UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DISTRICT C

FINAL REPORT OF MAJOR COAL-MINE BUMP DISASTER
GLEN ROGERS NO. 2 MINE
RALEIGH WYOMING MINING COMPANY
GLEN ROGERS, WYOMING COUNTY, WEST VIRGINIA

December 9, 1957

By

J. L. Gilley
Mining Health and Safety Engineer

F. J. Furin
Federal Coal-Mine Inspector

and

Thomas Allamon
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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 coal-mine bump occurred at 10:45 p.m., Monday, December 9, 1957, in the main east section of the Glen Rogers No. 2 mine and resulted in the instant death of 5 men and slight injury to 1 employee. The 7 other employees on the section were not injured. The rescue work, led by company officials, was completed at 6:35 a.m., December 10, 1957.

The names, ages, occupations, and number of dependents of the victims are shown in Appendix A.

GENERAL INFORMATION

The Glen Rogers No. 2 mine of the Raleigh Wyoming Mining Company is at Glen Rogers, Wyoming County, West Virginia, and it is served by the Virginian Railway. The names and addresses of the operating officials are:

L. T. Putman	President	Beckley, West Virginia
W. S. Brooks	Underground Superintendent	Glen Rogers, West Virginia
Thomas Chattin	Chief Engineer	Glen Rogers, West Virginia
L. J. Jenkins	Safety Director	Glen Rogers, West Virginia
Francis Harrington	Surface Superintendent	Glen Rogers, West Virginia
J. W. Saxon	Chief Electrician	Glen Rogers, West Virginia
Charles Shepherd	Mine Foreman	Glen Rogers, West Virginia

A total of 290 men was employed; 241 worked underground and 49 on the surface, on 2 shifts a day, 5 days a week, and produced an average of 1,900 tons of coal daily, all loaded mechanically. The production for 1956 was 441,322 tons of coal.

The mine is opened by 6 shafts ranging from 500 to 700 feet in depth; 2 of the shafts serve as air intakes and the others as return airways.

The Glen Rogers No. 2 mine is operated in the low-volatile bituminous Beckley coal bed, which ranges from 48 to 92 inches in thickness in this area. Numerous faults and rolls have been encountered on this property, and the coal bed is undulating but dips about 2 percent northwest.

Localized dispositional changes in the immediate roof were encountered in many areas of the mine. In some parts of the mine the roof immediately overlying the coal bed was comprised of dark gray shales of varying degrees in hardness and ranged from a few inches to 10 feet or more in thickness overlain by a thick stratum of sandstone. In other parts of the mine, massive sandstone, ranging from 53 to 79 feet thick, as indicated by inspection of the logs of 4 boreholes on the property, either contacted the coal bed or was very near to it. The immediate roof in the area involved consisted of 22 inches of irregularly bedded shales that indicated fracture from stress.

The log of a borehole 2,100 feet from the scene of the bump is shown in Appendix D. It will be noted that a stratum of sandstone, 53 feet 2 inches thick, was near the coal and that there are other overlying strata of sandstone present that range up to 89 feet thick.

The floor underlying the coal bed consists of soft dark shale in some areas of the mine and very hard, dense, sandy shale in other areas. The floor in the vicinity of the coal-mine bump is comprised of a very hard, dense, sandy shale that resists yielding (heaving), as indicated by the fact that the floor material did not heave or yield even after the bump occurred.

There is no written record that similar bumps have occurred at nearby mines. However, during the investigation several witnesses stated that they knew of bumps that had occurred previously in the nearby Eccles mine and the worked-out Glen White mine operated in the same coal bed. It was also brought out that several bumps, varying in magnitude, had occurred in this mine without serious injury to employees. Information as to exact dates and location of some of these bumps was not available because no records were kept of their occurrence.

The last Federal inspection of this mine was completed on November 6, 1957.

MINING METHODS, CONDITIONS, AND EQUIPMENT

Mining Methods. The mine was developed by a room-and-pillar method. Main entries were driven in groups of 6, cross entries in groups of 4 at intervals of 2,700 and 3,000 feet, and room entries in groups of 3 or more. Entries and rooms were driven 16 to 18 feet wide, entries were on 75-foot centers; rooms were on various centers ranging from 75 to 100 feet and varied from 250 to 300 feet in depth. Crosscuts were made at intervals of about 80 feet.

Previous mining in the main east area of the mine had either been depleted or abandoned to the extent that the 6 main entries and barrier pillars 200 to 300 feet thick flanking these entries were all that remained to be extracted. (See Appendix B.) When final mining of a pillar is started, it is accomplished by taking a single open-end lift on the back side of the pillar or by alternate open-end lifts, one next to the gob area on the inby side and then another lift from the outby side next to the gob area; however, due to roof falls or other circumstances, this method was not always followed. The recovery of chain pillars in main east depended mostly upon roof conditions or the nature and extent of roof falls encountered.

Systematic methods of roof support were in effect. The roof in 4 sections was supported with conventional timbers, and the roof in the remaining 4 sections was supported by roof bolts or roof bolts used in conjunction with conventional timbers.

Where roof bolts alone were used, the bolts were required to be installed on 4-foot centers and the row of bolts to be staggered and installed to within 24 inches of the uncut faces. Safety posts were required to be used while the bolts were being installed. Where conventional timbers were used in conjunction with the roof bolts, the normal complement or number of roof bolts required by the roof-bolting plan was used. Permanent posts, on 6-foot centers, were to be set along each side of the tracks to within 8 feet of the faces. Where conventional timbering only was used, the plan required that crossbars not more than 6 feet apart be set across the tracks, and posts, on not more than 6-foot centers, be set in the gob areas. A cap piece, 2 by 8 by 16 inches, was required to be used on each gob post, and safety posts were to be kept at each working face during the entire coal-producing cycle.

Roof-bolting was not being done in the section where the bump occurred, but undoubtedly roof bolts could have been used to advantage in the 3 places involved.

Coal is loaded by 8 track-mounted loading machines directly into mine cars. Three sections were on development work and 5 sections were on pillar recovery.

Explosives. The coal was blasted on shift with Airdox by authorized shot firers. Rock was blasted on shift with permissible explosives, fired with permissible blasting units by authorized shot firers. The air lines were suspended from roof bolts or nailed on posts and insulated where they crossed power or trolley wires.

Blow-down valves were provided at suitable locations. The boreholes were placed properly and fired singly immediately after charging and warning was given before shots were fired. Gas and roof tests were made immediately before and after blasting, and searches for fires were made after blasting operations, where permissible explosives were used.

The coal was either top, center, or undercut by track-mounted and shortwall mining machines. The boreholes were drilled by both electric and hydraulic hand-held drills.

Ventilation and Gases. The mine is classed gassy in accordance with the laws of the State. Ventilation was induced by 4 fans exhausting a total of 722,000 cubic feet of air a minute. Each fan was installed on the surface in a fireproof housing, offset suitably, and equipped with the necessary safety devices. A split system of ventilation utilizing 27 air splits, incombustible stoppings and overcasts, air-lock doors, and regulators, was employed in delivering more than 6,000 cubic feet of air a minute to the last open crosscuts of entries and to the intake ends of pillar lines.

At the time of the previous inspection (November 6, 1957) methane was being liberated from this mine at a calculated rate of 2,431,440 cubic feet in 24 hours.

Bleeder entries were provided for each individual pillar section. Substantially constructed line brattice was used from the last open crosscuts, and the working places were ventilated adequately at the close of the last inspection.

Preshift examinations, (including the roof and rib conditions along the active underground roadways and travelways) on-shift, and weekly tests for methane were made and recorded by certified officials. Accessible abandoned parts of the mine were inspected regularly.

Forty permissible flame safety lamps were available at the mine. The lamps were in good condition at the close of the last Federal inspection. The foreman, fire bosses, and other designated employees use the lamps in making gas tests in accordance with requirements. Tests for methane were made with permissible flame safety lamps before electrically-driven equipment was taken into or operated in the face regions and at frequent intervals while such equipment was being operated.

Dust. The mine was wet to dry. An excessive amount of dust was not raised into the air during mining operations. Water was used to allay the coal dust during cutting and loading operations at the working faces and water sprays were installed along the haulageway and at the underground rotary dump. Dangerous coal-dust accumulations were not present in the mine, and the open workings were adequately rock-dusted at the completion of the last Federal inspection.

Transportation. Trolley locomotives were used for main and secondary haulage, and battery-type locomotives were used in the face regions.

Electricity. Electric power, 110, 220, and 2,300 volts alternating and 250 volts direct current, was used on the surface and underground. All underground electric face equipment was of the permissible type and was maintained in permissible condition. The electric equipment consisted of locomotives, mining machines, loading machines, hand-held drills, air compressors, and pumps. Electric power was conducted underground by means of armored cables through boreholes and shafts to the underground substations which were installed in well ventilated fireproof buildings. The trolley, feeder, and other power wires were well installed on insulators. Cut-out switches were provided at regular 2,000-foot intervals in the main power circuits and near the beginnings of the branch lines. The electric equipment and the trailing cables of the portable equipment were provided with suitable overload protection. The trailing cables were of the fire-resistant type, and the temporary splices were made in a workmanlike manner and well insulated.

Illumination and Smoking. Permissible electric cap lamps were used for portable illumination and smoking was prohibited underground.

Mine Rescue. Personnel at the Glen Rogers No. 2 mine have not been trained in mine rescue and first aid within recent years. State-maintained mine rescue stations are available at Tralee and Kopperston, West Virginia, about 30 miles distant. Adequate fire-fighting facilities are available on the surface and underground.

STORY OF COAL-MINE BUMP AND RECOVERY OPERATIONS

Activities of Bureau of Mines Personnel. W. R. Park, district supervisor, was notified of the occurrence at 12:05 a.m., December 10, 1957, by a telephone message from an official of the company. Park contacted F. J. Furin and Thomas Allamon, coal-mine inspectors, immediately and instructed them to proceed to the mine. The 2 men arrived at the mine at 1:40 a.m., and they, together with a group pf State Department of Mines and company officials, entered the mine at 2:00 a.m., and arrived at the affected section about 2:30 a.m.

Messrs. W. R. Park and W. M. Cordray arrived at the mine at 8:00 a.m., the same day and conferred with State and company officials relative to the investigation of the accident.

Mr. J. L. Gilley, mining health and safety engineer, who is assigned to the study of coal-mine outbursts and who was in Harlan, Kentucky, was notified at 5:50 a.m., on December 10, 1957, by Mr. W. R. Park to proceed to the mine and arrived at 1:30 p.m., that day. Park, Gilley, Furin, and Allamon assisted with the underground investigation and official hearing to determine the cause of the bump.

<u>Mine Condition Prior to Coal-Mine Bump</u>. At the time of the coal-mine bump, blasting of coal, cutting, or mechanical loading operations were not actually in progress. Reportedly, 20 to 30 minutes had elapsed since cutting or blasting operations were performed, but the length of time the loading machine was idle immediately prior to the bump could not be definitely established. The loading machine had been moved into the face of No. 2 room crosscut and the machine operator and his helper were cleaning up loose coal with shovels along each side of the machine, which had been moved about 12 feet back from the face when the gathering locomotive arrived from the sidetrack with 5 empty cars. The preparation crew and the cutting-machine crew were, as explained later on, preparing the No. 3 room face for cutting and blasting. Conditions within the active workings, from statements of witnesses, appeared normal. Essentially similar statements by witnesses were that small bumps (bumping) incidental to normal pillar extraction in this coal bed had occurred during this and the recent previous shifts.

Mining of coal in the area involved in main east was started about November 15, 1957. Three places, designated from left to right, as Nos. 1, 2, and 3 rooms, were being driven on 75-foot centers into a 300-foot thick barrier pillar between the main east entries and an extensive mined-out area flanking this barrier pillar on the left. To the right and paralleling these rooms, 2 other openings had been driven as indicated in Appendix B, about 17 years previously. These 2 openings serve as bleeders for parts of the inby mined-out areas.

From Appendix B, it will be noted that No. 1 room had advanced about 230 feet, the No. 2 room approximately 250 feet, and the No. 3 room about 190 feet into the barrier block. However, in starting these rooms it was decided that, rather than clean up the rock in the No. 6 main east entry, a sub-entry would be driven and the 3 rooms developed as shown in Appendix B. The No. 1 room was started first and the sub-entry was turned to the right off No. 1 room and driven parallel with the No. 6 main east entry until it intersected the first bleeder entry. Subsequently, Nos. 2 and 3 rooms were turned off the sub-entry, but inasmuch as the No. 3 room was the last to be turned, it lagged behind Nos. 1 and 2 rooms.

The company officials stated that to their knowledge the worked-out area toward which the 3 places were being driven was pillared successfully, but to the right of the 3 developing rooms, considerable difficulty was encountered and that several pillars and remnants of pillars were left unmined.

In recovering the large barrier pillar, the plan was to drive the 3 rooms through to the mined-out area or old gob line ahead and then establish a pillar line. The plan included the possible removal of pillars between the old bleeder opening and the inby mined-out area, if roof conditions permitted, otherwise, these pillars were to be abandoned.

On the date the accident occurred, the second shift entered the mine at 4:00 p.m. The main east crew of 13 men, including the foreman, arrived on the section about 4:30 p.m. The section foreman stated that on leaving the man-trip, he visited each of the 3 working places and returned to the man-trip station where a brief safety meeting was held before assigning the men to their respective duties. The loading-machine crew was instructed to proceed to No. 1 room and load out the remainder of a cut of coal that was left from the previous shift. After the coal in the No. 1 room was loaded, the loading machine broke down as it was being trammed to No. 3 room. Later another loading machine was brought in from the shaft bottom; however, the trailing cable on this loading machine was too short and it was necessary to splice a length of cable to it in order to reach the face of No. 3 room. The loading-machine crew loaded the cut of coal in No. 3 room, and in the meantime, the cutting-machine and preparation crews had cut and prepared the faces of No. 1 room and No. 2 room crosscut. Inasmuch as it was nearing quitting time, the foreman stated that he instructed the loading-machine crew to take the loading machine in No. 2 room crosscut, instead of in the No. 1 room. Also at this time, the foreman sent the cutting-machine and the preparation crews into No. 3 room to prepare this place for cutting and blasting. The preparation crew and the machine crew set 3 crossbars, and while the preparation crew was extending the track to the face of the No. 3 room, the cutting-machine operator and his helper drilled 3 holes in the face of the place. After drilling the 3 holes, they walked back and were placing the drill on the cutting machine parked about 30 feet back from the face when the bump occurred. The shot firer standing near the front end of the machine and about 5 feet outby 1 of the members of the preparation crew who was killed, miraculously escaped injury.

The gathering-locomotive brakeman stated that 3 cars of coal had been loaded from the No. 2 room crosscut, and when the locomotive returned from the sidetrack with 5 empty cars the loading-machine crew had signaled the brakeman to stop the trip until they had finished cleaning up the loose coal.

Estel Spence, the section foreman, stated that because of the delay from the break-down incurred with the loading machine, he was late in eating his lunch, and while he was at the "dinner hole" (approximately 300 feet from the face of No. 1 room) sitting on a box eating a sandwich, the bump occurred. He said the concussion apparently must have knocked him off the box he was sitting on. He further stated that the dust in suspension was so dense he could not see, but he started immediately toward the faces to account for his men. On his way in, he met the cutting-machine operator who told him that a fall of rock had occurred in No. 3 room and that the preparation crew had been caught underneath it. He said he went into No. 2 room crosscut and then into No. 3 room and called to the men, but when he did not get an answer to his repeated calling, he notified the surface about the bump and the men being caught.

The stress wave released was rather intense, and reportedly the tremor was perceived by persons on the surface within a radius of 2 miles from the scene. The greatest forces were released in No. 2 room and in the No. 2 room crosscut, but effects of the bump were evident in each of the other 2 rooms; however, the intensity was least pronounced in No. 1 room. Considerable damage was done to the loading machine by the collapse of a large section of roof rock that ranged from 22 to 49 inches in thickness, 16 feet in width, and 35 feet in length. Several roof supports were broken and dislodged and line brattices were dislodged near the faces of the 3 rooms. The section of roof detached in No. 3 room was about 25 feet long and ranged from 2 to 33 inches thick. As previously mentioned, a dense cloud of dust was thrown into suspension, but methane, according to the section foreman, was not released by the bump; however, explosive percentages of gas were detected in the face of No. 2 room and in the No. 2 room crosscut during the official investigation on December 11. The ventilation was improved and the gas-air mixture was reduced satisfactorily during the investigation.

INVESTIGATION OF CAUSE OF COAL-MINE BUMP

The official investigation of the disaster was conducted on December 11, 1957, by the following persons:

West Virginia Department of Mines

C. M. Meadows	Assistant to the Chief
Jay A. Philpott	Inspector-at-Large
Lelan Phillips	Coal-Mine Inspector
O. W. Trent	Coal-Mine Inspector

Company Officials

L. T. Putman	President
W. S. Brooks	Underground Superintendent
Charles Shepherd	Mine Foreman
Thomas Chattin	Chief Engineer
L. J. Jenkins	Safety Inspector

United Mine Workers of America

James Leeber, Jr.	Safety Engineer, District 29
Leighton Farley	Field Representative, District 29

United States Bureau of Mines

W. R. Park	District Supervisor
J. L. Gilley	Mining Health and Safety Engineer
F. J. Furin	Federal Coal-Mine Inspector
Thomas Allamon	Federal Coal-Mine Inspector

A hearing was conducted in the main office at Glen Rogers on December 12, 1957, at which time witnesses and mine officials were interrogated relative to the disaster. At this hearing it was decided that State, Federal, and company officials would meet in the very near future for the purpose of discussing and planning a safe and practical method of extracting the coal in the main east territory. It was further decided at this hearing that mining of the large barrier pillar involved would be discontinued until an acceptable plan or method of mining the large barrier pillars was decided upon and put into effect. Work in preparing plans for mining the vulnerable areas was started within a few days following the investigation. The final plans were discussed with all interested parties and were unanimously approved.

Natural Conditions, Mining Methods and Practices as Factors in the Coal-Mine Bump. The topography on this property is rugged and the higher mountains reach 2,700 feet in elevation, and some of them exceed 800 feet in relief. The maximum cover over the main east barrier pillar where the bump occurred is 1,415 feet and the elevation at this location is about 1,240 feet, therefore, the roof pressure in that area is approximately 138 tons per square foot. Circumstances under which coal-mine bumps have occurred in this mine is evidence that a combination of natural conditions favoring such occurrences exist in certain areas. Obviously, this combination in conjunction with other factors that tend to accentuate rather than minimize over-stressing or impingement of forces in active pillar areas is likely to cause coal-mine bumps. Therefore, this warrants that every precaution should be taken to avoid, insofar as possible, these critical areas through proper mining methods and practices.

Investigation revealed that the thick massive sandstone roof inby and outby the large barrier pillar being mined had not caved and, in all probability, it could not cave as desired, because of incomplete extraction inby. It was further noted that the mine floor in the area involved was a hard, dense, sandy shale that resisted heaving. Combination of these factors undoubtedly subjected certain areas of the large barrier block, particularly along the back or gob side, to high stresses that extended for considerable distances within the block. From Appendix B, it will be noted that the 3 rooms were being driven in the manner and direction as indicated on 75-foot centers in the large barrier pillar and this development was being done toward an old gob area within the front abutment or highly stressed area of the block. When the faces of these places reached this highly stressed area, a coal-mine bump occurred with considerable force and mostly in the direction as indicated in Appendix C.

It will be further noted from Appendix B, that the method of development in many instances in main east resulted in the formation of several blocks of coal much larger in dimensions and different in shape than the surrounding coal pillars. Furthermore, the method used in recovery of coal pillars in the main east area had been governed in most instances by conditions or expediency, consequently complete recovery of pillars was not striven for as a requirement. The consequence is that several complete pillars and numerous remnants of coal pillars remain unmined in the gob areas. The large blocks, as in the case of the large barrier pillar involved, were not always developed systematically and sufficiently in advance of the extraction line before becoming part of the active pillaring area. Obviously, this method is not in accordance with best mining practices and often results in bumps, if conditions conducive to such occurrences are present when an attempt is made to mine them.

From all indications, this coal-mine bump was the result of an imposition of a shock load of considerable magnitude onto a large barrier pillar of coal, a portion of which was already highly stressed, when a break or fracture occurred high up in the overlying strata above the coal bed. The shock wave evidently traveled downward through the strata until it reached the 22 inches of soft fractured shale intervening between the coal bed and the main sandstone roof where the forces were expended, particularly in the No. 2 room face, No. 2 room crosscut, and No. 3 room. This being the case, the forces coming out of the extensively fractured shale stratum dislodged the roof supports and caused the roof in the faces of No. 2 room, No. 2 room crosscut, and No. 3 room to collapse with considerable force. In some instances the fragmentation of the shale roof from the forces of the bump resembled rock that had been blasted with explosives. Very little coal, however, was thrown out from the ribs in these places. The mine floor, insofar as could be determined, was not affected by the bump.

It is well to reiterate that several coal-mine outbursts have occurred in this mine during the past few years; one of the most severe occurred slightly to the right of and about 400 feet inby the location where the one occurred on December 9, 1957.

Summary of Evidence. A summary of evidence is as follows:

1. Natural conditions, favoring coal-mine bumps, consisting of 1,415 feet of cover, a main roof of thick massive sandstone close to

the coal, and a hard, dense, sandy shale floor that resisted yielding were present in the area involved.

2. The mining system used in main east was not in accordance with best practices from a coal-mine bump aspect, in that the mining plan did not incorporate a definite system for the development and extraction in sequence of the large barrier pillars flanking the entry chain pillars nor the extraction of the chain pillars in proper sequence.

3. Many of the pillars were not reasonably uniform in size or shape.

4. The failure to follow a systematic method in recovering pillars resulted in many pillars and remnants of pillars being left in the gob areas, a factor that either retarded caving or prevented establishment of a breakline to alleviate stressing of individual pillars.

5. Three rooms were being driven (secondary development) directly toward an old goaf within a highly stressed area (front abutment zone) of a large barrier coal pillar.

6. The large barrier pillar block involved was not developed nor divided into pillars of adequate dimension and approximately similar in shape sufficiently in advance to minimize high stressing of certain areas within the block and thus make the coal less hazardous to recover from a bump aspect.

7. Improper sequence of extraction of the pillar blocks in the main east accentuated rather than minimized unit mining stresses.

8. Bumps, of more or less magnitude or intensity, had occurred previously in the main east territory.

CAUSE OF ACCIDENT

It is the opinion of the investigators of the Bureau of Mines that this catastrophe was caused by a combination of existing conditions as follows:

A large barrier coal pillar situated next to an extraction area and flanked on one side by an old gob area from which the coal had been extracted about 13 years previously had not been developed sufficiently in advance into blocks of adequate dimensions and comparable in shape prior to its becoming essentially a part of a pillar line so as to minimize concentration of forces induced by the retreating abutment loading; the inby portion of this block was projecting into the goaf (mined-out area), thus accepting a major portion of the load; and 3 rooms were being driven directly toward an old goaf into this portion of this large block.

RECOMMENDATIONS

The following recommendations are submitted in the belief that, if followed, the number and severity of coal-mine bumps at this and other mines operating in this same coal bed may be minimized or eliminated entirely:

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

2. The mining system should require that the coal pillars be developed as nearly uniform in size and in shape, as practicable, sufficiently in advance of the extraction line (150 to 200 feet) so as to minimize overloading of individual pillars.

3. To assist the roof in caving, complete extraction should be striven for, and pillar remnants that tend to retard caving should not be left in the goaf. If it is not possible to recover a pillar remnant that is of such size as to delay caving, then its load-carrying capacity should be destroyed by blasting.

4. In pillar recovery in areas where massive sandstone roof is near or immediately over the coal and resists caving and where the floor is hard and resists yielding, every effort should be made to extract the coal pillars in a manner that will permit orderly distribution of induced mining stresses.

5. Under no circumstances should secondary development (such as driving rooms, crosscuts, or pillar pockets) be advanced toward the gob in coal pillars within the abutment zone.

6. A thorough study should be made of all coal-mine bumps regardless of the consequence and written records kept of their occurrence.

7. Pillars extracted and pillars or parts of pillars that are not recovered should be indicated accurately on the mine map.

ACKNOWLEDGMENT

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

Respectfully submitted,

/s/ J. L. Gilley

J. L. Gilley
Mining Health and Safety Engineer

/s/ F. J. Furin

F. J. Furin
Federal Coal-Mine Inspector

/s/ Thomas Allamon

Thomas Allamon
Federal Coal-Mine Inspector

Approved by:

/s/ W. R. Park

W. R. Park
District Supervisor

APPENDIX A

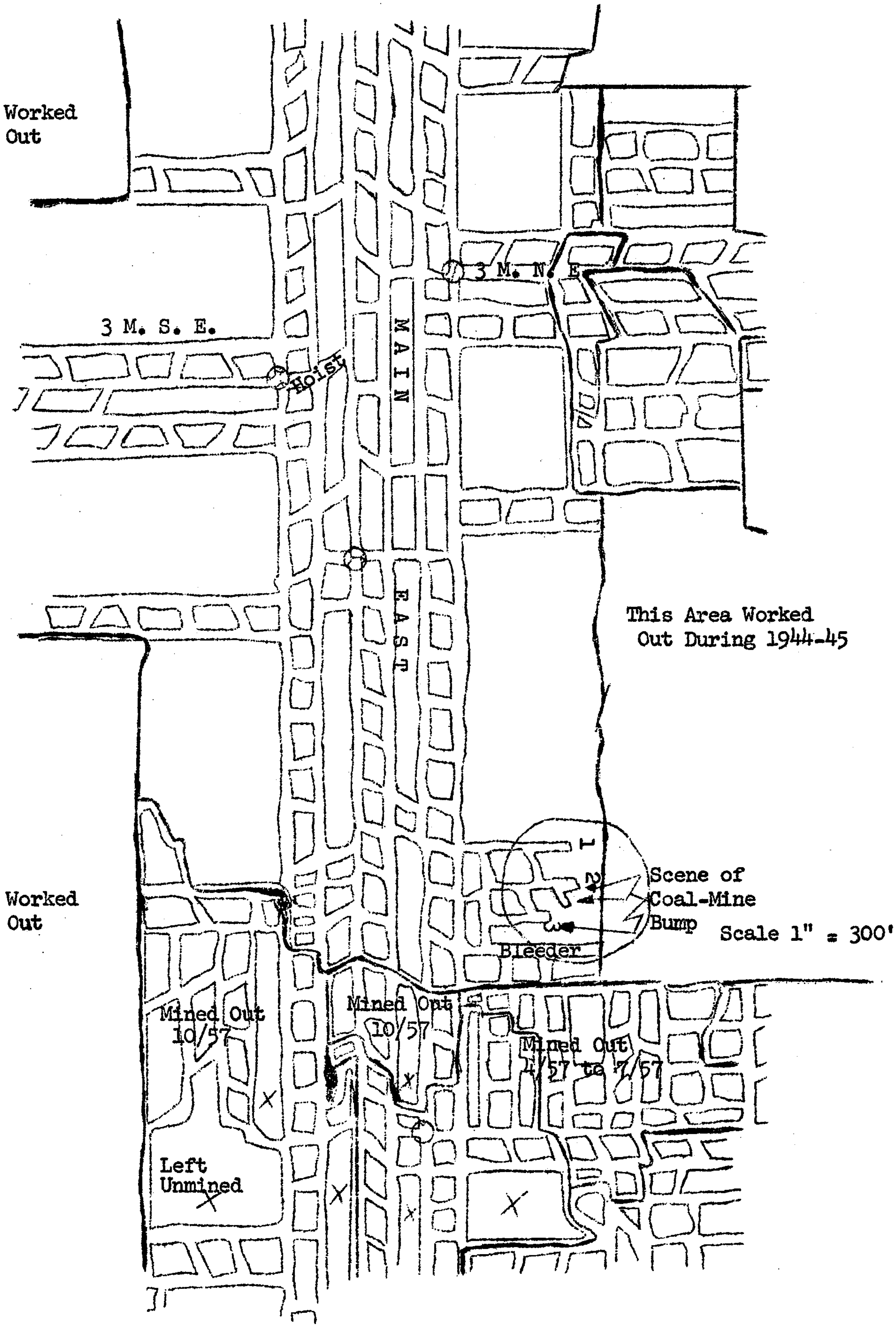
Victims of Coal-Mine Bump Glen Rogers No. 2 Mine

Raleigh Wyoming Mining Company

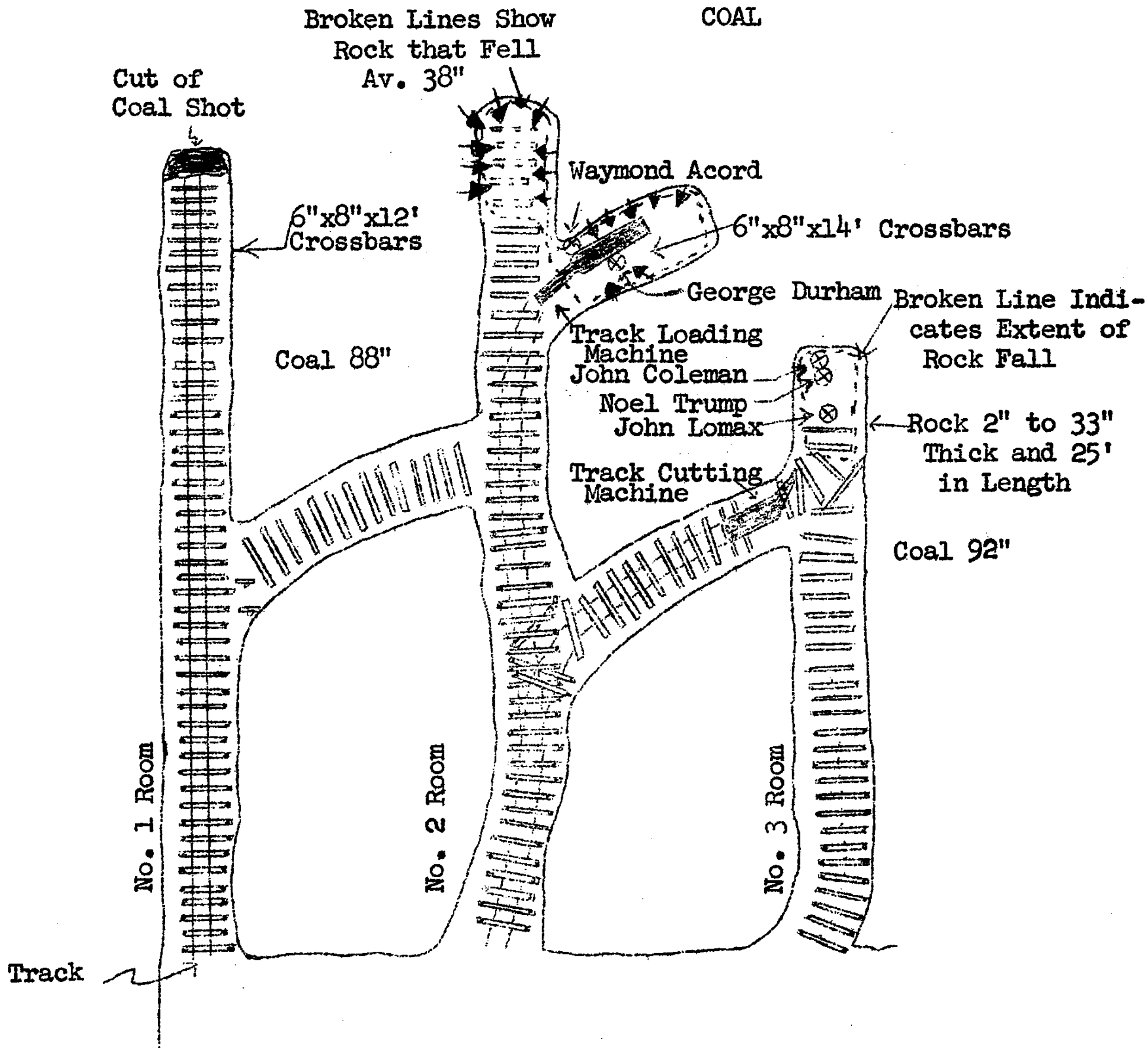
December 9, 1957

Name	Age	Occupation	Marital Status	Children Under 18 Years of Age
Waymond C. Acord	45	Loading-Machine Operator's Helper	Married	None
John Coleman	52	Timberman	Married	None
George C. Durham	31	Loading-Machine Operator	Married	3
John E. Lomax	36	Timberman	Married	5
Noel Trump	51	Trackman	Married	4

APPENDIX B


Worked
Out
3 M. N. E.
3 M. S. E.
Hoist
MAIN
EAST
This Area Worked
Out During 1944-45
1
2
3
Scene of
Coal-Mine
Bump
Scale 1" = 300'
Bleeder
Worked
Out
Mined Out
10/57
Mined Out
10/57
Mined Out
4/57 to 7/57
Left
Unmined

APPENDIX C



Entry and Rooms Timbered with 6" x 8" x 12' Crossbars on 3' Centers

NOTE - Heavy arrows indicate direction of forces.

MAJOR COAL-MINE BUMP DISASTER
GLEN ROGERS NO. 2 MINE
RALEIGH WYOMING MINING COMPANY
GLEN ROGERS, WYOMING COUNTY, WEST VIRGINIA

December 9, 1957

Scale 1" = 40'

APPENDIX D

Diamond Drill Hole on Brush Camp Hollow Over 3 Main Southeast - No. 2 Power Hole.

Depth Below Surface

Sandstone Gray	19'-9"	275'-7"
Sandstone Gray	42'-8"	354'-8"
Sandstone White Hard	89'-0"	469'-1"
Sandstone White Hard	58'-5"	540'-5"
Sandstone	25'-8"	591'-5"
Shale Dark with Coal Streaks	0'-10"	665'-0"
Bone Coal	0'-8"	665'-8"
Fire Clay Shaley	2'-10"	668'-6"
Shaley Sandstone	3'-3"	671'-9"
Sandstone Gray	16'-6"	688'-3"
Sandstone Gray with Shale and Coal Streaks	3'-3"	691'-6"
Shale Dark	2'-9"	694'-3"
Shale Gray Sandy	2'-7"	696'-10"
Shale Dray with Sandstone Streaks	21'-5"	718'-3"
Sandstone Gray	4'-6"	722'-9"
Sandstone Gray with Shale Nodules	1'-1"	723'-10"
Sandstone Gray	2'-4"	726'-2"
Coal	2'-2"	728'-4"
Shale Dark	0'-10"	729'-2"
Sandstone Gray with Fine Shale Streaks	12'-3"	747'-5"
Shale Dark with Sandstone Streaks	12'-6"	759'-11"
Shale Dark Sandy	31'-0"	790'-11"
Shale Dark with Sandstone Streaks	14'-0"	804'-11"
Shale Dark	5'-0"	809'-11"
Coal	0'-4"	810'-3"
Shale Gray	0'-11"	811'-2"
Sandstone Gray with Shale Streaks	13'-2"	824'-4"
Shale Dark	0'-10"	825'-2"
Sandstone Gray	1'-7"	826'-9"
Shale Dark with Sandstone Streaks	0'-11"	827'-8"
Sandstone Gray	7'-5"	835'-1"
Sandstone Gray with Coal Streaks	0'-6"	835'-7"
Shale Dark Sandy	10'-10"	846'-5"
Sandstone Gray with Shale Streaks	1'-10"	848'-3"
Shale Dark	1'-0"	849'-3"
Shale Dark Soft with Coal Streaks	0'-10"	850'-1"
Shale Dark Sandy	1'-2"	851'-3"
Sandstone Gray with Shale Laminated	1'-7"	852'-10"
Sandstone Gray	53'-2"	906'-00"
Shale Sandy	4'-6"	910'-06"
Shale Dark	0'-6"	911'-06"
Beckley Coal		