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UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Coal Facility

Fatal Sliding Material Accident
March 2, 2004

Brooks Run Processing Plant No. 1
Brooks Run Mining Company, LLC
Sutton, Webster County, West Virginia
ID No. 46-06045

Accident Investigators

Sherman L. Slaughter
Mine Safety and Health Specialist/Accident Investigator

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District 4
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Photograph of accident site, taken one day after the accident.

OVERVIEW

At approximately 4:00 p.m. on Tuesday, March 2, 2004, a 50-year old Maintenance Foreman with 31 years of mining experience was fatally injured at Brooks Run Mining Company, LLC's Brooks Run Processing Plant No. 1. The accident occurred while the victim was directing the placement of a steel plate over the chute of an underground reclaim feeder near the toe of a coal stockpile. Immediately after the plate was placed over the feeder, part of the coal bank collapsed. The victim was knocked to the ground and covered with approximately three feet of coal. It took about 30 minutes for nearby workers to uncover the victim. He was found in a face down position under the boom of the end loader but could not be revived.

Reclaiming operations to open up the stockpile for access to the feeder caused the coal bank near the feeder to be unstable. The coal bank became unstable due to the height of the stockpile and the steepness of its slopes. The accident resulted from failure to identify, report, and correct hazardous conditions and failure to provide required training. Contributing to the accident was failure to effectively communicate with the most experienced, most knowledgeable miner who was aware of potential hazards involving the coal pile.

GENERAL INFORMATION

The Brooks Run Processing Plant No. 1, Brooks Run Mining Company, LLC, is located near Cowen, Webster County, West Virginia. The plant began processing coal in 1980. The plant processes coal from three company-owned underground coal mines located near the plant. The coal is transported by contractor trucking companies from these mines to the plant.

The raw coal is trucked to the stockpile storage area where end loaders stack the coal and load it into a feed bin. The coal is transported from the bin to the plant by conveyor belt, where it is washed, screened, sized, and dewatered. The plant can process up to 1,000 tons of raw coal per hour. The refuse from the cleaning process is transported to a refuse disposal area by conveyor belt. The slurry from the process is injected into abandoned underground mines. The clean coal is transported to the clean coal stockpile area by conveyor belt, where it is separated into four different piles, depending on the type of coal quality. Bulldozers are used on the clean coal piles to push the stockpile coal to underground feeder chutes, where it flows through the feeders onto a reclaim conveyor belt. The conveyor belt transports the coal to the unit train loadout, where it is loaded into railroad cars for shipment.

The mine works three production shifts a day, six days per week, and employees 51 people. An average of 24,000 tons of raw coal is processed daily.

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

Samuel R. Kitts……President
Richard Henderson……General Mine Manager
Mark S. Workman……Plant Production Manager
Robert Davis……..……Superintendent
Jeffrey L. Bennett…….Safety Manager

Prior to the accident, the Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection on January 27, 2004. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine in 2003 was 0.00 compared to a National NFDL rate for bituminous coal preparation plants of 2.91.

DESCRIPTION OF ACCIDENT

At 7:00 a.m. on March 2, 2004, Gary Williams, Foreman, Chris Holcomb and Gregory Wriston, Laborers, arrived at the mine at the beginning of the day shift. These workers had been performing maintenance at this mine for about six months as employees of an independent contractor, Black Thunder Inc. (I.D. No. A798), of Mt. Hope, West Virginia. They were assigned to work on replacing the existing No. 4 vibratory feeder with a new mass-flow feeder. As part of this project, deteriorated metal mounting structure between the feeder and the chute was also to be replaced. On a previous shift, a temporary plate was placed in the chute, inside the draw-off tunnel, to keep stockpiled coal from flowing through the No. 4 feeder chute while initial cutting was being conducted on the feeder.

Also at this time, preparation plant employees, including Mobile Equipment Operators Dwayne Selman and Sam Wilson, met with John Withrow, Plant Foreman, in the Maintenance Foreman's office. Withrow assigned Selman to push coal using a bulldozer on the clean coal piles to prepare for loading a scheduled 10:00 a.m. train. He assigned Wilson to stacking on the raw coal stockpile. Kerry Holliday (victim), Maintenance Foreman, arrived at about 7:10 a.m.

Williams, Holcomb, and Wriston started work in the draw-off tunnel by cutting pieces of the mounting structure out of the No. 4 clean coal feeder chute. At about 10:00 a.m., they quit working in the tunnel so that the reclaim belt could be started to load the train. At this time, they went to work in another area known as Refuse Valley to work on the sampler.

Selman pushed coal on the clean coal stockpiles until shortly before 10:00 a.m., when he stopped to get a hose repaired on the bulldozer. He was getting the repairs made when the train arrived.

At 10:10 a.m. Selman began moving coal to the No. 5 feeder to load the train. The feeder was located beneath the No. 2 pile. The No. 5 feeder was the only one used to load the train. Selman had been made aware, by radio earlier in the shift, that the No. 4 feeder needed to be uncovered for maintenance. He was instructed to load the train in a manner that removed as much coal as possible from above the No. 4 feeder, which was located where the edges of the adjacent No. 1 and No. 2 piles merged.

By 1:00 p.m., the first segment of the train (48 cars) had been loaded. Selman had brought the No. 2 clean coal stockpile height down from 80 to 47 feet (approximated). He had also created a 30-foot wide trough opening in the piles, to ground level, over the No. 4 feeder (see Appendix C). He trammed the bulldozer off the No. 2 clean coal stockpile to obtain fuel.

The loaded cars needed to be pulled and the remaining 27 cars needed to be spotted-up to finish loading the train. Switching the loads and spotting the remaining empty railcars under the loadout normally required one hour. During this time, coal was being dumped onto the No. 1 pile.

Meanwhile, Withrow arranged to meet Wilson at the clean coal stockpile in order to instruct him on work to be done. Wilson obtained a Caterpillar 980G front end loader from the shop and moved it near the sediment pond at the No. 2 stockpile. Bob Davis, Plant Superintendent, arrived at the pile and told Wilson that Withrow would be there shortly to give him instructions. Withrow and Holliday eventually arrived in Holliday's truck. Holliday told Selman to push the No. 1 pile out, because the coal being dumped on the pile was building up too high and would spill over onto the No. 4 feeder. Withrow told Wilson to use the front end loader to clean the coal off the No. 4 feeder so the work could be done on the feeder. Withrow stood behind the front end loader and watched Wilson perform this work.

At about 2:00 p.m., Holliday and Withrow left the stockpile area and traveled to the sampler work area. Holliday told Williams and Marvin Watts, a separate contractor, to bring two plates to cover the chute over the No. 4 feeder, and that the stockpiled coal had been removed from above the chute. Holliday and Withrow left the sampler work area, discussing cleaning off the No. 4 feeder and covering it with the plate as they traveled back to the stockpiles.

Selman, who had been pushing coal on the No. 1 pile, reduced the height of the pile considerably. He then trammed around to the front side of the No. 2 pile to find out if Holliday had any additional instructions.

Meanwhile, Wilson continued using the front end loader to clean coal away from the No. 4 feeder. He widened the area by removing coal from the edge of the piles and moved it to the No. 5 feeder, which was now being used to load the second segment of the train. He noticed that the bank to his right was sloped with two or three points where the material was stepped back, becoming more vertical near the top two to three feet of the pile. The bank to his left was more vertical, which he watched more than the right bank.

At about 2:30 p.m., Williams and Watts arrived at the No. 1 and No. 2 clean coal stockpile area with the boom truck, which they had loaded with two steel plates from the refuse area bone yard. After delivering the plates, Watts left the stockpile area. Holcomb and Wriston arrived at the stockpile area at about 3:00 p.m., after finishing a smaller job in the sampler area.

When Holliday and Withrow returned to the stockpile area, Wilson was still cleaning coal from around the feeder. The boom truck was parked at the sediment pond with the plates loaded on it, and Holcomb and Wriston were at the work area. Selman had parked his bulldozer waiting to see if Holliday needed him to do anything else. While he waited, Selman observed the work area and became concerned with the condition of the banks. Selman tried to bring Wilson's attention to the hazardous bank by pointing to the coal stockpile as Wilson backed up the front end loader. Wilson, thinking that the bank was stable, shook his head negatively, indicating he did not see a problem with the banks.

Holliday and Withrow determined that sufficient coal had been removed from around the feeder. Holliday told Withrow the area looked alright. Holliday ordered the No. 5 feeder gate shut off and sent Selman to shove more coal away from the No. 4 feeder side of the No. 1 pile. He directed Wilson to back out from the feeder. Holliday stayed in his truck as Withrow got out of the truck and looked at the feeder and work area. There was still about four feet of coal over the feeder and he told Wilson to go back in and clean it. This coal was dumped at the toe of the stockpile, behind the feeder.

Withrow again examined the work area around the No. 4 feeder for hazardous conditions. Both feeders (No. 4 and 5) were uncovered. The bank on the right side was sloped up with some stepped back areas. The top two to three feet of the bank was more vertical than the overall stockpile slope. The bank on the left of the feeder was steeper than the bank on the right side. The stockpile was approximately 41 feet high on the left of the feeder, with an average slope of approximately 60 degrees. The stockpile was 47 feet high on the right of the feeder, with an average slope of approximately 53 degrees. At this time Withrow determined there were no hazardous conditions in the work area.

Holliday examined the work area around the No. 4 feeder. He did not discuss any hazardous conditions with anyone. Coal was sliding off the stockpile from in front of the feeder onto the feeder. Withrow told Wilson to use the end loader to push one of the plates in place above the feeder chute. Until Wilson was told to clean the coal off the No. 4 feeder, Selman and Wilson were not aware that they were going to set the plate before the train was completely loaded. Wilson went to the boom truck with the end loader. Williams, Withrow, and Wriston put one of the steel plates into the bucket with the boom truck. Wilson took the plate onto the stockpile to the No. 4 feeder chute. When he tried to push the plate in place with the end loader the plate hit the concrete surrounding the chute and bent.

Coal was continuing to slough from the stockpile onto the feeder. Withrow was one of the persons who observed this coal sloughing off the stockpile. Holliday was in his truck parked on the ramp to the No. 2 stockpile. He could see the sloughing coal from this location. Wriston, who was standing beside the truck could also see the sloughing coal. When the plate bent, Holliday got out of his truck and told Wriston to get shovels. He instructed Wilson to scoop the plate off the feeder and move it out of the way. Wilson removed the plate with the end loader and put it to the side on the edge of the coal pile. Wriston and Withrow used the shovels to uncover part of the concrete surrounding the

feeder chute. This made it possible for Wilson to locate the concrete as he cleaned the top of the chute off with the end loader. Holliday told Wilson to take more coal off of the feeder chute and to get the second plate from the truck.

Holliday told Selman to stop pushing on the No. 1 pile, because the bulldozer was shaking the pile. Withrow had the plows on the overhead stacker belt changed to stop the coal from dumping on the No. 1 Pile. The coal then began dumping on the No. 4 pile.

Wilson had to clean the feeder several times because coal continued to slough off the stockpile from around the stacker tube onto the feeder. It took about 20 minutes to remove and keep the coal off the feeder opening, so the second plate could be positioned over the feeder. Wilson trammed the end loader off the stockpile to get the second plate. It was evident that the second plate needed to be put in place as soon as possible, before sloughing coal from the stockpile covered the feeder again. Holliday continued to observe the work.

Selman trammed back to the front of the No. 2 pile, parked his bulldozer, and walked to Holliday, who was standing near the outer edge of the coal stockpile. He asked Holliday to let him push more of the No. 2 stockpile out because he thought the pile was too high and coal could slide from the pile into the work area. Holliday told Selman the pile was alright.

While Williams and Withrow chained the second plate to the end loader bucket, Selman asked Holliday a second time to let him push some more of the No. 2 pile out. Holliday looked at the pile and told Selman, "it would be alright." Selman did not know the actual slope of the pile, but knew from experience that the bank of the pile could collapse and loose coal could slide into the work area. Selman has extensive experience at the coal stockpiles at this mine having worked near them for more than 20 years.

Williams and Withrow walked onto the stockpile area as the end loader took the second plate to the feeder**.** Withrow saw Holliday walk beside the end loader as it moved toward the feeder. Wilson used the end loader to place the plate over the chute. Holliday directed the movements of the end loader by hand signals to make sure the plate was positioned correctly. Holliday stood between the right front wheel of the end loader and the bank of the No. 2 clean coal stockpile as he directed the work. He guided the plate in place with his hands. Withrow was standing about 30 feet behind the end loader, as the second plate was set in place. The left side of the end loader was approximately 3 feet from the bank, and the right side of the end loader was approximately 9 feet from the bank. Williams saw coal dribble off the bank of the No. 2 stockpile, on the right side of the end loader, while the second plate was being positioned over the feeder. He did not see any significant sloughing of coal off the pile.

Holcomb was waiting to unhook the plate for Holliday. He started walking along the right side of the end loader towards the feeder. As he neared the center of the end loader loose coal slid from the No. 2 Stockpile bank on the right side of the end loader. The sliding coal came from the midpoint of the stockpile and extending up towards the top of

the stockpile bank. When the coal started sliding out of the bank, someone yelled and Holcomb ran away from the end loader. He was not struck by the coal. Williams, Wriston, and Selman were standing about 25 feet behind the end loader. Withrow was positioned between them and the end loader.

Holliday looked up as the coal started to slide out of the bank. He saw that coal had blocked his exit down the right side of the end loader. As he stepped to go under the end loader boom between the right front tire and the bucket, he was knocked down by more sliding coal. The sliding coal buried Holliday at a depth of approximately three feet. Coal piled up to the top of the right front tire of the end loader, to the side of the machine at the swivel area, and to the top of the side of the bucket.

Withrow ran between the bank and the left side of the end loader to reach Holliday. He radioed for an end loader and shovels to aid in digging out the victim. Wilson exited the end loader on the left side and went to its front, between the tire and the bucket, to look for Holliday. Selman, Holcomb, Wriston, and Williams ran up the left side of the end loader to get the victim. They immediately started digging for Holliday with their hands. Emergency Medical Technicians, Chris Ray and Marty Simms, arrived at the accident site. Gary Stanley, Plant Operator, called for emergency services. Shovels and another end loader were brought to the accident site.

At about 4:00 p.m. the rescue workers uncovered Holliday. He was laying face down, with his head very near the front axle differential of the end loader. His feet were extended back towards the No. 2 stockpile bank. Holliday was pulled around to the side of the end loader. An assessment was made which detected no vital signs. Cardio-Pulmonary Resuscitation was then administered. At about 4:45 p.m., paramedics arrived and promptly transported the victim to Webster County Memorial Hospital at Webster Springs, West Virginia.

INVESTIGATION OF THE ACCIDENT

The MSHA District Office, located in Mt. Hope, West Virginia, was notified of the accident at 5:40 p.m., on Tuesday, March 2, 2004. MSHA accident investigators were immediately dispatched to the mine. A 103(k) order was issued to insure the safety of all persons at the mine. The investigation was conducted in cooperation with the West Virginia Office of Miners' Health, Safety, and Training (WVMHST), with the assistance of the mine operator and employees (refer to Appendix A for a list of persons who participated in the investigation).

The investigation team traveled to the accident scene to conduct an investigation of existing physical conditions. Photographs and relevant measurements were taken. The accident site was surveyed and drawings made. Interviews were conducted at the accident site. Nine persons, who had knowledge relevant to the accident, were interviewed at the operator's office. The physical portion of the investigation was completed on April 15, 2004, and the 103(k) order was terminated.

DISCUSSION

Physical Layout of the Preparation Plant

The Brooks Run Processing Plant typically produces 10,000 tons of clean coal per day. Coal is delivered from the plant to the clean coal stockpile on a 36-inch conveyor belt. The stockpile has two stacker tubes, but they are no longer used to distribute the coal. Instead, coal is plowed off the belt at different points, so that four separate piles of coal are formed, corresponding to four different grades of coal. Coal plowed off the belt, approximately 35 feet before the No. 1 Stacker tube, forms Clean Coal Pile No. 1, while coal plowed off the belt approximately 35 feet past the No. 1 Stacker tube, forms Clean Coal Pile No. 2. Piles No. 3 and 4 are located on either side of the No. 2 Stacker tube. Because of the close proximity of the piles to each other, the coal from adjacent piles flows together near the toe, as the height of the piles increase. When the coal was reclaimed from above the No. 4 feeder to gain access to place the plates over the feeder, the coal bank on the left side of the feeder towards the preparation plant was in the No. 1 Clean Coal Stockpile, while the coal bank on the right side of the feeder towards the loadout was in the No. 2 Clean Coal Stockpile.

The four piles of clean coal differ in heat value (BTU) and ash content, but according to plant personnel, there is no significant difference in the size or water content of the coal in the different stockpiles. All clean coal is sized 2-inch by zero. A screen analysis on a clean coal sample taken on December 2002, showed that, by weight, 32 percent of the coal particles were coarser than 5/8 inch and 84 percent were coarser than 1 millimeter. The clean coal unit weight varies from about 60 to 65 pounds per cubic foot. The outside angle of the coal pile, as measured on Clean Coal Pile No. 1 after the accident, was between 36 and 37 degrees. This was the angle of repose of the pile.

Coal is normally reclaimed by pushing the coal with a bulldozer to chutes located at ground level above the feeders. The coal runs through the feeders onto a 48-inch reclaim conveyor belt located in the reclaiming tunnel. There are three feeders on each side of the No. 1 Stacker tube, and two feeders on each side of the No. 2 Stacker tube. The feeders at the No. 1 Stacker tube are numbered 1 through 6, with feeders 1 through 3 located under Clean Coal Stockpile No. 1, and feeders 4 through 6 located under Clean Coal Pile No. 2. These feeders discharge coal onto the 48-inch belt in the reclaim tunnel, and typically, 25 to 28 trains are loaded per month.

The clean coal enters the feeders through chutes, which have 8-foot by 8-foot openings at ground level. The centerline of Feeder No. 4 was located approximately 8 feet from base of the stacker tube. Feeder No. 5 was located 25 feet from Feeder No. 4, and Feeder No. 6 was spaced 25 feet from Feeder No. 5.

Job Risk Analysis

The purpose of the maintenance work was to replace the existing No. 4 vibratory feeder with a new mass-flow feeder. Also, deteriorated metal between the feeder and the chute

was to be replaced. The existing feeder and metal components were original plant equipment, dating from 1980, and had been affected by corrosion. The No. 4 feeder was taken out of service during the week before the accident due to the corrosion. Mine personnel were concerned that corroded metal could fail and fall on the belt. The company had already replaced some of the vibratory feeders with mass-flow feeders and intended to eventually replace all of them. The mass-flow feeder can feed at rates of 2,500 to 3,000 tons per hour, while the vibratory feeders discharge at rates of 300 to 500 tons per hour. The No. 5 feeder, which was being used to reclaim coal prior to the accident, had previously been converted to a mass-flow feeder.

On a previous shift, a temporary plate had been put in the chute inside the reclaim tunnel, to prevent coal from coming through the No. 4 feeder chute from the stockpile above while some initial cutting was done on the feeder. Because the mounting structure for this plate was deteriorated, the plate and structure had to be replaced with the feeder. The workers put straps on the plate to hold it up, while they made the initial cuts to remove the mounting structure. Three or four pieces of metal were cut out. Additional steel plates would have to be installed above the No. 4 feeder chute on the ground, to prevent coal from coming out of the stockpile into the tunnel as the plate and the feeder were removed.

The clean coal stockpiles were seldom reclaimed to the extent that the feeders were accessible for repair work from the top of the ground. To place the plate over the feeder openings required coordination with a train being loaded. This would allow for a place to put the coal as it was reclaimed from above the feeder to allow access from the top. On the day of the accident, a bulldozer was used to reclaim the No. 1 and No. 2 clean coal stockpiles down to near feeder level, and an end loader was used to remove the remaining coal from the feeder and widen the work area. This would allow access to perform the work of covering the feeder. The coal was loaded through the No. 5 feeder into the train cars.

Unit trains are loaded at this facility by splitting the trains and loading the two segments individually. The workers referred to the two segments as “first half and second half,” even though the segments did not consist of an equal number of cars. At about 1:00 p.m. the first segment of the train of 48 cars was loaded. The loaded cars were pulled and the remaining 27 cars were moved to finish loading the train. It normally took an hour to switch the loads out and spot the empty railcars of the second segment of the train under the loadout.

No one discussed the hazards presented by the coal banks in the work area at the No. 4 feeder with the employees of the contractor who were working at the site when the accident occurred. No one discussed the actual procedures that would be used to cover the No. 4 feeder with Wilson or Selman before Wilson began uncovering the feeder, after 1:00 p.m. on the day of the accident.

After the first plate bent, it was evident that the second plate needed to be put in place as soon as possible, before coal sloughing out of the pile from in front of the feeder covered

it again. A single plate would not have covered the feeder opening completely, therefore it was evident Holliday intended to use both plates. He intended to push the plates in place with the bucket of the end loader. When this plan failed, he decided to remove additional coal off of the feeder and place the second plate using persons on the ground to direct the end loader as it lowered the plate into position. These persons would then unhook the plate from the chain attached to the end loader bucket. These actions significantly increased the risk to the workers. Holliday did not discuss the hazards presented to the workers or the work procedures to be used for placing the second plate with anyone. He began giving instructions to the workers for placing the second plate over the No. 4 feeder, immediately after Wilson bent the first plate.

Selman recognized the risk to the workers on the ground. After the first plate bent and before the workers brought the second plate to the feeder, he discussed his concerns with Holliday. Holliday chose to ignore two requests by Selman to cut the No. 2 pile down, despite Selman having more experience working with coal stockpiles than any other person at the work area.

A plan or procedure for covering the feeder, including an analysis of the hazards involved was not developed and discussed with the workers prior to commencement of the work. Had this been done, it is likely that Wilson and Selman would have brought attention to the increased hazard of working persons on the ground, near the toe of the stockpile banks. They had the most experience working on the stockpiles. Wilson did not see a hazard for the end loader being used near the toe of the piles to place the plates, but agreed that exposing persons to the same condition on the ground was hazardous. Selman knew that the coal bank in the No. 2 pile was too high and presented a hazard to the workers. His concerns would have been known by the other workers, if a plan to do the work had been discussed with them. Withrow and Holliday discussed using the end loader to place the plates over the feeder. When this plan failed, Holliday did not discuss the method to be used to place the second plate with anyone until beginning the work. The workers followed his instructions, but were not involved in a discussion as to how the work would be done.

Training

The operator did not provide training or instruction to any of the persons at the work area in the methods used to determine stability of a coal stockpile bank.

Williams, Holcomb, and Wriston, had not been trained or provided instruction in the methods used to determine stability of a coal stockpile bank. Wriston had no previous work experience on coal stockpiles. Withrow had not been trained or provided instruction in the methods used to determine stability of a coal stockpile bank. He determined the stockpile banks were not hazardous from his experience and his conclusion that there was no movement of coal off the banks on each side of the feeder. The coal movement which occurred before they attempted to place the first plate was from the bank in front of the feeder. He had been a foreman for 12 years.

The operator did not use their engineering staff as a resource to obtain information that should have been used to train the workers in the procedures used to determine the stability of a bank in a coal stockpile.

While Wilson was cleaning coal from around the feeder, he was not concerned with the banks and said he would have worked there all day. He had operated equipment for about 15 years at this mine, some of the time operating dozers on the stockpiles. His determination was made relative to working equipment near the banks, not persons on foot.

The person with the most experience working on coal stockpiles was Selman. He had operated the bulldozer pushing on the piles at this mine for more than 20 years. He was the only person to have concerns with the stability of the piles. He had not received training to enable him to determine stability of a coal bank in a stockpile, but had received training that addressed the potential for coal banks to slide. His experience with the piles caused him to be concerned with the stability of the banks above the work area. The other workers, who were not concerned with the piles, did not have the experience or the training to recognize the hazards that existed.

Workplace Examination

Withrow examined the work area around the No. 4 feeder for hazardous conditions after Holliday had the No. 5 feeder gate shut off. Based on experience, Withrow determined the stockpile banks were not hazardous because there was no movement of coal off the banks on either side of the feeder. Actually, he did see coal slough from the bank of the stockpile in front of the feeder from around the stacker tube. He watched as the end loader made repeated efforts to clean this coal off the No. 4 feeder.

Due to experience, the examiners at this site should have been familiar with the handling of coal stockpiles and their associated hazards. Raw coal is stockpiled upon receipt at the preparation plant and raw coal reclamation is conducted using a front-end loader. The raw coal reclamation is conducted in a manner that is similar to that used prior to the accident. Raw coal is scooped up with the front-end loader by loading coal into its bucket, tramming the machine to a dump which is located at-grade and depositing the coal into a feeder. This method changes the slope of the raw coal stockpile as the reclamation of the coal progresses. In addition, both raw and clean coal is stockpiled and reclaimed daily at this site using both bulldozers and front-end loaders. Both the raw coal and clean coal stockpile work areas receive on-shift examinations at least once each working shift. Therefore the examiners at this site have made numerous on-shift examinations of coal stockpiles for the purpose of identification and correction of stockpile hazards.

When Withrow made the examination of the work area at the No. 4 feeder, the approximate configuration of the stockpile was 41 feet high on the left of the feeder, with an average slope of 60 degrees, and 47 feet high on the right of the feeder with an

average slope of 53 degrees. The angle of repose of a coal stockpile is typically 34-37 degrees which may vary according to the composition of the pile. The reclaiming operations of the bulldozer and the end loader in the stockpiles to uncover the No. 4 feeder left the banks in the piles steepened to an angle exceeding the angle of repose of the coal. The banks on both sides of the No. 4 feeder were not stable. This was a hazardous condition. Withrow did not report finding any hazardous conditions. No action was taken to correct this hazardous condition. A record of this examination was not made. Holliday examined the work area around the No. 4 feeder. He told Withrow the area looked alright.

Accident Scene

The machine that was used to reclaim the coal around the feeder, and to position the steel plates, was a Caterpillar 980G front end loader. The operating weight of the end loader is approximately 66,000 pounds. The loader is approximately 31 feet long, 12 feet wide and the height to the top of the cab is approximately 12.3 feet. The tires are approximately six feet in diameter.

A contour map of the clean coal pile was prepared based on an aerial survey performed approximately 24 hours after the accident. When the accident occurred, the two Clean Coal Stockpiles, No. 1 and No. 2, at their highest points were approximately 60 feet above the feeder opening level.

The steel plate that was bent as it was being placed over the feeder chute by the end loader, measured 5 feet wide, 12 feet long, and 3/8 inches thick. The steel plate that was being positioned over the feeder at the time of the accident, measured 6 feet wide, 12 feet long, and 5/16 inches thick. The opening above the No. 4 feeder chute was 8 feet by 8 feet at ground level.

The bottom width of the excavation tapered as it approached the No. 4 Feeder opening, varying from approximately 50 feet wide at the entrance, to approximately 15 to 20 feet wide near the No. 1 Stacker.

The height of the No. 1 and No. 2 Clean Coal Stockpiles was approximately 80 feet, when Selman started loading the train. As Selman pushed coal to the No. 5 feeder to load the train, the heights were reduced.

At the time of the accident, the approximate configuration of the No. 1 clean coal stockpile was 41 feet high on the left of the feeder, with an average slope of 60 degrees and the approximate configuration of the No. 2 clean coal stockpile was 47 feet high on the right of the feeder, with an average slope of 53 degrees.

There was approximately 3 feet between the left side of the end loader and the bank and approximately 9 feet between the right side of the end loader and the bank. The slope on the left side of the loader was steeper than the slope on the right side of the loader. The right side slope was stepped back, with a short, near vertical section at the top. The slide

mainly involved material from the upper half of the slope and extended for a length of 30 to 50 feet across the slope.

Holcomb, who was standing between the tires of the loader when the slide occurred, was able to "outrun" the sliding coal. This shows that the slide mainly involved material from about mid-height of the pile and higher, because he would not have had enough time to get away from coal that would have slid out from the base of the pile.

Slope Stability

Prior to this accident, while the feeder was being uncovered, movement was occurring in the face of the stockpiles as the end loader reclaimed coal from the toe in order to widen the work area. Movement continued from the face of the pile, around the stacker tube, after the first plate was put in place. Movement of material on the face of the banks of the stockpiles was an indicator that the piles were unstable.

Following the accident the slopes of the coal stockpiles, in the area where the accident occurred, were standing at various angles. Most of the slope to the right side of the loader was at an angle of about 38 degrees. However, portions of the pile stood at steeper angles for limited heights. One portion of the pile near the stacker tube stood for a height of approximately 14 feet, at an angle of over 57 degrees. Other portions of the slopes stood at heights from approximately 7 to 11 feet, at angles from approximately 65 to 70 degrees.

Based on the pile contours after the accident, and the descriptions of the conditions prior to the accident, it was determined that the pile, in the area where the slide occurred, was approximately 47 feet high and sloped at an average or overall angle from 53 to 56 degrees. This is based on estimating the amount of material that slid and determining how steep the slope would have been if that quantity of material was back in place, with the toe of the slope being 8 to 10 feet from the loader (Appendix C-2). The actual slope was likely steeper in some portions and flatter in others.

Factors that can allow a coal stockpile to stand at angles steeper than its normal angle of repose include dozer traffic on the pile and the moisture content of the coal. Traffic packs the coal tighter, while moisture can add "apparent" strength by providing surface tension. Less strength is exhibited in portions of the pile receiving less traffic, or where the surface tension effect is lost by drying. In general, anytime granular material is standing at an angle steeper than the material's angle of repose, the slope material is marginally stable and should be considered in danger of sliding.

At the time of the accident, the overhead coal supply belt was still running, but the coal was being discharged onto Pile No. 4 which is located 200 feet from the accident location.

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: Work was performed in a hazardous location. The victim was working on the ground near the No. 2 clean coal storage pile, where he was exposed to the hazard of loose coal sliding from the unstable banks. This condition was developed in the stockpile by the reclaiming operations of the bulldozer and end loader while uncovering the No. 4 feeder.

Corrective Action: The company developed a "Stockpile Area Maintenance Plan" that designates work zones for persons working near any coal storage pile at the mine. The Plant supervisors use Abney Hand Levels to determine the projected toe of a pile, based on its natural angle of repose. Eighteen feet of distance is added to the projected toe to establish the work zone limit. This point on the ground is marked by cones, danger tape, or other visible means. No one is allowed to work, while on foot, between the limit of the work zone (marked by the cones, danger tape, etc.) and the toe of the coal storage pile.

2. Causal Factor: An inadequate examination was performed. The work area was examined for hazardous conditions by the certified person designated by the company to do such examinations before the victim began the work at the No. 4 feeder, near the unstable bank of the No. 2 clean coal storage pile. The certified person did not identify the unstable coal pile as a hazardous condition, report the unstable banks to anyone, and did not have the hazardous conditions corrected before persons were allowed to work in the area. Based on his experience, the examiner believed the area to be safe. However, he did not know how to determine when a bank in a coal storage pile was stable.

Corrective Action: Examiners were trained in the procedures of identifying, recording, and correcting hazardous conditions present during examinations. All certified persons, who make examinations for hazardous conditions in active working areas at the mine, received training in the procedures used to determine when a bank in a coal stockpile is stable. Those procedures identify an unstable coal bank and outline the steps to be taken to keep persons from working near such a bank.

3. Causal Factor: None of the workers exposed to the unstable banks of the No. 1 and No. 2 clean coal storage piles had received training to enable them to determine the stability of a bank in a coal storage pile (stockpile). They made the determination that the work area was safe based on their experience. The three contractor employees had minimal experience working near coal storage piles.

Corrective Action: The "Stockpile Area Maintenance Plan" developed by the company outlines procedures used to determine when a bank in a coal storage stockpile is stable. Those procedures identify an unstable coal bank and outline the steps to be taken to keep persons from working near such a bank. All the workers assigned duties on, in, or around coal storage piles at this mine received training in this plan. The plan was made a part of the mine safety program, was distributed to each employee, and posted at the mine.

CONCLUSION

The reclaiming operations to open up the No. 1 and No. 2 Clean Coal Stockpiles above the No. 4 feeder caused the coal banks near the feeder to be unstable. The coal banks were unstable due to the resulting height of the stockpile and the steepness of its slopes. This caused the No. 2 stockpile bank to collapse on the victim while he was working near its base. Management's decision to have workers clean coal from the concrete surrounding the feeder chute, position the second plate, and unhook the plate from the end loader bucket exposed the workers to sliding material hazards.

The accident resulted from failure to identify, report, and correct hazardous conditions and failure to provide required training. Contributing to the accident was the failure to effectively communicate with the most experienced, most knowledgeable miner who was present and aware of potential hazards involving the coal pile.

Approved By:

ORIGINAL SIGNED BY — January 27, 2005
Jesse P. Cole — Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) Order No. 7230703 was issued to Brooks Run Mining Company, LLC, on March 2, 2004, to ensure the safety of persons at the mine until an investigation of the accident could be completed.

2. A 104(d)(1) Citation No. 7214000 was issued to Brooks Run Mining Company, LLC for a violation of 30 CFR 77.209, stating in part, that two foreman and two contract laborers were permitted to stand near the steep banks of the No. 1 and No. 2 clean coal storage piles at this mine where they were exposed to sliding material hazards. Reclaiming operations produced the steep banks in the clean coal storage piles.

3. A 104(a) Citation No. 7214001 was issued to Brooks Run Mining Company, LLC for a violation of 30 CFR 77.1713(a), stating in part, that the hazards of sliding material which were noted during examinations of the No. 1 and No. 2 clean coal stockpiles were neither reported or corrected.

4. A 104(a) Citation No. 7214002 was issued to Brooks Run Mining Company, LLC for a violation of 30 CFR 48.27(c), stating in part, that John Withrow and Kerry Holliday, Foremen, who were working near steep coal stockpile banks in order to install a steel plate over the No. 4 reclaim feeder opening at the mine, were not instructed in the safety aspects and safe work procedures of the task of performing maintenance and repairs on equipment near coal stockpiles specific to determining when a stockpile was stable and the procedures to be used when a stockpile was not stable.

5. A 104(a) Citation No. 7214003 was issued to Brooks Run Mining Company, LLC for a violation of 30 CFR 48.27(a)(1), stating in part that Dwayne Selman and Sam Wilson, mobile equipment operators, who were working near steep coal stockpile banks in order to install a steel plate over the No. 4 reclaim feeder opening at the mine, were not instructed in the safety aspects and safe work procedures of the task of performing maintenance and repairs on equipment near coal stockpiles specific to determining when a stockpile was stable and the procedures to be used when a stockpile was not stable.

6. A 104(a) Citation No. 7214004 was issued to Black Thunder, Inc., for a violation of 30 CFR 48.27 (c), stating in part that Gary Williams, foreman, Gregory Wriston, laborer, and Chris Holcomb, laborer, (all contractor employees), who were working near steep coal stockpile banks in order to install a steel plate over the No. 4 reclaim feeder opening at the mine, were not instructed in the safety aspects and safe work procedures of the task of performing maintenance and repairs on equipment near coal stockpiles specific to determining when a stockpile was stable and the procedures to be used when a stockpile was not stable.

7. A 104(a) Citation No. 7214005 was issued to Brooks Run Mining Company, LLC for a violation of 30 CFR 48.27(c), stating in part that Gary Williams, foreman, Gregory Wriston, laborer, and Chris Holcomb, laborer, (all contractor employees), who were working near steep coal stockpile banks in order to install a steel plate over the No. 4

reclaim feeder opening at the mine, were not instructed in the safety aspects and safe work procedures of the task of performing maintenance and repairs on equipment near coal stockpiles specific to determining when a stockpile was stable and the procedures to be used when a stockpile was not stable.

8. A 104(a) Citation No. 7214013 was issued to Black Thunder, Inc. for a violation of 30 CFR 77.209, stating in part that two laborers employed by this contractor were permitted to stand near the steep banks of the No. 1 and No. 2 clean coal storage piles at this mine where they were exposed to sliding material hazards. Their work was being directed by two foremen employed by the mine operator. Their immediate supervisor, employed by this contractor, was observing the work. Reclaiming operations produced the steep banks in the clean coal storage piles.

Appendix A

Persons Participating in the Investigation

Brooks Run Mining Company, LLC

Name	Title
Samuel R. Kitts	President
Richard Henderson	General Mine Manager
Mark S. Workman	Plant Production Manager
Robert Davis	Superintendent
Jeffrey L. Bennett	Safety Manager
John Withrow	Day Shift Plant foreman
Vaughan R. Groves	Attorney
R. Henry Moore	Attorney
Charles C. Dunbar, PE, PS	VP – Engineering
Donnie Ratliff	VP of External Affairs

Black Thunder Inc.

Name	Title
Gary Williams	Foreman
Gregory A. Wriston	Laborer
Chris Holcomb	Laborer

Labor – Brooks Run Processing Plant No. 1

Name	Title
Albert Moore	Representative of Miners
Bruce Gregory	Representative of Miners
Sam Wilson	Equipment Operator
Dwayne Selman	Equipment Operator

West Virginia Office of Miners Health, Safety and Training

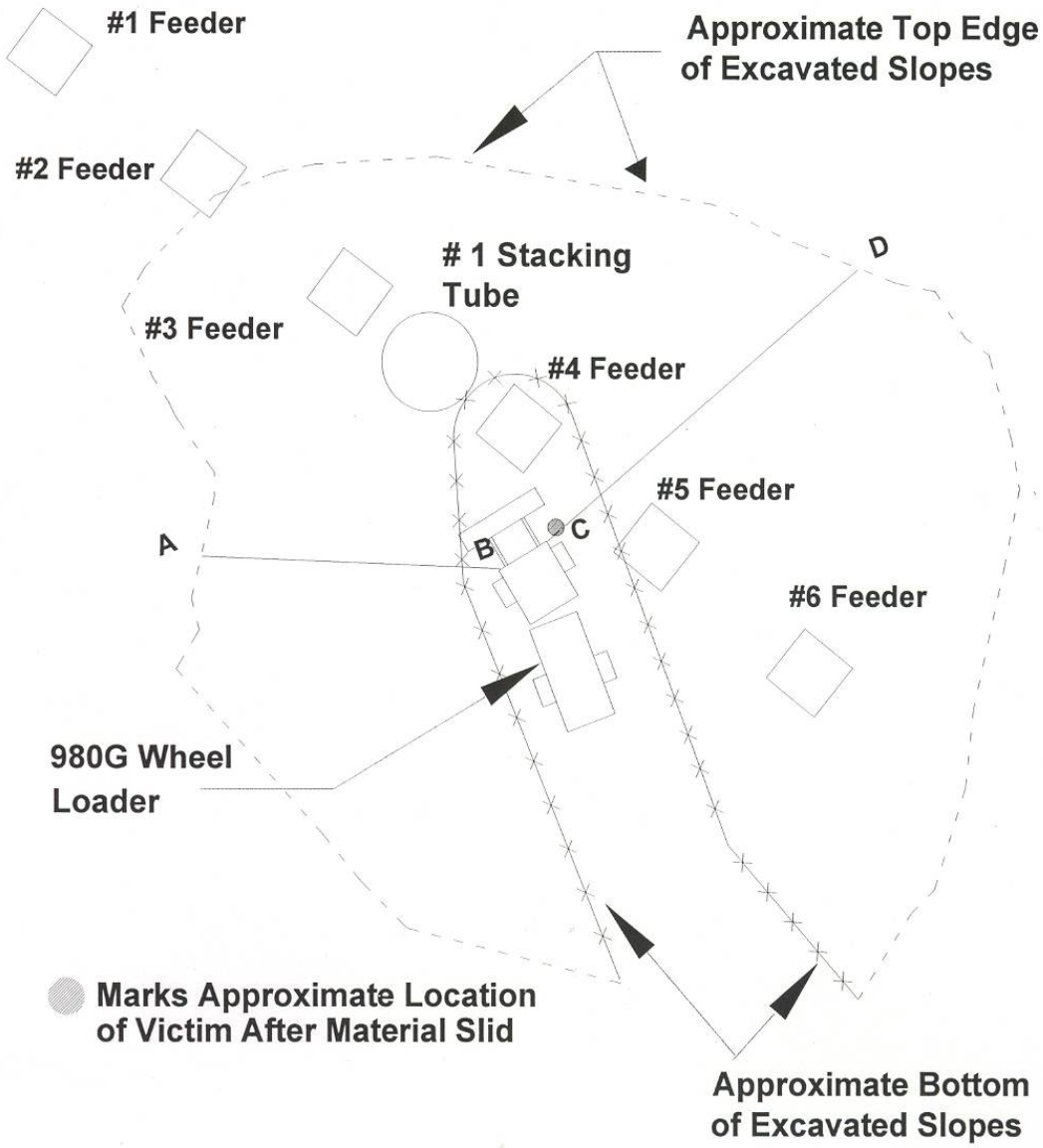
Name	Title
Gary S. Snyder	Inspector-At-Large
Lloyd G. Collins	Inspector

Terry Casto.....Inspector
Bill Tucker.....Inspector

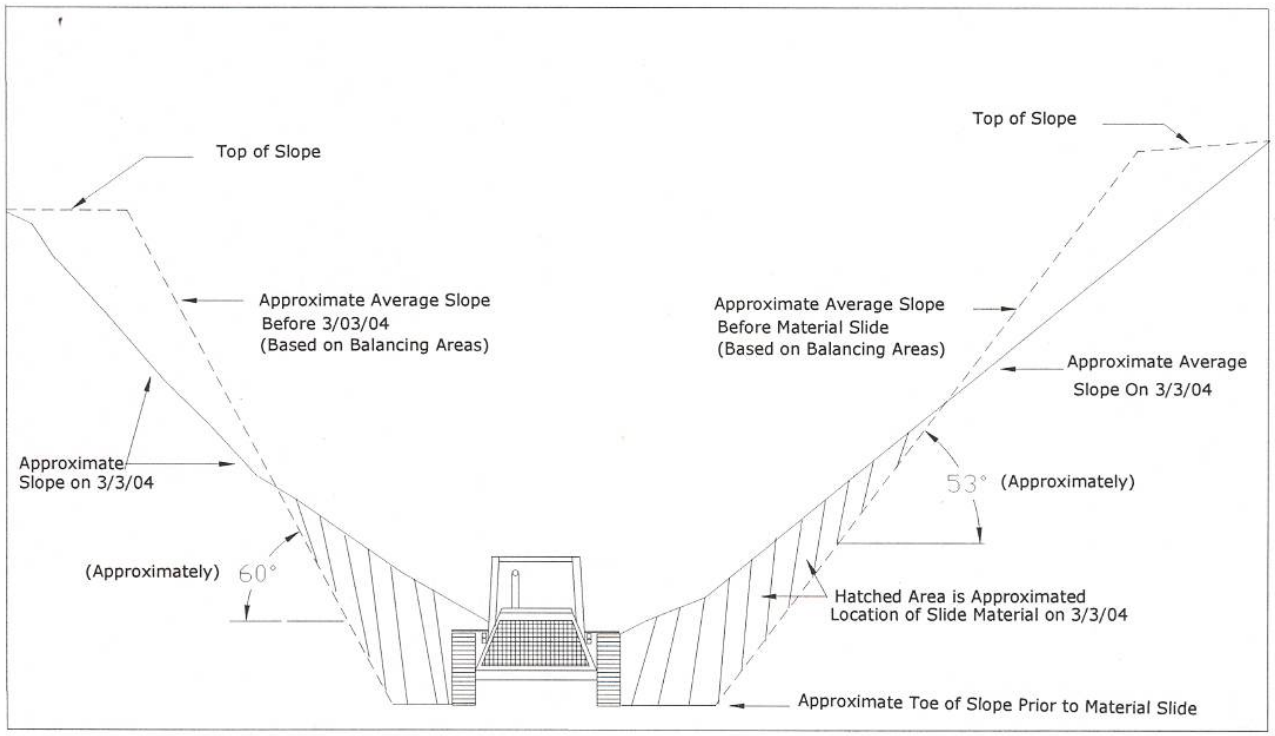
Mine Safety and Health Administration

Name	Title
Sherman L. Slaughter	MS&H Specialist/Accident Investigator
James R. Humphrey	CMS&H Inspector/Accident Investigator
Michael C. Superfesky	Civil Engineer
John W. Fredland	Civil Engineer
Preston T. White	Training Specialist
Daniel M. Barish	Trial Attorney Arlington Regional Solicitor's Office
Paul E. Hess	Supervisory CMS&H Inspector
Joseph C. Mackowiak	CMS&H Inspector

Appendix B. Sketches of Accident Site



Plan View of Accident Scene



Approximate Slopes of Coal Pile

Corresponds to Section A-B-C-D on Plan View