CAI-2005-09

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Fall of Roof Accident
June 10, 2005

at

Tracy Lynne
Rosebud Mining Co
Apollo, Armstrong County, Pennsylvania
ID No. 3608603

Accident Investigators

Nevin J. Davis
Coal Mine Safety and Health Inspector

Joseph W. Trybus
Coal Mine Safety and Health Inspector (Roof Control)

Thomas H Whitehair II
Coal Mine Safety and Health Inspector (Roof Control)

Sandin E. Phillipson, PHD
Mining Geologist

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District 2
319 Paintersville Road
Hunker, Pennsylvania 15639
Cheryl McGill, District Manager

Release Date: 08/23/05

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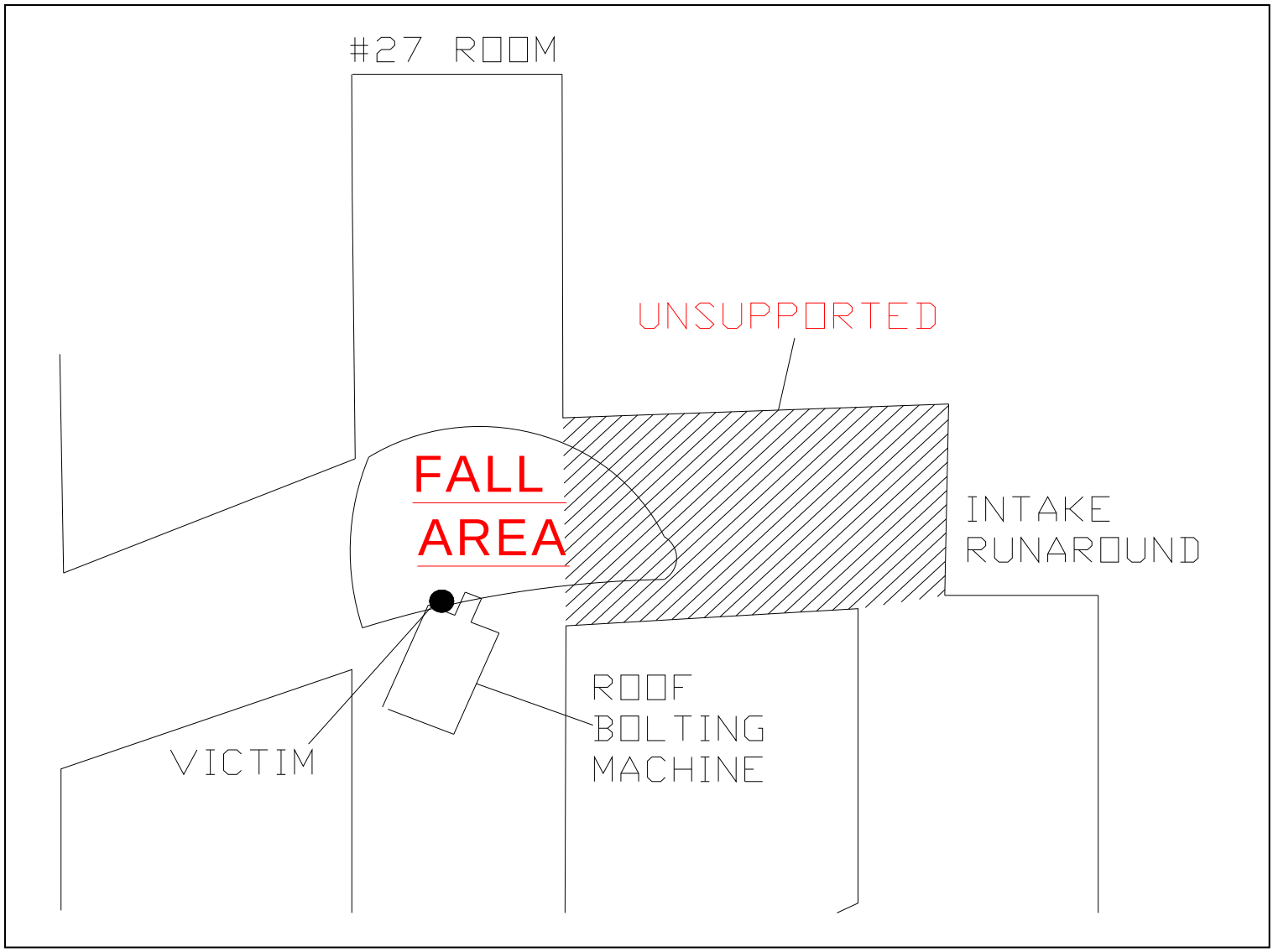
-ACCIDENT SITE



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OVERVIEW

At approximately 5:50 p.m. on Friday, June 10, 2005, Boyd A. Beer Jr., a 26-year old roof bolter operator, with 14 months of mining experience, was fatally injured when a roof fall occurred in the No. 27 room intersection of the 3rd East Butt section. The accident occurred while the victim was installing 6-foot resin grouted roof bolts into the mine roof of the previously supported intersection. The mine roof in the intersection was originally supported with 36-inch resin grouted roof bolts. A visual roof defect (horseback) extended up and into the immediate roof strata for a distance of approximately five feet in depth.

The accident occurred as a result of management's failure to address the obvious defective roof condition which would have prompted additional safety precautions to be taken in the No. 27 Room intersection of the 3rd East Butt Section.

GENERAL INFORMATION

The Tracy Lynne mine, operated by Rosebud Mining Co., is located along Brownstown Road, in the city of Apollo, Armstrong County, Pennsylvania. The mine is opened by three drifts into the Lower Kittanning coalbed. The coal seam has a maximum 432 feet of cover and ranges in thickness from 44 to 57 inches. Employment is provided for 30 persons underground and three persons on the surface. The mine works two production shifts and one maintenance shift, five days per week. One continuous mining machine section produces an average of 1,660 tons of coal a day. Coal is transported from the face by continuous haulage and discharged onto a belt conveyor. The belt conveyor transports the coal to the surface. Coal is transported by truck to power-generating stations.

The principal officers for the mine at the time of the accident were:

Jerry Hefferan .....Manager of Mines
Paul Agnello.....Superintendent/Mine Foreman
Dave Sharkins..... Manager of Maintenance

Prior to the accident, the Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection on March 11, 2005. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine in 2004 was 14.20, compared to the National NFDL rate of 5.45.

DESCRIPTION OF ACCIDENT

On June 10, 2005, the afternoon Section Foreman, Robert Brink, entered the mine at approximately 2:00 p.m., and traveled to the active 3rd East Butt working section, at which time he had a discussion with Wendall Shick, Day Shift Section Foreman, about general section conditions. Everything was reported to be normal. The afternoon shift crew consisting of nine persons entered the mine at their regularly scheduled starting time of 2:30 p.m. The crew traveled from the surface to the 3rd East Butt working section, mechanized mining unit (MMU) 007-0, via battery-powered rubber-tired personnel carriers. They arrived on the section at approximately 2:55 p.m.

Clean-up and rock dusting of the section was being completed by the day shift production crew, while the afternoon shift prepared for mining. Production was started by the afternoon shift crew, in the return runaround room, at approximately 3:15 p.m.

While conducting routine examinations of the working section Brink observed a defect in the roof strata in the No. 27 intersection. He tested the roof and checked an approximately 51 inch test hole finding no separations or indications of loose roof.

After mining five cuts throughout the section, the crosscut from 27 Room to the intake runaround room was mined to a depth approximately 35 feet creating a 9-foot opening into the intake runaround. After mining was complete, Boyd A. Beer Jr. (victim) began to support the newly exposed roof using 36-inch resin grouted bolts. Beer installed three roof bolts and then reported to Brink, in the No. 26 room (belt), that he had drilled a test hole and had detected a separation in the roof at approximately five feet in depth. Brink instructed Beer to back up and start installing 6-foot bolts. Beer returned to 27 Room, repositioned the bolting machine and began installing 6-foot bolts in the previously supported intersection.

Brink was in the No. 26 room when he heard a noise that sounded similar to the sudden dropping of a scoop bucket onto the mine floor. He immediately traveled to the intersection of the No. 27 room, where he discovered a roof fall covering the front and left side of the roof bolting machine but did not see Beer. He yelled several times for Beer and received no response. Closer inspection of the area revealed Beer's hard hat next to the fallen roof materials. Brink traveled to the mine phone where he contacted Paul Agnello, Superintendent/Mine Foreman, to inform him that roof fall had occurred and he believed Beer was under the fall and that the roof was still working. Agnello instructed Brink to get timbers and move everybody outby the fall area. Agnello traveled underground and arrived at the accident site to direct recovery operations. Additional roof supports consisting of posts and cribs were installed to protect the rescue workers. A scoop tractor was used to lift the rock from Beer. At approximately 9:30 p.m., Beer was transported to the surface, where he was pronounced dead at 10:30 p.m. by Robert Bowers, Armstrong County Coroner. Beer was transported by the Oklahoma Volunteer Fire Department Ambulance Service to the Armstrong County Memorial Hospital where an autopsy was to be performed.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at approximately 6:10 p.m. on June 10, 2005, by a telephone call from Paul Agnello, Mine Superintendent, to Anthony Colicchia, Mine Inspector. An investigation was started the same day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of the mine employees, Pennsylvania Bureau of Deep Mine Safety, MSHA Technical Support, MSHA Education and Field Services, and the Armstrong County Coroner's office. Fourteen persons were interviewed during the course of the investigation.

DISCUSSION

The following is a discussion of the relevant factors identified during the accident investigation.

METHOD OF MINING

The 3rd East Butt section consists of a 3-room development, along with return and intake runaround rooms. A Joy 14-10AA-CM continuous miner, and a single mobile bridge unit with two bridge carriers, were being used in development. Rooms and crosscuts were driven a maximum of 20 feet wide. Room centers of 65 feet, and crosscut centers of 60 feet, resulted in pillar sizes of roughly 45 feet by 40 feet. The section was ventilated with a single split of blowing ventilation.

A deep cut was mined approximately 35 feet in the crosscut from the No. 27 room intersection into the intake runaround room by the afternoon shift, which created a 4-way intersection. Testimony obtained during interviews indicated the roof in this intersection contained a visual defect. A similar roof defect was recognized in the No. 26 Room which prompted the afternoon shift mining crew to limit the cut depth to 20 feet adjacent to the area where the condition existed.

GEOLOGIC CONDITIONS

The immediate roof generally consisted of gray shale ranging in thickness to 20 feet. However, as observed in the general vicinity of the accident site, the roof fall was sharply defined by two intersecting slickenside zones. The first slickenside zone represents a "drag fold" that was traced across the entire mining section, from the intake runaround,

through rooms 25-27. The 2nd slickenside zone represents a fault. Where the two zones intersect, a large wedge (commonly referred to as a horseback) was defined above the 27 room intersection. The roof fall cavity formed when the wedge dropped out of the roof.

The roof fall material fell out along a slickenside fault surface. The triangular-shaped wedge, bounded by the slickensides, was estimated to be approximately 26 feet in length, tapering from 15 feet to 13 feet in width, at the base, and tapering from five feet to less than one foot in height, along its length. The roof fall material, which consisted of recrystallized black shale, was estimated to weigh approximately 39 tons.

ROOF CONTROL PRACTICES

The mine roof on the section was typically supported with 36-inch, fully grouted resin roof bolts, installed on a 4-foot crosswise by 4-foot lengthwise pattern. In the intersection of the accident site, 36-inch fully grouted resin bolts were initially installed to support the roof. At the time of the accident, 6-foot fully grouted resin roof bolts were being installed as supplemental supports, due to separations detected during the drilling of a test hole.

The single boom DBT LRB-15AR roof bolting machine involved in the accident was located on the outby side of the last intersection in the No. 27 room. It appeared only one side of the ATRS was under the area of the roof that fell due to the angle of the roof bolting machine. This caused the ATRS structure to be twisted and damaged.

The No. 27 room intersection (3-way) was originally mined by the daylight shift, on June 10, 2005. A visual roof defect was observed and a test hole drilled in the intersection which did not show any separations in the roof strata. The entire intersection was supported, utilizing 36-inch resin grouted roof bolts. A 4-way intersection was then created when the afternoon shift mined from 27 Room to the intake runaround.

Visual roof defects similar to the defect in the No. 27 Room were also observed in the Nos. 25 and 26 Rooms. These areas contained 42 and 72-inch roof bolts as supplemental support in addition to the normal 36-inch roof bolts installed throughout the section.

WORKPLACE EXAMINATIONS

Interviews with both day and afternoon shift production crew members indicated that a visual roof defect which was inconsistent with normal roof conditions was recognized in the Nos. 25, 26 and 27 Rooms which was generally similar in size and magnitude. The condition was recognized as an area that required additional precautions in the Nos. 25 and 26 Rooms based on the fact that supplemental supports were installed and the depth of cut was limited.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident that were correctable through reasonable management controls. During the analysis, causal factors were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below are causal factors identified during the analysis and their corresponding corrective actions implemented to prevent a recurrence of the accident:

1. *Causal Factor:* The standards, policies, and administrative controls in use at the mine did not ensure that supplemental roof supports were installed according to the approved roof control when a visual defect in the roof was evident.

   Corrective Action: The roof control plan was reviewed and explained to all employees prior to mining being resumed. Special emphasis was placed on recognizing hazards and roof defects in the roof in conjunction with the importance of installing supplemental roof supports according to the approved roof control plan.

2. *Causal Factor:* The standards, policies, and administrative controls in use at the mine did not ensure that deep cuts were not taken off of areas where defective roof exists. A deep cut was taken from the 3-way intersection in No. 27 Room to the intake runaround which also created a 4-way intersection in the area of the roof defect.

   Corrective Action: The roof control plan was reviewed and explained to all employees prior to mining being resumed. Special emphasis was also placed on the importance of limiting cut depth adjacent to areas with defective roof conditions.

3. *Causal Factor*: A review of examinations for hazardous roof conditions conducted prior to the accident on the 3rd East Butt Section indicated that hazardous conditions were not addressed or recorded in the preshift record book. An evident visual defect was present in the mine roof of the No. 27 Room intersection and this condition was not corrected or recorded to alert the oncoming shift foreman to hazardous conditions. The record could have prompted actions by mine management in response to the uncorrected hazardous condition.

   Corrective Action: The certified persons making the examination should be trained to properly identify, make the appropriate corrections, and record all hazardous conditions. Mine management should develop and follow procedures to identify and correct any and all hazardous conditions and to notify all persons affected by the conditions.

CONCLUSION

The accident occurred as a result of management's failure to address the obvious defective roof condition which would have prompted additional safety precautions to be taken in the No. 27 Room intersection of the 3rd East Butt Section.

ORIGINAL SIGNED BY AUGUST 22, 2005
Cheryl McGill
District Manager

ENFORCEMENT ACTIONS

The following citations/orders were issued due to conditions revealed during the investigation:

1. A 103 (K) order was issued to ensure the safety of all persons in the mine until an investigation was completed and all areas and equipment were deemed safe

2. A 104 (d) (1) citation was issued for a violation of 30 CFR 75.220 (a) (1). Two (2) deep cuts, approximately 35 feet in depth, were mined off the No. 27 intersection on 06/10/2005 where subnormal roof conditions were present. This subnormal roof had been observed by the day shift roof bolter operator and by the afternoon shift section foreman. The first deep cut was mined from this intersection into the straight of the No. 27 room by the day shift production crew. The second deep cut was mined from the intersection into the intake runaround room by the afternoon shift production crew. Safety Precaution No. 11, page 22 of the approved roof control plan, requires that "when subnormal or adverse roof conditions are encountered, the depth of the cut will be limited to 20 feet or less until roof conditions have improved to a point where extended cuts may be resumed. Two 20-foot cuts will be taken and permanently supported in good (normal) roof and the roof evaluated by the mine foreman or section foremen before extended cuts are resumed (predominate slips, cutters, or clay veins)."

3. A 104 (d) (1) order was issued for a violation of 30 CFR 75.220 (a) (1). The operator did not comply with Safety Precaution No. 6, page 6 of the approved roof control plan. Subnormal roof (slip) had been previously noted by the day shift roof bolter operator and the afternoon shift section foreman in the accident site intersection of the No. 27 room, however, only 36-inch resin grouted roof bolts had been installed to support the roof. There was no supplemental roof support installed in this area. This safety precaution requires "in an area where a slip, cutter, or clay vein is evident, one bolthole shall be drilled 12 inches above the normal bolt length, to test for bed separation". Should a separation be detected, or if evident conditions warrant, supplemental supports such as longer bolts, J-beams, crossbars, posts, oversize bearing plates, channels, metal straps or cribs shall be installed. The additional supports shall start two rows of bolts outby in solid roof and shall continue for two rows of bolts inby in solid roof."

4. A 104 (d) (1) order was issued for a violation of 30 CFR 75.360. The preshift examination conducted on 6/10/2005 for the 2:30 p.m. afternoon shift in the 3rd East Butt working section (007) was inadequate. A visible defect was present in the mine roof in the intersection of the No. 27 room and supplemental roof support was not installed. The preshift examination record book located on the surface for this shift indicated no hazards or dangers reported for this working section.

Appendix A
Persons Participating in the Investigation

Rosebud Mining Co.

Name	Title
Jerry Hefferan	Manager of Mines
Dave Sharkins	Manager of Maintenance
Paul Agnello	Superintendent
Robert Brink	Section Foreman
Wendall Shick	Section Foreman
Bernie Pavlick	Engineering
Joseph Yuhas	Attorney

County of Armstrong

Robert Bowers	Coroner

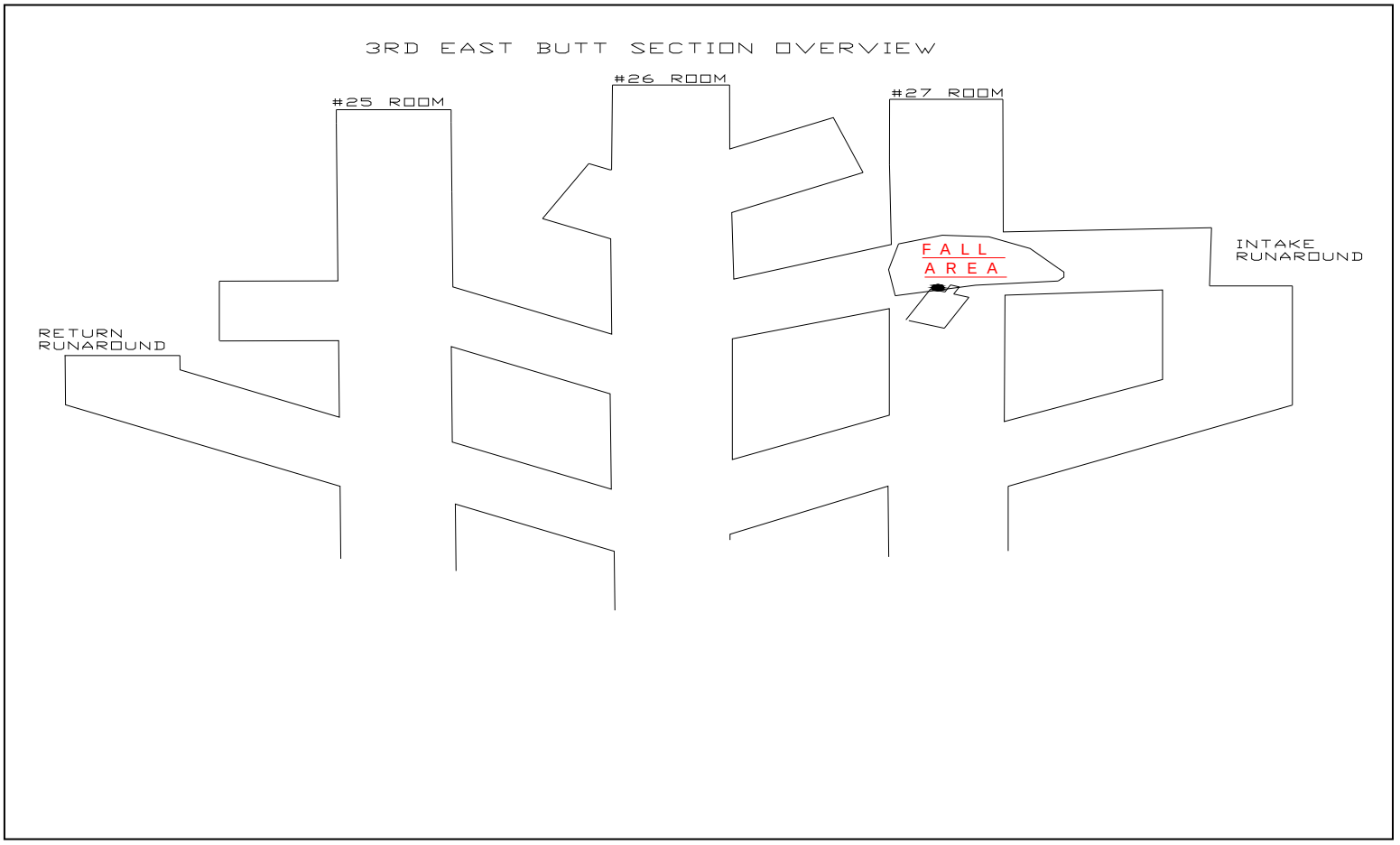
Pennsylvania Department of Environmental Protection

Name	Title
Joseph Sbaffoni	Director, Bureau of Deep Mine Safety
Daniel J. Smicik	Chief, Bituminous Deep Mine Safety
Bruce A. Pontani	Inspector Supervisor
Dennis Gramling	Mine Inspector

Mine Safety and Health Administration

Name	Title
Cheryl McGill	District Manager
Thomas Todd	Staff Assistant
Thomas McCort	Supervisory Coal Mine Safety and Health Inspector
Nevin J. Davis	Coal Mine Safety and Health Inspector
Joseph W. Trybus	Coal Mine Safety and Health Inspector
Thomas H. Whitehair II	Coal Mine Safety and Health Inspector
Donald Huntley	Coal Mine Safety and Health Inspector
Dan Baran	Coal Mine Safety and Health Inspector
Anthony Colicchia	Coal Mine Safety and Health Inspector
Terry Hoch	Chief, Roof Control Division
Sandin E. Phillipson PHD	Mining Geologist, PH&STC Roof Control Division
Joseph C. Zelanko	Supervisory Mining Engineer (Roof Control)
Paul Bizich	Supervisory Mine Safety and Health Specialist

Appendix B
Overview of 3rd East Butt Section



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