or the bolts not being anchored properly, remedial action should be taken immediately to prevent a recurrence of such falls in other adjacent workings.

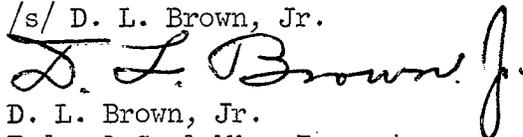
5. Blast holes should not be drilled in the immediate roof in the first cut of coal at intersections and only "coal powder" should be used to charge these boreholes.

#### ACKNOWLEDGMENT

The cooperation of the representatives of the West Virginia Department of Mines and company employees and officials during this investigation is gratefully acknowledged.

Respectfully submitted,

/s/ D. L. Brown, Jr.



D. L. Brown, Jr.  
Federal Coal-Mine Inspector

/s/ W. M. Cordray



W. M. Cordray  
Federal Coal-Mine Inspector (Roof Control)

MULTIPLE FATAL ROOF-FALL ACCIDENT DATA SHEET

1. Name of victim: William B. Bain
2. Mine: Wharton No. 2 Company: Eastern Gas and Fuel Associates, Coal Division  
Location: Barrett, Boone County, West Virginia
3. Date of accident: May 28, 1958 Time of accident: 1:15 p.m.
4. Daily employment: 445 General location of accident: 12 butt 2 south mains
5. Job when injured: Section Foreman Regular job: Same
6. Age: 34 Years experience: Regular job 7 In mines 15
7. Dependents: Widow x Number of children under age 18 4 Others
8. Method of loading in place where accident occurred: Mechanical       x  
Hand into cars or conveyors        Other
9. Location: Face        Room        Haulageway   x   Idle Workings        Other
10. Type of permanent support in use at location where accident occurred:  
Posts   x   Crossbars   x   Bolts   x   None
11. Type of temporary support in use in place where accident occurred:  
Posts   x   Crossbars        Jacks        None
12. Did injury occur in by last permanent roof support? Yes        No       x
13. Distance from last supports to face: Permanent   3-1/2'   Temporary   2'
14. Was standard support plan adopted?   Yes   Was it followed in this place?   No
15. Last prior visit by mine official:   Official present
16. Approximate dimensions of fall in inches: Length   744   Width   192    
Max. Thickness   48     45

MULTIPLE FATAL ROOF-FALL ACCIDENT DATA SHEET

1. Name of victim: Cecil Brown
2. Mine: Wharton No. 2 Company: Eastern Gas and Fuel Associates, Coal Division  
Location: Barrett, Boone County, West Virginia
3. Date of accident: May 28, 1958 Time of accident: 1:15 p.m.
4. Daily employment: 445 General location of accident: 12 butt 2 south mains
5. Job when injured: Roof-Bolter Regular job: Same
6. Age: 46 Years experience: Regular job 7-1/2 months In mines 18 years
7. Dependents: Widow x Number of children under age 18 1 Others
8. Method of loading in place where accident occurred: Mechanical x  
Hand into cars or conveyors          Other
9. Location: Face          Room          Haulageway x Idle Workings          Other
10. Type of permanent support in use at location where accident occurred:  
Posts x Crossbars x Bolts x None
11. Type of temporary support in use in place where accident occurred:  
Posts x Crossbars          Jacks          None
12. Did injury occur in by last permanent roof support? Yes          No x
13. Distance from last supports to face: Permanent 3-1/2' Temporary 2'
14. Was standard support plan adopted? Yes Was it followed in this place? No
15. Last prior visit by mine official: Official present
16. Approximate dimensions of fall in inches: Length 744 Width 192  
Max. Thickness 48 4 5

MULTIPLE FATAL ROOF-FALL ACCIDENT DATA SHEET

1. Name of victim: James Stone
2. Mine: Wharton No. 2 Company: Eastern Gas and Fuel Associates, Coal Division  
Location: Barrett, Boone County, West Virginia
3. Date of accident: May 28, 1958 Time of accident: 1:15 p.m.
4. Daily employment: 445 General location of accident: 12 butt 2 south mains
5. Job when injured: Joy Operator Regular job: Same
6. Age: 38 Years experience: Regular job 7-1/2 In mines 11
7. Dependents: Widow x Number of children under age 18 2 Others
8. Method of loading in place where accident occurred: Mechanical x  
Hand into cars or conveyors  Other
9. Location: Face  Room  Haulageway x Idle Workings  Other
10. Type of permanent support in use at location where accident occurred:  
Posts x Crossbars x Bolts x None
11. Type of temporary support in use in place where accident occurred:  
Posts x Crossbars  Jacks  None
12. Did injury occur in by last permanent roof support? Yes  No x
13. Distance from last supports to face: Permanent 3-1/2' Temporary 2'
14. Was standard support plan adopted? Yes Was it followed in this place? No
15. Last prior visit by mine official: Official present
16. Approximate dimensions of fall in inches: Length 744 Width 192  
Max. Thickness 48 *45*

MULTIPLE FATAL ROOF-FALL ACCIDENT DATA SHEET

1. Name of victim: Harry Hartman
2. Mine: Wharton No. 2 Company: Eastern Gas and Fuel Associates, Coal Division  
Location: Barrett, Boone County, West Virginia
3. Date of accident: May 28, 1958 Time of accident: 1:15 p.m.
4. Daily employment: 445 General location of accident: 12 butt 2 south mains
5. Job when injured: Loading-Machine Operator's Helper Regular job: Same
6. Age: 26 Years experience: Regular job 3 In mines 7
7. Dependents: Widow x Number of children under age 18 3 Others
8. Method of loading in place where accident occurred: Mechanical x  
Hand into cars or conveyors        Other
9. Location: Face        Room        Haulageway x Idle Workings        Other
10. Type of permanent support in use at location where accident occurred:  
Posts x Crossbars x Bolts x None
11. Type of temporary support in use in place where accident occurred:  
Posts x Crossbars        Jacks        None
12. Did injury occur in by last permanent roof support? Yes        No x
13. Distance from last supports to face: Permanent 3-1/2' Temporary 2'
14. Was standard support plan adopted? Yes Was it followed in this place? No
15. Last prior visit by mine official: Official present
16. Approximate dimensions of fall in inches: Length 744 Width 192  
Max. Thickness 48 45

APPENDIX A

VICTIMS OF ROOF-FALL, WHARTON NO. 2 MINE

EASTERN GAS AND FUEL ASSOCIATES, COAL DIVISION

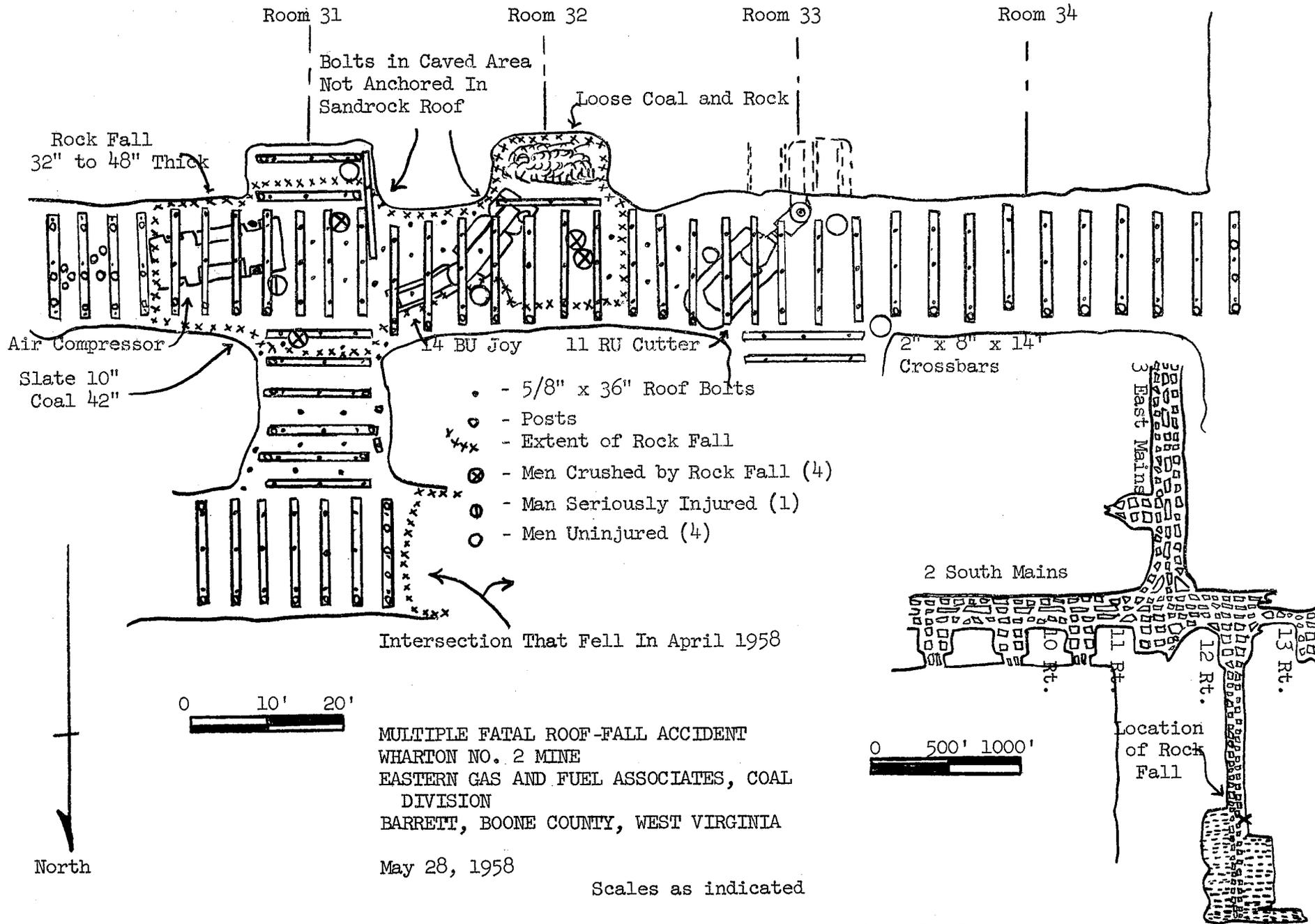
May 28, 1958

<u>Name</u>	<u>Age</u>	<u>Occupation</u>	<u>Marital Status</u>	<u>Number of Dependents</u>
William B. Bain	34	Section Foreman	Married	5
Cecil Brown	46	Roof-Bolt Machine Operator	Married	2
James Stone	38	Loading-Machine Operator	Married	3
Harry Hartman	26	Loading-Machine Operator's Helper	Married	4

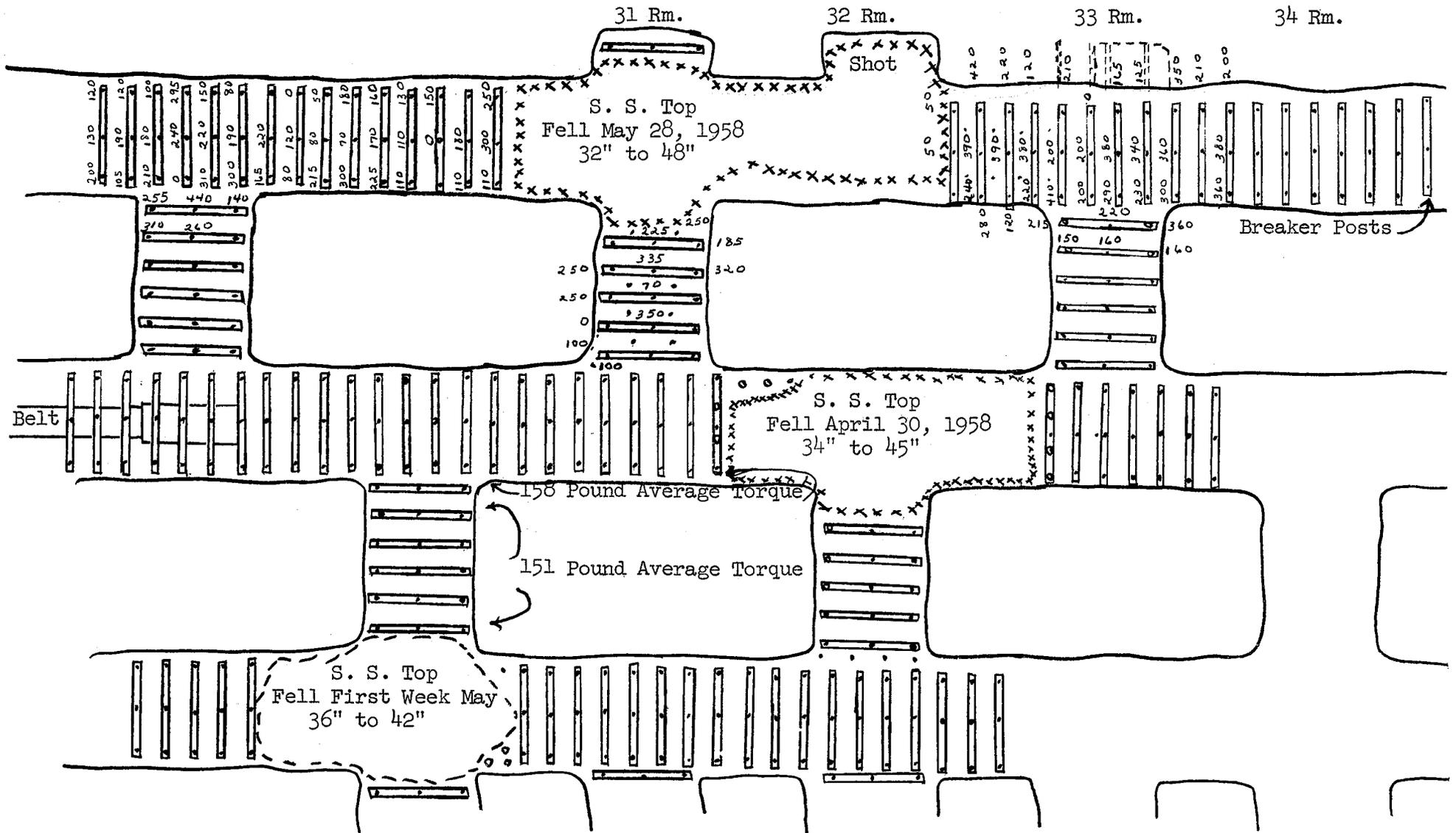
James B. Jarrell, mechanic, was caught underneath the fallen material but escaped unassisted and uninjured.

Hollie Drennen, roof-bolt machine operator, was also caught underneath the fallen material and was rescued about 5 hours and 15 minutes after the fall occurred. He was pinned against the air compressor and received ~~injuries to the right leg.~~  
*injuries*

Cecil Ball, timberman, Albert Gore, mining-machine operator, Luther Gunnoe, mining-machine operator's helper, Edward Walters, shot firer, and Goff Vance and George Walls, shuttle-car operators, were in close proximity of the fall but were not injured.



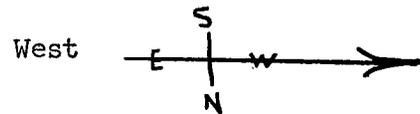
Appendix B



Mined Out

Only Timbering in Vicinity of Accident Shown  
Posts Not Shown

Scale 1" = 20'



TORQUE SURVEY, WHARTON NO. 2 MINE, EASTERN GAS AND FUEL ASSOCIATES, COAL DIVISION  
BARRETT, BOONE COUNTY, WEST VIRGINIA

Appendix C