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UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

# REPORT OF INVESTIGATION

Surface Coal Mine

Fatal Ignition Accident
February 1, 2006

Black Castle Mining Co.
Black Castle Mining Co.
Sylvester, Boone County, West Virginia
MSHA I.D. No. 46-07938

Accident Investigators

James R. Humphrey
Coal Mine Safety and Health Inspector/Accident Investigator

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

Originating Office
Mine Safety and Health Administration
District 4
100 Bluestone Road
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Jesse P. Cole, District Manager

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## OVERVIEW

At approximately 2:10 p.m. on Wednesday, February 1, 2006, a 58-year old bulldozer operator with 15 years experience was fatally injured due to an ignition of natural gas. As the bulldozer operator was developing a drill bench, the blade of the machine contacted and ruptured a 16-inch low-pressure, high-volume natural gas line which immediately burst into flames.

The accident occurred because mine management directed the bulldozer to work in close proximity to a known but unlocated active gas line. Although aware of the gas line and potential hazard, mine management did not accurately locate and mark the gas line before directing the bulldozer to operate in the area. This exposed the bulldozer operator to a hazardous condition. Additionally, failure to conduct required on-shift examinations contributed to the accident in that the hazardous condition was not properly identified and corrected.

## GENERAL INFORMATION

The Black Castle Mining Co. surface mine is located near Sylvester, in Boone County, West Virginia. Black Castle Mining Co., a subsidiary of Massey Energy Company operates the surface coal mine, which employs 234 persons. The mine operates two production shifts per day, six days per week. An average of 11,700 clean tons of coal is produced daily from six separate pits. Coal is transported from the pits by tandem and tractor/trailer coal trucks.

The principal officers for Black Castle Mining Co. are:

Phillip Marsh.....President
Mike Vira..... Superintendent
Mike Booth .....Mine Foreman
Aaron Price .....Safety Director

The last regular MSHA inspection of this operation was completed on December 20, 2005. The mine's Non-Fatal Days Lost (NFDL) incidence rate for 2005 was 1.19, compared to the national average of 1.48 for mines of similar type and classification.

## DESCRIPTION OF THE ACCIDENT

On Monday, January 30, 2006, a meeting was held at the mine office to discuss a contour cut on the mine's East of Stollings Amendment site. Mike Booth, Drilling and Blasting Foreman, asked Billy Marcum, Mine Manager, to direct a bulldozer operator to develop a bench on the Clarion Coal seam level. Marcum told Booth to use Paul Moss, Master Bulldozer Operator, to conduct the work.

On Tuesday morning, January 31, 2006, Booth took Moss to the East of Stollings Amendment site. They stopped at the area known as the Low Gap, which signifies the starting point of the East of Stollings Amendment site. While they sat in the truck, Booth told Moss to construct an access road, uphill starting from the Low Gap area, to locate the Clarion coal seam outcrop. Once the Clarion coal seam outcrop was located, Moss was told to cut a drill bench. Booth pointed out the general area of a gas line right-of-way. Booth told Moss to enter the site to the left of the gas line right-of-way. The location of the 16-inch gas line had not been identified and marked at this time.

During the morning hours of January 31, 2006, Booth traveled to the site where Moss was already operating the bulldozer, preparing an access road near the Low Gap. Booth picked up Moss and drove toward an area known as the Buffalo site. Booth showed

Moss the Buffalo site where an additional access road could be developed. Booth returned Moss to his bulldozer. Moss continued to construct the drill bench.

A short time later, Marcum arrived at the East of Stollings Amendment Site. As Moss' bulldozer was approximately 80 feet past the Low Gap area, starting up the hill, Marcum told Moss that he had just transferred (drove) through the area closest to the gas line; from here on up, the bulldozer can start cutting its way to the Clarion bench. He told him not to drop his blade in the area behind him.

During the afternoon, Moss experienced mechanical problems with the bulldozer. The bulldozer was bogging down, acting like the fuel filters were stopped up. By the end of the shift at 3:30 p.m., Moss had roughed in an access road to the Stockton coal seam (located below the Clarion coal seam). Marcum met Moss at the end of the day and told him that he would have the surveyor locate the gas line tomorrow. After Moss had completed the shift, a mechanic worked on the bulldozer.

On January 31, 2006, Regene Boulet, owner of East Cumberland (a company contracted to remove trees in advance of mining), and a crew of tree cutters were cutting trees on the East of Stollings Amendment site. Just before noon, Boulet watched the bulldozer operated by Moss advance to the Low Gap area. The bulldozer was operated within several feet of the suspected location of the 16-inch gas line. Boulet thought that the gas company had shut off the gas lines.

Marcum met Richard Darnell, chief surveyor, Tuesday evening and asked Darnell to mark the gas line. Darnell did not have a metal detector on the job site. Darnell told Marcum that he would mark the gas line Wednesday morning. Marcum told Darnell to mark 300 feet of gas line in both directions from the Low Gap.

En route to work the morning of Wednesday, February 1, 2006, Moss told Kenneth Smith, loader operator at Black Castle Surface Mine, about the gas line. Moss was concerned about the gas line because he did not know its exact location. Moss was going to start benching in the area of the gas line.

At approximately 5:30 a.m., Moss arrived at the mine and picked up a mantrip vehicle at the S-1 trailer. Moss drove the man-trip vehicle and delivered the shovel operator and an excavator operator to their work areas. He then traveled back to the S-1 trailer where Mike Vira, Superintendent of Black Castle Surface Mine, told Moss to go with Booth again today. Moss, traveled to his bulldozer and moved it to the East of Stollings Amendment site at approximately 6:45 a.m. to continue construction of the drill bench. Booth was already at the work area prior to Moss's arrival. Upon Moss' arrival, Booth observed Moss operating the bulldozer and communicated with him via CB radio. Booth asked Moss if he was okay and Moss replied that he was fine. Booth did not discuss the gas line with Moss at this time.

At approximately 7:30 a.m., Moss spoke to Jackson Woodard, bulldozer operator, who was operating a bulldozer in a pit directly across the valley and in view of Moss. Moss

asked Woodard to contact a boss and tell him that he needed to speak to him. Sometime between 8:30 and 9:00 a.m., Smith, while operating a loader in another pit, heard Moss calling on the CB radio for Booth or Vira.

Shortly after 8:30 a.m., Vira arrived at the pit where Woodard was working. Vira was conducting an on-shift examination of work areas and picking up pre-operational examination records from equipment operators. Vira and Moss spoke via CB radio. Moss explained to Vira that he believed he was close to the gas line. Vira told Moss to stay 100 feet away from the gas line. Neither Vira nor Moss knew the exact location of the gas line. After talking to Moss over the CB radio, Vira left the area to return to the mine office for a scheduled foremen's meeting. Vira told Booth, when entering the mine office, that Moss wanted to talk to him.

Mike Black, General Mine Foreman, called to Moss on the CB radio as he drove through the East of Stollings Amendment. Black asked Moss if he was alright, Moss replied that he was doing fine.

Woodard, spoke to Moss on the CB radio at approximately 9:30 a.m. Moss did not know how far back in the hill he needed to develop the bench. Moss knew that he should stay below the gas line, but he did not know its location. Moss proceeded to cut a bench which was located approximately 680 feet above the Low Gap area.

At approximately 10:00 a.m. Darnell and Lonnie Wood, surveyors, arrived at the East of Stollings Amendment site to locate the active gas line. At this time Moss was not working in the area that was to be marked. Moss, after seeing the survey crew, drove the bulldozer down the hill to the surveyors. Moss shut off the machine, exited the cab, and asked Darnell if he was going to locate the gas line. Darnell Wood told him that he would try his best. Moss asked him to call on the radio for Booth. Darnell Wood tried but could not make radio contact. Moss took the bulldozer back up the hill and started working again. Darnell used a CST-Magna-Trak 102 metal detector to locate the gas line. The location of the gas line was identified with pin flags, stakes and paint. From the area known as the Low Gap, the gas line was located approximately 300 feet in both directions.

Darnell walked up the hill to a high rocky knob to check the location of the active gas line. Darnell did not mark any of this additional length of gas line because he was out of markers and he had already marked the location of the gas line beyond Marcum's instructions. Moss drove the bulldozer below Darnell and stopped between Darnell and the Low Gap. Moss shut off his bulldozer, exited the cab and asked about the location of the gas line. Darnell pointed down the hill to the location of the gas line. Moss asked Darnell if the gas line was in the grassy area of the hill. Darnell replied yes. Moss and Darnell did not discuss the location of the gas line farther up the ridge. Moss asked Darnell if there was going to be a second bench in the area. Darnell responded that there was not enough room in the area for a second bench because they were right against the gas line. Darnell also told Moss that there could be a second bench farther out the ridge, but he would have to talk to some else about that.

About 11:30 a.m., Booth spoke to Moss on the CB radio and decided to travel to Moss's location. Just after Booth's arrival, the surveyors left the site. Moss was eating lunch when Booth arrived. After lunch, Moss and Booth walked around the bench. They talked about how far off of the coal seam Moss was currently working. Moss told Booth that his progress would be a little slow. Booth told Moss to be careful and he left the work area.

Moss returned to work, continued to cut the roadway up the hill and establishing a bench on the Clarion coal seam level. The timber cutters finished working around 12:45 p.m. and they left the site.

At approximately 1:45 p.m., Woodard, who was operating a front-end loader across from the access road, tried to make contact with Moss to determine why Moss was operating the dozer so far up on the hill. Moss did not respond on the CB radio. Due to past practice, Woodard believed this was because Moss had the volume on his radio turned down.

At approximately 2:10 p.m. the bulldozer contacted and ruptured the 16–inch, low-pressure, high-volume natural gas line while making the first push of brush, 260 feet above the Clarion coal seam. The bulldozer was immediately engulfed in flames. Moss exited the cab of the bulldozer and traveled on top of the right track toward the cutting blade. Booth and Black heard coal truck drivers talking on the CB radio about a dozer fire at the East of Stollings Amendment site and immediately drove to the area. Black observed the open door on the bulldozer, but was unable to find Moss. Both foremen tried to get close to the bulldozer, but had to retreat due to the heat and flames.

At approximately 2:30 p.m., cut off valves on each side of the rupture were turned off to eliminate the flow of natural gas. The flames diminished and Black spotted the victim's body lying on the ground behind the blade of the bulldozer. Helicopters were used to aerial-drop water in an effort to extinguish the flames. After determining the area of the ruptured gas line to be safe, the victim was removed from the site and transported to the State Medical Examiner's Office, located in Charleston, West Virginia.

## INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 2:15 p.m. on Wednesday, February 1, 2006. MSHA personnel from the Madison Field Office were immediately dispatched to the mine. A 103(k) order was issued to insure the safety of all persons during the accident investigation. The investigation was conducted in cooperation with the West Virginia Office of Miners' Health, Safety, and Training (WVOMHST), with the assistance of the mine operator and employees. Persons who participated in the investigation can be found in Appendix A.

An investigation of the physical conditions of the accident was conducted. Photographs and relevant measurements were taken. The accident site was surveyed and drawings

were made. Interviews were conducted at both the mine office and the Danville office of WVOMHST.

## DISCUSSION

### Gas Line

The 16–inch, low-pressure, high-volume natural gas transfer line (referred to as the non-jurisdictional rural gathering line) was installed in the mid 1940s by C & G Gas Company. At the time of the accident, it was owned and operated by Equitable Gas. The gas line transferred natural gas from Madison to Chelyan, West Virginia. Gas flowed through the line at 2.5 million cubic feet per hour under 70-80 pounds per square inch of pressure. Approximately 3,750 feet of this gas line passed through the East of Stollings Amendment site.

Carsonite (plastic) markers were used to identify the location of the buried gas line. Several of the carsonite markers were missing on the East of Stollings Amendment site, including those at the accident site. The right-of-way outlining the gas line on the Black Castle Surface mine was mowed in the first part of 2005. Electrical rectifiers were installed at various locations along the 16-inch gas line to supply an impressed current on the steel line (cathodic protection) to protect against line deterioration. Sufficient electrical energy would have been present on the line to produce an arc when the pipe was separated or ruptured.

The 16-inch gas line was not adequately located or marked to identify it's location at the site. The morning prior to the accident, a section of the line was located and identified approximately 300 feet from the Low Gap, extending up the hill. The line was identified after 10:00 a.m. of the second day that work occurred. The remaining 3,450 feet of gas line across this site was not identified and marked.

### Gas Line Relocation Planning

A meeting was held in February, 2005 between Brian Miller, Assistant Superintendent of Pipelines for Equitable Gas, Mark King, Engineer for Black Castle Mining Co., and Tim Comer, Vice President of Black Castle Mining Co. The meeting was held to discuss the relocation of the 16-inch gas line for future mining plans. It was determined that the relocation of the 16-inch line at the East of Stollings area where the accident occurred would take place in March or April 2006. These plans were changed in January, 2006, when King notified Miller that the relocation was rescheduled to May or June, 2006.

It is customary for a mine operator to contact the owner of a gas line or of a gas line right-away before any work would be done on a tract of land. This includes timber cutting preceding any surface disturbance. Once notified, the gas company will relocate the gas line or identify the gas line with markers. After timber cutting is completed, the gas company will replace any damaged or destroyed gas line markers.

Equitable Gas recommends a safe zone or area of 50 feet on each side of an active gas line when equipment is being operated in the area. Should a piece of equipment need to cross an active gas line, Equitable recommends the gas line be encased with a steel pipe which has a minimum wall thickness of ¼ inch and be buried a minimum of six feet, or protected from damage by equivalent means. In the areas where equipment will be allowed to cross, the gas lines will be marked by signs designating the crossing area and identifying the presence of the gas line.

**Tree Clearing and Bench Preparation**

East Cumberland began timber cutting in advance of mining just after January 1, 2006, on the 122-acre East of Stollings site. Rogene Boulet, Owner of East Cumberland, was instructed to cut trees on the tract, but not to bring any heavy equipment and not to disturb the surface of the ground.

Just before noon on January 31, 2006, Boulet observed the bulldozer advance to the Low Gap area and operate within several feet of the 16-inch gas line. Moss began to remove cut trees and vegetation from the area above the proposed highwall. In order to prepare the drill bench, the bulldozer must operate above the proposed highwall and clear any fallen trees. The fallen trees are pushed down below the area where the drill bench is to be developed.

**Accident Site**

Multiple coal seams are mined at varying elevations. The Five Block coal seam is located at approximately 1820 elevation; the Clarion coal seam is located at approximately 1740 elevation; the Stockton coal seam is located at approximately 1660 elevation; the Coalburg coal seam is located at approximately 1640 elevation; and the Buffalo coal seam is located at approximately 1500 elevation. The low gap area near the accident site is located near the Coalburg coal seam at approximately 1640 elevation.

**Workplace Examinations**

Booth and Marcum, instructed and observed Moss operating the D10R bulldozer in close proximity to an active gas line. The exact location of the gas line was not known. The gas company was not notified that the surface of the ground within close proximity of the active gas line was being disturbed. The gas line was not identified or marked before instructing Moss to operate the D10R bulldozer. Both foremen, Booth and Marcum, knew the active gas line traveled across the area of the mine. Both foremen knew that operating a bulldozer of this size in close proximity of the unmarked active gas line was exposing Moss to a hazardous condition.

Vira was the certified person designated by the mine operator to perform the pre-shift examination required by the West Virginia Office of Miners' Health, Safety and Training. Vira was also the person designated by the mine operator to perform the daily on-shift inspection of the surface coal mine. Vira was aware that the 16-inch gas line

traveled across the site. While conducting the examinations, Vira did not travel onto the access road where Moss was operating the D10R bulldozer. Vira was aware that the gas line was to be marked by the survey crew, but he never checked the area to see if the gas line had been identified. The active work area where the accident occurred was not examined by a certified person designated by the operator, and the hazardous condition was not corrected.

Marcum, mine manager, also made two visits to the site the day prior the accident. Marcum knew Moss would be traveling in close proximity to the gas line at the beginning of the access road from the Low Gap starting up the hill. Early in the shift of the first day at the site, Marcum instructed Moss not to drop his bulldozer blade.

Marcum made arrangements for the gas line to be identified and marked after Moss had worked one day at the site. Marcum instructed the survey crew to locate approximately 300 feet of the gas line near the Low Gap. The surveyors were not instructed to mark the entire length of the gas line, approximately 3,750 feet. The gas line was ruptured approximately 2,520 feet from the Low Gap area.

## ROOT CAUSE ANALYSIS

A root cause analysis was conducted to identify the most basic causes of the accident that were correctable through reasonable management controls. Listed below are root causes identified during the analysis and their corresponding corrective actions implemented to prevent a recurrence of the accident.

**Root Cause:** Mine management directed the bulldozer to work in close proximity to a known but unlocated active gas line. Although aware of the gas line and potential hazard, mine management did not accurately locate and mark the gas line before directing the bulldozer to operate in the area. This exposed the bulldozer operator to a hazardous condition. There were no policies or procedures in place to address hazards associated with working near active gas lines.

**Corrective Action:** The Ground Control Plan was revised to establish safety precautions to be taken when gas lines are in close proximity to active work areas. The Ground Control Plan has been received and acknowledged by the District Manager, District 4, Mine Safety and Health Administration.

**Root Cause:** The required on-shift examinations for the active work area were not conducted. The hazardous condition was not properly identified or corrected. The person designated by the mine operator to perform the examinations did not travel onto the access road where Moss was operating the bulldozer. There was no effective management system in place to assure that required examinations were being conducted in all work areas.

**Corrective Action:** Mine management conducted retraining for all persons designated to conduct on-shift examinations. The retraining focused on the topic of hazard recognition.

## CONCLUSION

The accident occurred because mine management directed the bulldozer to work in close proximity to a known but unlocated active gas line. Although aware of the gas line and potential hazard, mine management did not accurately locate and mark the gas line before directing the bulldozer to operate in the area. This exposed the bulldozer operator to a hazardous condition. Additionally, failure to conduct required on-shift examinations contributed to the accident in that the hazardous condition was not properly identified and corrected.

Original Signed By
Jesse P. Cole
District Manager

July 10, 2006
Date

## ENFORCEMENT ACTIONS

1. A 103(k) Order, No. 7251646 was issued to assure the safety of all persons at this operation until an investigation could be completed and prohibits all activity at the mine until MSHA determines that it is safe to resume normal mining operations in the affected area.

2. A 104(d)(1) Citation, No. 7247101 was issued to the mine operator for a violation of 77.1713(a). An adequate daily examination for hazardous conditions was not made of the active working area in the East of Stollings Area of the mine. A bulldozer operator was working in this area developing a drill bench at the Clarion coal seam level. The area was not adequately examined by a certified person for hazardous conditions and an existing hazardous condition, which was neither reported nor corrected, contributed to a fatal accident.

   An active 16-inch diameter gas line was buried and was not adequately marked in the area where the bulldozer was being operated. The area was not adequately examined to determine the location and extent of the gas line. Mine management knew that the gas line was located in the general area where the bulldozer was being operated and knew that the gas line was not marked. The presence of the unmarked gas line constituted a hazardous condition which should have been reported and corrected during the required daily inspection. Although management conducted an on-shift examination of the general area, this hazardous condition was neither reported nor corrected. Management instructed the bulldozer operator to locate the clarion coal seam crop and to develop a drill bench at that level. While carrying out this task, the bulldozer contacted the gas line causing it to rupture. The natural gas was ignited, flames engulfed the bulldozer and the operator received fatal injuries.

   This violation is an unwarrantable failure to comply with the cited mandatory standard.

## APPENDIX A

**List of persons furnishing information and/or present during the investigation:**

### Black Castle Surface Mine

Michael Snelling ..... Manager of Surface Operations
Shane Harvey ..... Attorney
Anna Dailey ..... Attorney
Aaron Price ..... Safety Director
Phillip Marsh ..... President
Mike Vira ..... Superintendent
Mike Booth ..... Mine Foreman
Mike Black ..... Foreman
Billy Marcum ..... Mine Manager
Richard Darnell ..... Surveyor
Lonnie Wood ..... Rodman
Lonnie Napier ..... Dozer Operator
Jackson Woodard ..... Dozer Operator
Kenneth Smith ..... Loader Operator

### Equitable Gas

Brian Miller ..... Assistant Superintendent of Pipelines

### East Cumberland

Regene Boulet ..... Owner

### West Virginia Office of Miner's Health, Safety and Training

C. A. Phillips ..... Deputy Director
Dennie Ballard ..... Assistant Inspector-at-Large
Lonnie Gore ..... Surface Inspector
Curtis Vance ..... Surface Inspector

### Mine Safety and Health Administration

Jesse Cole ..... District Manager
James Humphrey ..... Coal Mine Safety and Health Inspector
Sherman Slaughter ..... Coal Mine Safety and Health Specialist