CAI-2017-06

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

Coal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Coal Mine

Fatal Powered Haulage Accident
May 6, 2017

Rosebud Mine & Crusher/Conveyor
Western Energy Company
Colstrip, Rosebud County, Montana
ID No. 24-01747

Accident Investigators

David Hamilton
Coal Mine Safety and Health Inspector

Jim Branson
Coal Mine Safety and Health Inspector

Ronald Gehrke
Mining Engineer Coal Mine Safety and Health

Originating Office
Mine Safety and Health Administration
District 9
P.O. Box 25367, Denver Colorado 80225
Richard A. Gates, District Manager

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OVERVIEW

On May 6, 2017, at approximately 4:45 p.m., Michael Ramsey, a 62-year-old miner with 14 years of mining experience, received fatal injuries when the Caterpillar 777F haul truck he was operating went over a highwall. The victim was backing up his haul truck to dump his load of overburden when the ground under the truck failed. The haul truck, with the victim inside, fell backwards over the highwall edge to the bottom of the pit containing dumped overburden. The truck traveled approximately 150 feet before coming to a stop.

The accident occurred because the mine operator did not ensure that haul truck drivers dumped their loads a safe distance from the highwall. Also, the mine operator had knowledge that unsafe dumping was a practice at the mine.

GENERAL INFORMATION

The Rosebud Mine & Crusher/Conveyor is a surface mine operated by Western Energy Company and owned by Westmoreland Coal Company. The mine is located near Colstrip, Montana. Overburden is removed exposing the Rosebud coal seam utilizing four draglines and is deposited in previously mined pit areas. The coal is loaded by front-end loaders into 100 ton and 200 ton haul trucks for transport to areas where the

coal is stockpiled. The coal seam averages 20 to 25 feet in thickness and overburden thicknesses vary from 20 feet to more than 200 feet.

The mine employs 370 miners and operates seven days a week, with two 12 hour production shifts and two 12 hour maintenance shifts per day. The mine produces approximately 20,000 tons of coal per day.

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

Lukas Klemke……..Mine Manager
Jerry Gillespie……....Production Manager
Nora Buchholz……...Safety Manager
LeRoy Sessions……...Maintenance Manager

The last regular safety and health inspection (E01) conducted by the Mine Safety and Health Administration (MSHA) was completed on February 2, 2017. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine in 2016 was 0.78, compared to the national NFDL incident rate of 0.74 for mines of this type.

DESCRIPTION OF ACCIDENT

Haul truck driver Michael Ramsey arrived for work on Saturday, May 6, 2017, at 6 a.m. He was a member of Crew 3, along with haul truck drivers Rob Moore and Matt Nelson. The three drivers received instructions for their shift from Ed Buchholz, Crew 4 Supervisor, who worked the night shift. They were assigned to haul overburden from the Cat 993 loader number LD 11 and dump it into the pit between the C-1 South and B-9 ramps. The drivers got to their equipment at approximately 6:15 a.m. Ramsey performed a pre-operational examination on his Caterpillar 777F haul truck, and the documentation shows he did not detect any safety defects or other issues with the truck.

The shift progressed normally, with all three trucks dumping their loads at the same dump point. The trucks dumped approximately 300 loads, when at approximately 4:40 p.m., Ramsey's truck was loaded with 98 tons of overburden. Ramsey drove to the dump but did not return to the loader. At about 4:50 p.m., Moore, whose truck was next in the loading cycle, approached the dump point at the crest of the highwall and noticed a section of the berm was gone. He dumped his 100 ton load short to block the gap in the berm. He then radioed Nelson to inform him that the berm was gone and that he had dumped his load short.

Rich Hart, Loader Operator, noticed Ramsey was missing from the rotation and asked over the radio if anyone knew Ramsey's location. Nelson arrived at the dumping location and saw a haul truck upside down at the bottom of the pit. He radioed Stephan Hanson, Gate Guard, and requested he announce a "mayday" over the radio

and give out the accident location. At 5:00 p.m. Hanson announced the mayday over all mine radio channels and he called 911 for assistance. Charlie Charette, Crew 3 Supervisor in Areas A, B, and D, and James Fulkerson, Crew 3 Supervisor in Area C, heard Hanson say over the radio that a truck went over the highwall.

David Murch, Bulldozer Operator, arrived on the scene at the top of the highwall. He tried to communicate verbally with Ramsey but did not receive any response. Charette traveled to the bottom of the pit in an attempt to get to Ramsey. Charette was only able to get within several hundred feet of the truck because of water in the bottom of the pit. He contacted two bulldozer operators in the area to travel to the spoil side of the pit and start building a road to the truck.

Troy Cozzens, Emergency Medical Technician (EMT) and Rescue Team Member (RTM), and Jason Serrano, RTM, arrived at the top of the highwall. Cozzens rappelled over the wall and was the first person to reach the haul truck location. He found Ramsey unresponsive. Cozzens informed Serrano they would need additional assistance. Cozzens removed Ramsey's seatbelt and lowered him to the roof of the haul truck to check for vitals. Cameron Ator, RTM, arrived to help Cozzens and they started cardiopulmonary resuscitation (CPR), continuing the procedure for about 30 minutes. There was no response from the victim. Meryl Young, RTM, also arrived with necessary equipment to rescue Ramsey.

Dan Allerdings, EMT and RTM, stayed at the top of the highwall to communicate with Colstrip Ambulance personnel who arrived at the top of the highwall at 5:27 p.m. Shawn Haig, Colstrip Ambulance Attendant, contacted Dr. Jose Ortiz at the Colstrip Medical Clinic to inform him of the 30 minutes of CPR and that Ramsey had not responded. Dr. Ortiz instructed Haig to cease further resuscitation and recover the victim. Haig relayed the information to the rescue team.

Cozzens, Serrano, and Young secured Ramsey to a backboard at the truck. Ramsey was then lifted out of the pit. Alan Fulton, Rosebud County Coroner, arrived at the mine and pronounced Ramsey dead at 7:25 p.m.

INVESTIGATION OF THE ACCIDENT

On May 6, 2017, at 5:43 p.m., Charette notified the Department of Labor (DOL) National Contact Center that a serious accident had occurred at Rosebud Mine & Crusher/Conveyor. MSHA issued a noncontributory citation for a violation of § 30 CFR 50.10 because the mine operator did not contact MSHA immediately, at once, without delay, and within 15 minutes.

William Vetter, Coal District 9 Health Supervisor, was notified by the Contact Center of the accident on the district's emergency cell phone at 5:58 p.m. At 6:32 p.m., he issued a

103(j) order over the telephone to Walt Shaw, Maintenance Superintendent, to preserve the accident scene.

David Hamilton, Coal Mine Safety and Health Inspector/Accident Investigator, and James Branson, Coal Mine Safety and Health Inspector, were dispatched from the Gillette, Wyoming Field Office to the mine. When they arrived, they modified the 103(j) order to a 103(k) order. They also took preliminary statements from persons having knowledge of the facts and circumstances concerning the accident and conducted a preliminary investigation of the scene.

On May 7, 2017, Hamilton and Branson examined the existing physical conditions at the accident scene. They also took digital photographs and relevant measurements of the scene and reviewed training, mine examination, equipment, and maintenance records. MSHA held formal interviews at the mine on May 7, 2017. Additional interviews were conducted on May 9, 10, 11, 16, and 18, 2017 (see Appendix A). The investigation was conducted in conjunction with the company, the miners' representative, and the State of Montana Safety and Health Bureau, Mine Section.

DISCUSSION

Location of Accident, Conditions, and Dump Practice

The truck went over the highwall in Area B between the C-1 south ramp and B-9 ramp (see Appendix B). The highwall is at the boundary line of the mine permit. The haul road on top of the highwall is 50 feet wide. The haul trucks were using a right hand traffic pattern traveling east to west along the highwall edge. When the trucks reached the dump location they would turn left, backup to the edge, and dump over a berm. The berm, which consisted of soil and clay, was located at the edge of the highwall and measured four foot eight inches high by five foot six inches wide.

The ground where the truck was dumping failed, creating an opening at the edge of the highwall causing the truck to fall. The opening was approximately 24 feet wide and extended up to 10 feet back from the edge of the highwall. The operating width of a Cat 777 truck is 21 feet 4 inches.

Company Policies and Unsafe Dump Practices

The dump practice described above did not comply with Western Energy Company's safety manual and standard operating guideline, which state:

Safety manual (2014) excerpt 6.23:
No equipment shall work on top of the highwall within twenty five (25) feet of the vertical un-shot edge and at no time shall the equipment move or work parallel within twenty-five (25) feet of the edge.

Standard Operating Guideline (March 3, 2014):
When dumping off a highwall, end dumps should dump short, with the bulldozers pushing material off of the highwall until a dump point can be solidly established on spoil material.

Investigators learned that unsafe dump practices were commonly performed by several crews, including the victim's crew. These crews routinely operated equipment within 25 feet of the highwall, and their trucks did not dump short so that bulldozers could push overburden over the highwall. If trucks dumped short, overburden material would have been present more than 25 feet from the highwall. Investigators did not find overburden material in this location.

At the time of the accident, no bulldozer was being used to push overburden over the highwall, and from interviews, investigators learned that the bulldozer closest to the accident site was approximately 1,300 feet away from the highwall. The 25-foot provision was also listed in the mine operator's safety program (required by 30 CFR § 77.1708).

On Thursday, May 4, 2017, two days before the accident, Alan Raymond, Motor Grader Operator and Miners' Representative, observed tire marks in a berm at the highwall 200 feet from the accident scene. This indicated to him that unsafe dumping practices were occurring at this location. He believed trucks were repeatedly pounding into the berms when dumping, causing the berms to be pushed back toward the edge of the highwall, to the point where the berms were in danger of giving way or failing. Raymond believed a miner would get hurt or die if this practice continued. He immediately exercised the mine operator's "stop work authority" provision and informed E. Buchholz, the Crew 4 Supervisor, of his concerns regarding the unsafe practice and the potential injury or death to a miner. Western Energy Company's safety manual states the following regarding stop work authority:

> Western Energy Company expects each employee to accept the responsibility for his or her own personal safety, as well as the safety of their co-workers; to observe all safety rules; and to constantly promote safety through both work and actions. All employees and visitors are empowered with STOP WORK AUTHORITY. If you observe unsafe activity, it is your responsibility to speak up. You have the authority to stop work until it is safe, and there will be no repercussions to you.

Raymond notified E. Buchholz and E. Buchholz immediately ordered that loading, hauling, and dumping activities in the area be stopped so he could ensure everyone on Crew 3 was aware they were not to dump over the berm.

E. Buchholz then used the radio to address miners in Crew 3 working in the area. He stated to them that the procedure was to dump short and push loads over the highwall when the angle of repose had not been established. Each member of the crew confirmed verbally that they understood.

E. Buchholz had a separate discussion with Charette and told him that the crews should be dumping short and pushing over in the area at issue. He also told Charette that the overburden should not be dumped in one location, but from different locations along the highwall. This way a bulldozer operator could keep up with pushing overburden over the highwall.

During the night shift on May 4, 2017, E. Buchholz traveled to the berm area and took a photograph of the tire tracks (see Appendix C). His intention was to show the photo to Richard Sheridan, the supervisor of the previous shift (Thursday day shift), so that Sheridan could discuss it with his crew. However, E. Buchholz told investigators he did not have a chance to show the photograph to anyone prior to the accident.

Investigators were not able to determine if, prior to the accident, trucks impacted the berm at the location where the victim's truck went over the highwall. However, it was clear that the company's dump short and 25 foot policies were not followed at either location.

Weather Conditions

The weather was not a factor in the accident. The haul roads were dry. Normal temperatures were present without precipitation and visibility was clear.

Examinations

Investigators reviewed the on-shift examination records and questioned examiners. Mine examiners reported they did not find any hazards related to the highwall, dump location, or the truck on the day of the accident.

Caterpillar 777F Haul Truck

On May 12, 2017, the mine completed the access road to the haul truck. On that day, MSHA investigators took photographs and performed a preliminary inspection in and around the truck; they found no obvious defects.

The vehicle involved in the accident was equipped with the Vital Information Monitoring System (VIMS). VIMS uses numerous sensors to provide information on vital machine functions and alert the driver of an impending or abnormal condition.

On May 18, 2017, VIMS data for the truck was downloaded by Steve Clark, Field Technical Representative, for Tractor & Equipment Company (T&E), of Billings, Montana. Investigators were present and all events and payload data from March 1, 2017 through May 6, 2017, were shared with MSHA. Investigators determined the VIMS data did not contain any information related to the accident.

On May 31, 2017, Guy Barbera, P.E. Senior Engineer, Jacobson Forensic Engineering, Inc. of Littleton, Colorado, performed four brake tests: park brake test, park brake release, rear service brake, and front service brake on the Caterpillar 777F truck 982. Barbera checked the accumulators, which store energy that the brake system will use when there is a loss of power to the brake system. He also checked the thickness of the brake pads. All tests and measurements were found to be within the parameters specified by Caterpillar.

The truck also had an engine control module (ECM), integrated braking control (IBC), and transmission/chassis control systems (TCC). These systems control operation of the truck, monitor operation, and provide diagnostic warnings to the driver. These systems also store diagnostic and event codes for abnormal conditions and abnormal operation. Barbera downloaded the diagnostic and event code information from these systems. These systems indicated there were no abnormal conditions or operation before the accident. No information was recorded on these systems during and after the accident. Investigators found the haul truck had no safety defects that could have contributed to the accident.

Training and Experience

Ramsey had 10 years and 18 weeks experience at this mine as a haul truck operator. Ramsey received task training on the Caterpillar 777 end dump trucks on January 3, 2016. During the task training, Jennifer Leigh, Truck Driver, demonstrated and explained proper dumping techniques, including the use of the dump lever control. Leigh also observed Ramsey operate the truck, including dumping. Ramsey completed annual refresher training on April 7, 2017.

Kathy Cattles, Training Specialist, examined all of Ramsey's training records and found that his training was in accordance with 30 CFR § Part 48.

ROOT CAUSE ANALYSIS

MSHA conducted an analysis to identify the most basic causes of the accident that were correctable through reasonable management controls. Root causes were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below is the root cause identified during the investigation and the operator's implemented corrective actions to prevent a reoccurrence of this type of accident.

Root Cause*:* The mine operator did not ensure that trucks dumped a safe distance from the highwall. Also, the operator had knowledge that unsafe dump practices were a practice at the mine. The truck fell because it was too close to the highwall and the ground at the dumping place did not support its weight.

Corrective Action*:* The mine operator submitted a revised ground control plan, which specifically states: "Berms will not be used as a stop under any circumstances. Trucks will not dump over the highwall under any circumstances. Trucks will dump short and material will be pushed over by bulldozers in any situation where the angle of repose has not been established. The minimum distance for trucks to dump in this situation will be 25 feet from the vertical un-shot edge above any highwall. At no time shall any trucks move or work parallel within 25 feet of the highwall edge." All truck drivers and bulldozer operators have been trained in the revised ground control plant. To ensure that the ground control plan is being followed, the mine operator has placed a bulldozer at the dump site. The bulldozer operator communicates with the truck drivers to tell them where to dump. In addition, stakes have been installed 25 feet from the highwall so that truck drivers can see where to stop their trucks.

CONCLUSION

On May 6, 2017, at approximately 4:45 p.m., Michael Ramsey received fatal injuries when the Caterpillar 777F haul truck he was operating went over a highwall. The victim was backing up his haul truck to dump his load of overburden when the ground under the truck failed, and the haul truck with the victim inside fell backwards to the bottom of the pit containing dumped overburden. The truck traveled approximately 150 feet before coming to a stop.

The accident occurred because the mine operator did not ensure that haul trucks dumped their loads a safe distance from the highwall. Also, the mine operator had knowledge that unsafe dumping was a practice at the mine.

Approved By:

_____ _____

Richard A. Gates Date
District Manager

ENFORCEMENT ACTIONS

1. A verbal 103(j) order was issued on May 6, 2017, at 6:32 p.m.

2. The 103(j) order was modified to a 103(k) order, 8477486 on May 7, 2017, at 1:00 a.m. to ensure the safety of miners until the investigation could be completed.

   An accident occurred at this operation on May 6, 2017, at approximately 5:00 p.m. As recovery work is necessary, this order is being issued under section 103 (j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity in Area B between C-1 South and B-9 ramps both spoil side and the highwall side for approximately 2000 feet, until MSHA has determined that it is safe to resume normal mining operations in this area. This order was initially issued orally to the mine operator at 6:32 p.m. and now has been reduced to writing.

3. 104(d)(1) citation No. 8477490 was issued for a violation of 30 CFR § 77.1608(b)

   On May 6, 2017, the ground at the dumping place between C 1 South and B 9 ramp designated by the operator failed to support the weight of a loaded haul truck. The Caterpillar 777F c/n 982 haul truck fell 150 feet to the bottom of the pit and resulted in fatal injuries to a miner. The mine operator allowed this practice of dumping over a highwall from one location. The trucks did not dump at a safe distance from the edge.

Appendix A
Persons Participating in the Investigation
(Persons interviewed are indicated by a * next to their name)

Westmoreland Coal Company

*Jerry Gillespie ..... Production Manager
LeRoy Sessions ..... Maintenance Manager
Charlie Fake ..... Maintenance Supervisor
Rusty Batie ..... Engineering Manager
Ernie Sprague ..... Miners' Representative
*Gerald Sundhiem ..... Truck Driver, Rescue Team Member, and Miners' Representative
Trudy One Bear ..... Miners' Representative
Steve Fay ..... Miners' Representative
*Troy Cozzens ..... EMT Rescue Team Member
*Cameron Ator ..... Rescue Team Member
*Meryl Young ..... Rescue Team Member
*Dan Allerdings ..... EMT Rescue Team Member
*Kristian Whiteshield ..... Rescue Team Member
*Jason Serrano ..... Mechanic/Welder and Rescue Team Member
*John Wemple ..... Mechanic/Welder
*Jerome Thomas Fischer ..... Mechanic/Welder
*David Murch ..... Bulldozer Operator
*Rob Moore ..... Truck Driver
*Matt Nelson ..... Truck Driver
*Wade Blackwell ..... Truck Driver
*Steve Heronemus ..... Truck Driver
*Cody Johnson ..... Truck Driver
*Kerry Ayers ..... Truck Driver
* Jennifer Leigh ..... Truck Driver
*Alan Raymond ..... Motor Grader Operator and Miners' Representative
*Larry Daugherty ..... Motor Grader Operator
*Rich Hart ..... Loader Operator
*Charlie Charette ..... Supervisor, Crew 3 Area A-B-D
*James Fulkerson ..... Supervisor, Crew 3 Area C
*Doryld Watson ..... Supervisor, Crew 2 Area C
*Braden Colbert ..... Supervisor, Crew 2 Area A-B-D
*Ed Buchholz ..... Supervisor, Crew 4 Area A-B-D
*Richard Sheridan ..... Supervisor, Crew 1 Area A-B-D
*Dave Sorenson ..... OB Production Superintendent
*Craig Steinbach ..... OB Production Superintendent
*Wes Sessions ..... Coal Production Superintendent
*Nora Buchholz ..... Safety Manager

*Lukas Klemke..... Mine Manager

Securitas Security Services USA, Inc.

*Stephan Hanson.....Gate Guard

State of Montana Safety and Health Bureau, Mine Section

Gordon Brannon.....Mine Inspector

Mine Safety and Health Administration

David Hamilton..... Mine Safety and Health Inspector /Investigator
James Branson .....Coal Mine Safety and Health Inspector
Ronald Gehrke.....Mining Engineer Mine Safety and Health
Kathy Cattles..... Training Specialist, Educational Field Services
James Preece..... Assistant District Manager
Wayne Johnson.....Gillette WY Field Office Supervisor

Tractor and Equipment Company

Steve Clark ..... Field Technical Representative
Mike Neitzel.....Field Mechanic

Jacobson Forensic Engineering, Inc.

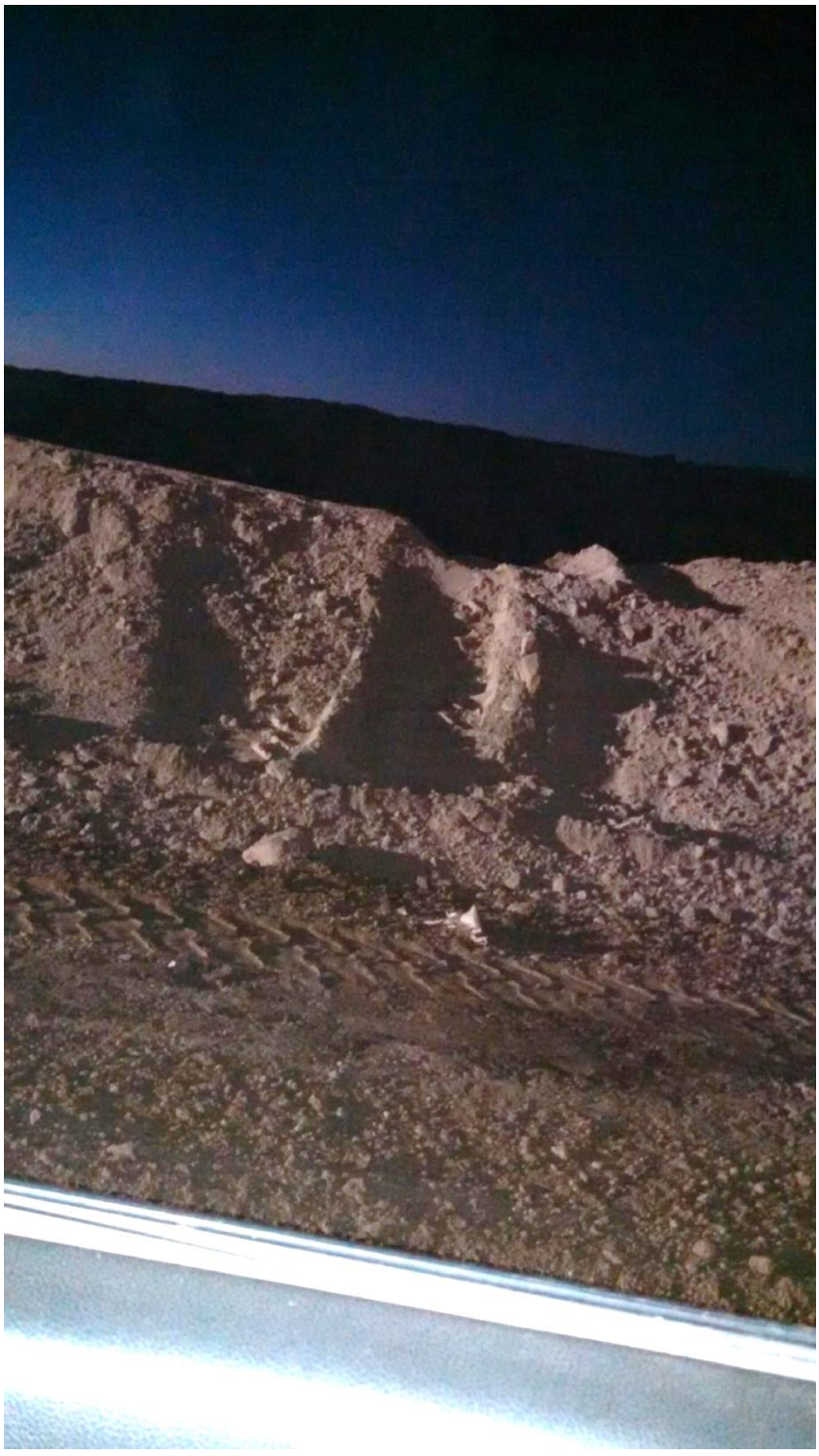
Guy J. Barbera..... Senior Engineer

Jackson and Kelly

Kristin White.....Counsel

Appendix B
Map of Accident Site

Appendix C
Photo of Tire Marks



Appendix D
Victim information

Accident Investigation Data - Victim Information
Event Number: 4 2 6 8 6 8 8

U.S. Department of Labor
Mine Safety and Health Administration

Victim Information: 1

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:
Michael L. Ramsey	*M*	*62*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 05/06/2017 b.Time: 19:25	*a. Date: 05/06/2017 b.Time: 6:00*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
176 Truck Driver	*055 Operating haulage truck*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*10*	*18*	*0*	b. Regular Job Title:	*10*	*18*	*0*	c: This Mine:	*10*	*18*	*0*	d. Total Mining:	*14*	*8*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
076 injuries received in truck overturning	*370 Blunt force trauma to head and torso*

13. Training Deficiencies:
Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task:

14. Company of Employment: (If different from production operator)
Operator
Independent Contractor ID: (if applicable)

15. On-site Emergency Medical Treatment:
Not Applicable: | First-Aid: X | CPR: X | EMT: X | Medical Professional: | None:

16. Part 50 Document Control Number: (form 7000-1) *220171310022*
17. Union Affiliation of Victim: *2501* *Int Union Operating Engineers*