CAI-2013-17

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Coal Mine

Fatal Machinery Accident
October 6, 2013

Jim Bridger Mine
Bridger Coal Company
Point of Rocks, Sweetwater County, Wyoming
Mine ID No. 48-00677

Accident Investigators

David Hamilton
Coal Mine Safety and Health Inspector

Richard Dickson
Coal Mine Safety and Health Inspector

F. Terry Marshall
Mechanical Engineer/Technical Support

Originating Office
Mine Safety and Health Administration
District 9
P.O. Box 25367, Denver, Colorado 80225
Russell J. Riley, District Manager

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PHOTOGRAPH OF ACCIDENT SCENE

BOTTOM OF HIGHWALL

OVERVIEW

In the early morning hours of October 6, 2013, Mark C. Stassinos was fatally injured while operating a Caterpillar D-11R track bulldozer. The bulldozer had been refueled at 2:35 a.m. At some time after 2:35 a.m., the bulldozer traveled through a berm at the top of a 163 foot highwall, located at ramp 56 drill bench at the Jim Bridger Mine. The bulldozer overturned one and a quarter times before coming to rest with the bulldozer blade stuck vertical into the spoil at the bottom of the highwall. The victim had been partially ejected out the rear window of the bulldozer before it came to rest.

The accident occurred because the bulldozer operator did not have full control of his equipment while it was in motion at the ramp 56 drill bench. In addition, the seat belt in the cab of the bulldozer had not been attached or secured by the machine operator prior to the occurrence of the accident.

GENERAL INFORMATION

The Jim Bridger Mine is a surface coal mine that became active on July 1, 1974. The mine is located at Point of Rocks, Wyoming, in Sweetwater County. The mine currently has 184 employees, and operates two twelve-hour production shifts daily, seven days a week. The mine has three active pits; the mine utilizes typical drill and blast methods such as casting overburden material to reduce time and equipment use. The overburden is removed by two Marion 8200 draglines. The typical highwall in the area of the accident ranged from 115 to 180 feet of overburden and sloped to an angle of 70 degrees. All highwalls are presplit and then the overburden is cast blasted into the previous strip. Once the over burden is removed, the coal seams are mined using front-end loaders, excavators and off road haul trucks. The average daily production rate is 6,000 tons.

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

Daniel Meadors.....General Manager

Jim Seely.....Surface Mine Manager

James Poulson..... Safety Superintendent

Paul Gust.....Safety Manager

Harvey Kettering.....Crew 4 Shift Supervisor

The last regular safety and health inspection (E01) conducted by the Mine Safety and Health Administration (MSHA) was completed on September 30, 2013. The mine's Non-Fatal Days Lost (NFDL) incidence rate for 2013 based on data available as of Quarter 2, was 1.08, compared to the national average of 0.89 for mines of the same type.

DESCRIPTION OF THE ACCIDENT

On Saturday, October 5, 2013, at 7:00 p.m. Mark Stassinos, victim, was given his job assignment by Harvey Kettering, Shift 4 Supervisor, to finish completion of the drill bench at ramp 56 with Caterpillar D-11R bulldozer company 548.

Stassinos had talked to Mike Kline, Dayshift Bulldozer 548 Operator, at approximately 6:45 p.m. to share information on the remaining construction to be

done at ramp 56. Stassinos left the change house at 7:10 p.m. and drove pickup truck 2420 and traveled to the 56 ramp work area. Stassinos then conducted a pre-operational examination of the bulldozer before proceeding to work in this area. Stassinos then began operating the bulldozer, removing overburden down to grade for the drill. The drill was not operating at the time of the accident and had been parked to the south of the bulldozer work area, where it previously drilled presplit holes on the completed grade.

Work continued normally for approximately two hours. While Kettering was making his inspection of the area, prior to the accident, he contacted Stassinos at 9:30 p.m. as he approached the work area. Stassinos parked his bulldozer and got into Kettering's pick-up truck and discussed the work being done. The next time Kettering saw the bulldozer was around 1:30 a.m., October 6, 2013, when he was traveling on ramp 54 at the perimeter road to check on the 102 dragline spoil. Kettering could see the bulldozer pushing and the bulldozer's lights were on.

At approximately 2:35 a.m., on October 6, 2013, Curtis Beratto, Equipment Oiler, approached highwall bench 56 on the northwest side of the bulldozer's work area to fuel the 548 bulldozer. After fueling the bulldozer, Beratto left the area, while Stassinos resumed working on the bench. Beratto was the last to see Stassinos alive and did not witness the accident.

At 7:00 a.m., on October 6, 2013, Kline, the Dayshift Bulldozer 548 Operator, was in the change house waiting for Stassinos to arrive to get a progress report on what had been completed during the night on the 56 bench. At 7:05 a.m., Kline contacted Calvert in the change house and told him he was driving to the work site. Kline traveled to ramp 56 which leads to bench 56, and approached the work area from the north end. He saw the 2420 pickup truck. The engine was on and the park lights were on, but he did not see 548 bulldozer. Kline then drove to the back of the work site and over to the 306 drill where he saw a hole in the berm. Kline drove down onto the drill pad and looked over the edge and saw the bulldozer at the bottom of the highwall at 7:34 a.m.

Kline returned to his pickup and called Calvert to inform him of the accident. He stated that bulldozer 548 went over the highwall and that emergency medical technicians (EMT) were needed. Kline then drove to the bottom of the highwall to gain access to the accident scene. A road bridge blocked the access so he returned back to the 56 upper highwall bench where the Caterpillar bulldozer 530 was parked. He drove the bulldozer back to the bottom of the highwall.

Kline made his way to the bottom and proceeded to bulldozer 548. It appeared Stassinos was deceased. Ron Smart, Surface Mechanic, arrived at the top of the ramp at approximately 8:00 a.m. When bulldozer 528 made the opening at the top of the ramp, Smart was there to direct traffic to the accident scene. At this time Smart heard Kline state over the radio that it was a "recovery."

The bulldozer 548 engine was off, but the lights were on and Kline turned the key to the off position. By this time, Daly, Bulldozer Operator on bulldozer 528 made a road down to the bottom from the southwest side spoils. Ted Kalista, a mine rescue member, had arrived at the area in the mine ambulance and was the first medical responder on the scene. Kalista made a call from the mine ambulance phone to get Sweetwater ambulance dispatched and have Guardian Air Helicopter on standby. Kline gave Kalista a ride to the scene on bulldozer 530, where Kalista checked the victim and told Calvert the victim was deceased. Carey Knotman, Sweetwater County Medic, arrived at 9:15 a.m., and was taken to the scene, where he applied an electrocardiogram (EKG), at 9:40 a.m., which indicated that there was no heartbeat. Emergency response personnel from the local Fire District 1 unit helped in the recovery of the victim. The victim was placed in the custody of Sweetwater County Coroner, Dale Majhanovich.

INVESTIGATION OF THE ACCIDENT

Paul Gust, Safety Manager, notified the MSHA Call Center was notified of the accident on Sunday, October 6, 2013, at 8:12 a.m. The call center notified Don Gibson, District 9 Assistant District Manager at 8:45 a.m. Gibson verbally issued a 103(j) order at 9:05 a.m. to Gust to secure the accident scene and assure miners' safety at the mine. Gibson then notified Todd Jaqua, Field Office Supervisor in Gillette Wyoming, at 9:10 a.m. and instructed Jaqua to dispatch an inspector to the accident scene. Jaqua and Coal Mine Inspector David Hamilton traveled to the mine. Coal Mine Inspector, Richard Dickson, from the Craig, Colorado field office was also dispatched to the mine. Dickson modified the 103(j) order to a 103(k) order upon arrival at the mine.

Upon arrival, Dickson conducted a preliminary examination of the accident scene. Photos and measurements were taken of the bulldozer's route of travel and resting place at the bottom of the highwall. Jaqua and Hamilton arrived on-site and began the investigation of existing physical conditions and conducting initial interviews with mine employees present at the scene. The physical examination of the Caterpillar D-11IR bulldozer, company number 548, was not

possible until the bulldozer was recovered on October 17, 2013. The bulldozer was examined by F. Terry Marshall, Mechanical Engineer, from MSHA's Office of Technical Support.

The investigation of the physical features of the accident was completed on October 17, 2013. Digital photographs, relevant measurements, and sketches of the scene were developed as part of the investigation. The investigation also included a review of training records, mine and equipment examination records, and maintenance records. Additional interviews were conducted on October 7, 8, and 10, 2013, with persons who had knowledge of the accident. These interviews revealed there were no eyewitnesses to the accident.

The physical examination and function tests performed on the Caterpillar bulldozer, company number 548, were completed on October 22, 2013.

The investigation was conducted in conjunction with the Wyoming Department of Workforce Services, State Mines Division, with assistance from the mine operator and employees. Those persons interviewed or present during the investigation are listed in Appendix A and B.

DISCUSSION

Location of Accident and Conditions:

The surface scene of the accident was located above an existing highwall that was left from previous mining at ramp 55 ½. Stassinos was removing overburden from the top of the bench. The highwall measured 163 feet high where the bulldozer traveled off the edge of the highwall. The slope of the highwall was 70 degrees. The bulldozer blade contacted the highwall and the bulldozer rotated over. The rear of the roll over protection structure (ROPS) and back of the cab came in contact with the bulldozer over loose dirt and rock material, causing the fuel tank mounting bolts to break. The bulldozer continued to overturn and landed with the bulldozer blade buried vertically in loose material at the bottom of the pit.

The accident occurred at some time after 2:35 a.m., when the bulldozer was refueled. There were no eyewitnesses to the accident. A snow storm had occurred at the mine on October 4, 2013. The road leading to the accident location was wet, but the work area was dry. The temperature was between 33

and 34 degrees. There were no light plants in the work area; however the bulldozer was equipped with additional lighting.

After fueling, the path of the bulldozer indicated that it traveled over five large windrows of overburden and rocks with the front blade up and not in contact with the ground. The bulldozer travelled for a distance of 188 feet to an area previously cleared and leveled of material. The bulldozer then backed up 112 feet, turned to face the highwall edge and moved forward with the blade up until it reached 51 feet from the edge. At that point, the corner bits contacted the ground and continued through the berm and over the highwall. The berm was 13 foot wide by 38 ½ inches high. There was no evidence to indicate an attempt to turn or apply the brakes to the machine.

The bulldozer came to rest parallel to and at the base of the highwall. The victim was ejected from the cab's rear window and was found under the displaced fuel tank. The seat belt in the bulldozer was in the retracted position. There was no evidence to indicate the victim was wearing the seat belt. The miner also failed to maintain full control of the piece of equipment during operation.

General Machine Information

The bulldozer involved in the accident was a 2003 Caterpillar D11R track-type tractor. The bulldozer serial number is 7PZ00712 and it is equipped with a ROPS. The bulldozer has an enclosed cab with a Falling Object Protective Structure (FOPS), an 11U abrasion (11U ABR) dozer blade and a rear single-shank ripper. It was designated by the mine operator as unit number 548. The bulldozer was estimated to weigh approximately 228,000 pounds, including the blade and the single shank ripper.

Caterpillar product information and measurements indicated that the bulldozer width (as measured from outside edges of both tracks) was 12 feet, 2 inches. The bulldozer overall length was 35 feet, 6 inches, with a blade width of 20 feet 10 inches at the end bits and a blade height (with rock guard) of 9 feet, 3 inches.

This bulldozer was provided with thumb-operated direction and speed shifting selectors (transmission controls) on the operator's left side. It has two finger-tip-operated steering clutch/brake controls (right and left steering controls) on the operator's left side immediately forward of the transmission controls. A finger-operated parking brake switch is on the operator's left side, and a hand-operated dozer blade control is on the operators' right side. The bulldozer has a foot-operated service brake pedal and a foot-operated decelerator pedal (reduces engine speed from the high idle governor switch setting). Lastly, the bulldozer

has a finger-operated governor switch (engine speed control) on the operator's right side near the blade control.

The fuel tank was separated from the bulldozer and the cab structure sustained impact damage during the accident. The top of the cab structure was generally pushed forward, but the cab controls were visibly intact and sustained relatively little damage. The engine could not be run without repairs and operational tests of the steering; transmission, braking, and engine systems were not conducted.

The cab glass for both the right and left side doors sustained impact damage and could not be visually evaluated for any significant defects that may have adversely affected the visibility of the bulldozer blade tip areas from the operators cab.

The Vital Information Display System (VIDS) electronic control module indicated that there was 51,475 operating hours on the machine.

No problems were identified with the steering, brakes transmission or engine decelerator control systems. There were four electronic control modules on the machine which were capable of storing active diagnostic codes, logged diagnostic codes, and logged event codes. No active or logged codes were determined to be present, or logged, respectively, which may indicate that an operational issue existed with the machine at the time of the accident.

Experience and training records

Stassinos was an experienced bulldozer operator, having 10 years of experience, with 1 year 48 weeks at this mine. Stassinos was task trained on a Caterpillar D-11R bulldozer on November 2, 2011. An examination of training records revealed Stassinos received required training in accordance with 30 CFR Part 48. Stassinos received annual refresher training on April15, 2013. Although the training records were up-to-date, the adequacy of the training was considered to be a root cause factor by the investigators.

Global Positioning Satellite (GPS) System

The D-11R bulldozer 548 is equipped with a GPS system that guides the equipment operator in removing material to a desired grade and serves as a production tool. This information is installed through a digital network communication from the mine office. The GPS is used for cut and fill indications. Position information is displayed on a video screen in the bulldozer operator's cab. Lines on the screen can be added to represent a wide variety of objects,

such as geological features, ponds, roads, etc. As the bulldozer travels, the GPS system will show the bulldozer's location in reference to the lines on the screen. The bulldozer involved in the accident had a line that represented the highwall; however the GPS system did not have the capability of alerting the equipment operator to his proximity to the highwall.

Illumination

During the accident investigation interviews, several miners stated they had access to and/or would be provided with light plants if they were needed or requested. Some of the miners indicated that they preferred not to use the light plants because they caused a glare for the equipment operators. Light plants were not in use in the area where the bulldozer traveled over the highwall. The newer, high intensity discharge lights that were installed on the mobile equipment at the mine provided more illumination than the original lighting installed on the equipment. The 2011 revision to the Bridger Coal Company accident prevention manual, section 12.0 on page 43 12.8 states: Adequate lighting shall be provided in all work areas.

The mine has Allmand and Allight brand light plants. Information for the Allmand light plants with 1,250 watt metal halide lamps shows they produce 150,000 lumens per lamp. A light plant has four lamps each for a total of 600,000 lumens and has a coverage area of 52,000 sq. ft. of surface area at .5 foot candle or brighter. The Allight uses a four head 1,500 watt metal halide lamp configuration that has 580,000 lumens. The bulldozer involved in the accident was equipped with eight (8) light-emitting diodes (LED) lights, providing 2,700 lumens per light. When all lights are turned on, the total lumens are 21,600 to the front of the bulldozer.

Examinations

The work area where the accident occurred was examined prior to the accident. No hazards were noted by the examiner hazard during the examination.

Toxicology

Toxicology of the victim's blood was conducted post-mortem. The results of the toxicology stated that the victim was "positive" for Oxycodone at 61ng/mL, which is within the therapeutic range. Oxycodone is described in Merriam-Webster Dictionary as: a narcotic analgesic $C_{18}H_{21}NO_4$.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident that were correctible through reasonable management controls. These root causes, if corrected, would have prevented the accident or mitigated the outcome. The following root causes were identified:

1. *Root Cause:* The mine operator failed to assure that the bulldozer operator maintained full control of his machine while in motion and working in close proximity to the edge of an existing highwall.

   Corrective Action: The mine operator retrained the surface equipment operators with regard to working in close proximity to the edge of highwalls.

2. *Root Cause:* The mine operator failed to ensure safe working procedures were being followed for the hazards associated with working on elevated areas. The training for equipment operators working on elevated areas was not adequate.

   Corrective Action: The mine operator revised their training program to include a new task training program for Track Dozers: All dozer operators who work on elevated benches, i.e. drill benches, were retrained in the proper procedures and hazards associated with pushing material off highwalls. While building berms on the highwall, a full blade of dirt will be pushed to within 15 feet of the highwall. Then, a second full blade of material will be pushed next to the first load of material off the highwall.

3. *Root Cause:* The mine operator failed to ensure seatbelts were used where there is a danger of overturning mobile equipment.

   Corrective Action: Re-training was provided to all miners using mobile equipment on mine property. All bulldozer operators who work on elevated benches, such as drill benches, were retrained in the proper procedures and hazards associated with pushing material off highwalls.

CONCLUSION

The accident occurred because the bulldozer was working in close proximity to the edge of an existing highwall. The bulldozer operator did not have full control of his equipment while it was in motion at the ramp 56 drill bench. A contributing factor was the failure to assure seatbelts are worn in vehicles where there is a danger of overturning and roll-over protection is provided.

Russell J. Riley
District Manager

06/23/2014
Date

ENFORCEMENT ACTIONS

1. 103(j) Order, No. 8477972, was issued to ensure the safety of all miners during and after any recovery actions taken for the affected area. It prohibits all activity mine-wide until MSHA determined that it is safe to resume normal mining operations. The order was modified to section 103 (k) order at 7:56 p.m. on October 6, 2013

2. 104(a) citation No. 8476758 was issued for a violation of 30 CFR § 77.403-1(g) Caterpillar D-IIR dozer c/n 548 was involved in a fatal accident at approximately 2:30 a.m. on 10/06/2013 at ramp 56 drill bench. Mobile equipment that is required to be equipped with ROPS by 77.403(a) states, seat belts required by 77.1710(i) shall be worn by the operator. In 2011, revision to the Bridger Coal Company accident prevention manual section 5 on page 22, 5.9 states: Seat belts will be provided on all mobile equipment and shall be worn by all occupants while the equipment is in operation. The victim was ejected from the dozer and the seat belt was not engaged when the dozer was recovered. A Mechanical Engineer from the Mechanical and Engineering Safety Division, Approval and Certification Center reported: The ROPS and the seat belt assembly were still intact after the accident and the seat belt functioned when tested.

3. 104(a) citation No. 8476759 was issued for a violation of 30 CFR § 77.1607(b). The equipment operator for Caterpillar D-IIR c/n 548 did not have full control of his equipment while it was in motion at the ramp 56 drill bench. The dozer traveled through a berm and over a 163-foot highwall, resulting in fatal injuries.

APPENDIX A
List of persons participating in the investigation

PacificCorp Energy

Micheal G. Dunn ..... President & CEO

Interwest Mining Company
A Subsidiary of PacificCorp

Cindy Crane ..... Vice President
Ralph Sanich ..... Manager Health, Safety & Training

Crowell & Moring

Dan Wolff ..... Counsel

Bridger Coal Company

Daniel Meadors ..... General Manager
Jim Seely ..... Surface Mine Manager
Richard Keller ..... Production Manager
James Poulson ..... Safety Superintendent
Paul Gust ..... Safety Manager
Jeff Lewis ..... Surface Safety
Harvey Kettering ..... Crew 4 Shift Supervisor

Bridger Coal Miner's Representatives

Roy A. Moyer ..... Miners Representative
Mario McKeever ..... Miners Representative
Ron Smart ..... Miners Representative

Bridger Coal Employees

Mike Kline ..... Day Shift Dozer operator
Terry Ellison ..... Surface Electrician
Ted Kalista ..... Mechanic/medical responder
Ron Smart ..... Mechanic
Curtis Beratto ..... Equipment Oiler
David Measles ..... Case System Technician
Howard Sleight ..... Heavy Equipment Operator
Scott Shulz ..... Heavy Equipment Operator
Carl Baker ..... Heavy Equipment Operator

Wyoming Machinery Inc.

Shawn Hawkins	Mechanic
Dan Nierhooth	Mechanic

IME, Intermountain Electrical

John Strand	Bucket Truck Operator
Ron Manning	Bucket Truck Operator

Mine Safety and Health Administration
Accident Investigators

David Hamilton	Lead Accident Investigator
Richard Dickson	Accident Investigator
Todd Jaqua	Supervisory CMS&H Inspector
Don Gibson	Assistant District Manager
F. Terry Marshall	Mechanical Engineer

Wyoming Department of Workforce Services
State Mines Division

Terry Adcock	State Mine Inspector
Mike McCann	Deputy State Mine Inspector
Ron Prettyman	Deputy State Mine Inspector

APPENDIX B
List of persons interviewed

Bridger coal employees

Harvey Kettering	Crew 4 Supervisor
Mike Kline	Day Shift Dozer Operator
Terry Ellison	Surface Electrician
Ted Kalista	Mechanic/medical responder
Ron Smart	Mechanic
Curtis Beratto	Equipment oiler
Howard Sleight	Heavy equipment operator
Scott Schulz	Heavy equipment operator
Carl Baker	Heavy equipment operator

APPENDIX C

Victim Information

Accident Investigation Data - Victim Information

Event Number: 4 4 8 3 7 4 3

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

Victim Information: 1

1. Name of Injured/Ill Employee: Mark C. Stasenko
2. Sex: M
3. Victim's Age: 44
4. Degree of Injury: 01 Fatal
5. Date/MM/DD/YY) and Time(24 Hr.) Of Death: a. Date: 10/06/2013 b. Time: 2:30
6. Date and Time Started: a. Date: 10/05/2013 b. Time: 19:00
7. Regular Job Title: 068 Heavy equipment operator
8. Work Activity when Injured: 047 operate bulldozer
9. Was this work activity part of regular job? Yes: X No:

10. Experience	a. This Work Activity			b. Regular Job Title:			c. This Mine			d. Total Mining		
	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days
	10	23	3	1	48	3	1	48	3	10	23	3

11. What Directly Inflicted Injury or Illness? 078 bulldozer rolled over highwall edge
12. Nature of Injury or Illness: 370 head injuries, multiple fractures
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: X | First-Aid | CPR | EMT | Medical Professional | None
16. Part 50 Document Control Number: (form 7000-1)
17. Union Affiliation of Victim: 2687 Western Energy Workers