

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Coal Mine

Machinery
September 1, 2011

Weston Engineering, Inc. (WT9)

at

North Antelope Rochelle Mine
Peabody Powder River Mining LLC
Wright, Campbell County, Wyoming
MSHA I.D. No. 48-01353

Accident Investigators

Danny Vetter
Staff Assistant

David Hamilton
Coal Mine Safety and Health Inspector

Wayne Johnson
Coal Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
District 9

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VIEW OF DRILLING RIG ACCIDENT SITE



OVERVIEW

On Thursday, September 1, 2011, at approximately 10:36 a.m., Cody A. Brown (victim), a contract well driller with approximately 17 months of drilling experience, was killed when a restraining wrench, commonly called a tong wrench, struck him in the upper body and limbs at Well Site #26. Brown and three other drilling personnel were attempting to remove drill pipe that had become bound up and was stuck in a drilled hole, approximately 1900 feet deep. The wire rope cable used to restrain the wrench broke, causing the wrench to strike Brown. Brown had just completed applying the wrench to the drill pipe to hold the applied torque when the wire cable failed. The wrench rotated around toward Brown at a high speed, throwing him into the drill rig.

GENERAL INFORMATION

The North Antelope Rochelle Mine, located 65 miles south of Gillette, Wyoming is operated by Peabody Powder River Mining LLC, a subsidiary of Peabody Powder River Operations LLC, St. Louis, Missouri. The mine is a large surface mine, producing over 105 million tons of coal a year. The principal officers at the mine at the time of the accident were Keith R. Haley, Operations Manager; Ryan M. Tew, Safety Director; and Deborah L. Diedrich, Senior Manager of Safety Operations.

Peabody Powder River Mining LLC began operating North Antelope Rochelle Mine (NARM) in 1981 under the name of Powder River Coal Company. Currently coal is produced by dragline and shovel operations in 14 pits and transported by truck, then belt, to one of five silos. The coal is loaded on trains 24 hours-a-day for transport off site.

The mine employs approximately 1,310 miners. The mine normally has up to 300 contract employees. Weston Engineering, Inc. contracted with NARM to drill water wells at various locations on the mine property. The wells were for future ground cover watering and dust suppression on the mine property.

In January of 2011, Weston Engineering, Inc., moved Drill Rig #109 onto the property and began drilling at the location of Well Site #26. Drilling continued on a regular schedule of two 12-hour shifts, five days a week. In early July 2011, Weston Engineering, Inc. Chief Engineer, Jerry Hunt, was notified that the drill bit had become stuck in the hole and it was not able to be rotated to extract or continue. At that point, the hole was down about 1900 feet. Attempts were unsuccessful in freeing the stuck bit and connected pipes. Because of other digging commitments, the company did not devote much time to freeing the drill bit and pipes.

The last E01 inspection at NARM was completed on August 11, 2011. The non-fatal day's lost (NFDL) incidence rate for the mine in the previous quarter was 0.30, compared to the national NFDL incidence rate for surface coal mines, which was 1.00.

DESCRIPTION OF ACCIDENT

On July 15, 2011, Hunt and three drilling crew members arrived at the mine in an attempt to free the pipe using a detonation cord method. This method involved using a tool to locate where the drill pipe connections were not loose, then dropping a blasting detonation cord with primer down the inside of the pipe to the deepest point possible, where the pipe was not loosening when reverse spin was applied. When this point was located, the driller would apply heavy torque in the reverse direction and the charge would then be set off allowing the pipe to disconnect at the lowest possible joint. This attempt was unsuccessful and the pipe remained stuck in the hole.

On September 1, 2011, at approximately 8:05 a.m., Brown and coworker, Casey Houston, arrived on the NARM mine property. The two drillers traveled to the location of the Drill Rig #109, Well Site #26, and began preparing to free as much of the stuck pipe as could be saved. They conducted a work place examination of the drill area, which Brown documented, and then started the drilling motors.

At about 8:55 a.m., Weston Engineering, Inc. Engineer, Jerry Hunt and employee, William Fulton, arrived at the mine to assist in the freeing of the drill pipe. Soon thereafter, at about 9:00 a.m., Tim Bickett, General Manager of Goodwell Incorporated, arrived at the mine. Bickett had been contracted by Weston Engineering, Inc. to detonate the blast.

Bickett dropped a tool, called a "free point," down the inside of the drill pipe. The free point locates the deepest available pipe joint. The cord dropped to the 1,360 feet depth and located a joint. Bickett then dropped the detonation cord in the drill pipe. The detonation cord dropped to 1,360 feet and torque was applied to the pipe in a reverse direction. Hunt informed Bickett that two, to three revolutions were going to be placed on the stuck drill pipe.

Hunt was operating the controls that rotated the drill pipes and Brown and Houston were assigned to place the tong wrench on the "Kelly," when the maximum torque was reached. The Kelly is the square chuck that rotates the pipe during normal drilling and withdrawal of the pipe. Houston attempted to place the tong wrench on the Kelly, but the wrench failed to grip.

Brown replaced Houston, stating he would get the wrench to hold. Brown placed the tong wrench on the Kelly and began to take a step out of the area. At

the same time, Hunt, seeing the wrench was in place, began to release pressure, applying torque to the drill pipes. The tong wrench began to rotate clockwise, with the release of pressure on the pipe, until the wrench reached the end of the tightening cable, referred to in the drilling industry as the “snub line.” The snub line cable, in this application, is used to prevent the Kelly and drill pipe from turning, thereby maintaining the torque.

As Hunt began to release the reverse rotation on the drill pipes, the tong rotated. The snub line length allowed the tong to travel past the optimum 90 degree angle. When the tong passed the 90 degrees, the snub line began to fail, which caused the tong to continue through its rotational arc, striking Brown.

INVESTIGATION

At approximately 1:14 p.m. on the day of the accident, Dan Vetter, MSHA District 9 Staff Assistant, received a call from the MSHA Call Center, informing him of an accident on NARM property that resulted in death. Vetter first called the mine and issued a verbal 103(j) Order. Vetter then called the Gillette, Wyoming Field Office and spoke with Todd Jaqua, Field Office Supervisor. Jaqua had assigned two inspectors to continue an E01 inspection at a nearby mine. Jaqua called the inspectors and redirected them to the NARM property.

Inspectors David Hamilton and Wayne Johnson traveled to the NARM site and assumed control of the scene. The 103(j) Order was modified to a 103(k) Order, denying any access to the accident scene without MSHA personnel being present. All drilling operations were ceased.

An accident investigation team was assembled and traveled to the mine on September 2, 2011. The team met with NARM management officials, Weston Engineering, Inc. management, and the State of Wyoming inspection personnel.

During the physical investigation of the scene, a 107(a) Order was issued to Weston Engineering, Inc. Stored energy was still present in the drill pipe when the tong wrench rotated and contacted the drill rig, stopping the release of torque. The energy was released under controlled methods and the 107(a) Order was terminated.

The accident scene was documented with photographs and measurements. After a physical examination of the scene, the team arranged to conduct interviews with the witnesses to the accident. Interviews were conducted with persons known to have knowledge of the accident. A list of persons who participated in the investigation is contained in Appendix A.

DISCUSSION

Location of Accident

The accident happened at the Rig #109, Well #26 pad located at the North Antelope Rochelle Mine.

Rig #109, Well #26 Pad

The Rig #109, Well #26 was in the process of drilling a water well for use in future and present mining operations. The well was intended to access water from a known aquifer, approximately 2,100 feet deep. The drilling crew had drilled about 1,900 feet, when the drill bit became bound, preventing both further drilling and drill pipe extraction. The well sat idle in the bound-up condition for about two months.

The drilling rig was a Model 3500 Holemaster, 90-100 Stratmaster manufactured by the George E. Failing Company in the early 1980's. When the drilling became bound up at the 1,900-foot level, attempts were made to free it with a detonation cord and by applying torque in a reverse motion on the pipe. In July 2011, a crew of four assembled at the well pad site and applied the torque, dropped a detonation cord in the pipe, but the shot was unsuccessful. At that time, the contractor that initiates the detonation was without a tool to locate a stuck joint.

At the time of the fatal accident, Brown and Houston were assigned to attach the tong wrench to the Kelly after Hunt had applied as many revolutions as possible to the drill steel without initiating unscrewing of the pipe at a higher joint than desired. Both Brown and Houston were in the path of the wrench in their attempts to attach the wrench to the pipe.

The Snub Line Cable

Typically, the snub line wire rope is attached to the rig derrick on one end and to the end of the tong wrench on the other end. The purpose of the snub line in normal drilling is to hold the wrench in place while a new joint of drill pipe is installed down the hole. When used in the detonation application, the snub line is used to prevent the pipe from rotating because of the torque applied when the drill rotation clutch is released. The snub line in use on the day of the accident had a working length of 96 inches. This length allowed the tong to rotate past the 90 degree optimum angle putting excessive strain on the rope which led the rope passing 180 degree angle and wrapping around the drill pipe.

Training and Experience

Brown's training records were reviewed and determined to be current. Brown completed the first 16 hours of New Miner training on April 24, 2011. Brown was trained initially by a contract trainer in the Gillette, Wyoming vicinity, using the approved training plan for Weston Engineering, Inc. The plan had been approved in November 2007. The plan was reviewed and updated in May 2011. During the accident investigation, MSHA reviewed the quality of the training plan and found no plan deficiencies.

Brown had limited drilling experience and no previous mining experience. Brown received MSHA required onsite training on May 5, 2011 from NARM trainer, Keith Engel. Brown received task training on the operation of a Drill Rig on December 23, 2010 and additional task training in drilling operations on May 5, 2011. Both were conducted and documented by driller, Jerry Hunt.

Hunts' training records were examined. Hunt had New Miner training by a contract training company on June 6, 1997. Hunt received Annual Refresher training yearly after the initial training. On February 11, 2011, Hunt received onsite hazard training from NARM trainer, Keith Engel. All training that Hunt received was documented and current.

Hunt was one of the original founders of Weston Engineering, Inc. The business was incorporated in 1978. Hunt has been a driller since that time, splitting his time between securing contracts and operating the drill.

Work Place Examinations

Hunt was the only person certified as a surface mine foreman for Weston Engineering, Inc. to conduct work place examinations. On September 1, 2011, Brown conducted and recorded a work place examination. The record was not countersigned by a mine official. Previous days indicated that no work place examinations were conducted for the drilling operation and signed by a certified examiner. A record was available to show that prior examinations were conducted, but the records were not signed by the examiner or countersigned by a mine official.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted. Root causes were identified that could have prevented the accident or mitigated its severity. Listed below are root causes identified during the analysis and corrective actions to prevent a recurrence of the accident.

Root Cause: The snub line cable should not have been used in this application. There was no immediate need for persons to be on the drill deck, other than the driller. The driller is shielded by the derrick supports. The torque could have been maintained using the clutches; this would not allow anyone to be in the line of an energy release, in case of failure. The snub line used to hold torque on the drill pipes was inadequate in size and strength to hold the load that was being placed on it. The snub line in use this day was ½ inch diameter.

Corrective Action: Weston Engineering, Inc. established Standard Operating Procedures (SOP) with provisions that the drill operation will not use the snub line when attempting to hold torque on the drill pipe. In normal drilling operation and application, the snub line is adequate to hold the force. When attempting to unhook two joints of pipe, the snub line will not be used, because of inadequate size and strength. The SOP was established in writing and all drilling personnel will receive training on this SOP prior to conducting further mine drilling operations. The training will be documented.

Root Cause: Release of the clutches was initiated prior to personnel being clear of pinch points and clear from the revolution of any machinery parts.

Corrective Action: Weston Engineering, Inc. established an SOP, detailing the positioning of personnel prior to release of any stored energy. The SOP will ensure that all personnel involved in any aspects of drilling operations are out of the areas where they may be contacted by moving machinery or tools. The SOP was reduced to writing and all drilling personnel will receive training on this SOP prior to conducting further mine drilling operations. The training will be documented.

Root Cause: The task training was inadequate to inform personnel involved with drilling operations of the acceptable snub line size and the safe positioning during drill work or activity related to drilling.

Corrective Action: All personnel performing drilling related duties will receive task training, detailing proper examination of all components of the drilling operations and adequate tool and equipment size for the intended purpose. The additional task training will be documented.

CONCLUSION

The accident occurred when the victim was struck by a rotating wrench that he had clamped on a drill chuck after torque had been applied to the chuck. The victim had clamped a wrench on the chuck and had not exited the area, when pressure was released from the drill engine clutches, causing the drill pipe to revolve, including the protruding tong wrench. The ½-inch cable rope attached to the tong wrench and to the derrick was being used to restrain rotation of the pipe under torque. The wire rope was too long to provide the maximum restraint required to hold the torque energy on the pipe. As the rope took the excessive load due to the length it failed, allowing the tong wrench to rotate, striking the deck hand forcefully.

Approved by:



Allyn C. Davis
District Manager



Date

ENFORCEMENT ACTIONS

1. A 103(k) Order, Number 8464922, was issued to Peabody Powder River Mining, L.L.C. to ensure the safety of persons at the accident site until an investigation could be conducted and operations could be safely resumed.
2. A 107(a) Order was issued to Weston Engineering, Inc. when stored energy was found in the drill pipes at the accident scene. The energy was released under controlled measures and the order was terminated.
3. A 104(d)(1) Citation was issued to Weston Engineering, Inc. for a violation of 30 CFR § 77.1713(a). At least once during each working shift, or more often if necessary for safety, each active working area and each active surface installation shall be examined by a certified person designated by the operator to conduct such examinations for hazardous conditions and any hazardous conditions noted during such examinations shall be reported to the operator and shall be corrected by the operator. On September 1, 2011, the onshift examination was conducted by a miner who was not certified to conduct workplace examinations. The miner then entered the results in the book kept for that purpose and signed the record.
4. A 104(d) Citation was issued to Peabody Powder River Mining, LLC for a violation of 30 CFR § 77.1713(a). At least once during each working shift, or more often if necessary for safety, each active working area and each active surface installation shall be examined by a certified person designated by the operator to conduct such examinations for hazardous conditions and any hazardous conditions noted during such examinations shall be reported to the operator and shall be corrected by the operator.

Weston Engineering, Inc. has one person certified and qualified to conduct the one-site examinations. There were a total of 14 days of work when the certified person from Weston Engineering was on site and 84 days when the drilling crew was on site. A total of 70 days when personnel were assigned to work on the drill rig, an adequate on-shift was not performed.

On September 1, 2011, the onshift examination was conducted by a miner who was not certified to conduct workplace examinations. The non-certified examiner then entered the results in the book kept for that purpose and signed the record. The mine operator failed to ensure that a certified person was on site to conduct the required examinations. This work site is the designated work site for the contract well drillers, Weston Engineering, Inc. The site is known as Drill Pad #26.

Appendix A: List of Persons Participating in Investigation

NORTH ANTELOPE ROCHELLE MINE

Stephen Laramore	Safety Team Leader
Deborah Diedrich	Manager, Safety Operations
Christopher G. Peterson	Attorney/North Antelope Rochelle Mine

WESTON ENGINEERING, INC.

Jerry Hunt	Supervising Engineer
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STATE OF WYOMING

Terry Adcock	State Inspector of Mines, Administrator
Cary D. Ashley	Deputy Inspector of Mines

MINE SAFETY AND HEALTH ADMINISTRATION

Danny Vetter	District 9 Staff Assistant
David Hamilton	Coal Mine Safety and Health Inspector
Wayne Johnson	Coal Mine Safety and Health Inspector
Dean S. Nichols	Mine Safety and Health Technical Support

Appendix B: Persons Interviewed during Investigation

GOODWELL INCORPORATED

Tim Bickett	General Manager
Casey Musser	Assistant

WESTON ENGINEERING, INC.

William Fulton	Deck Hand
Casey Houston	Derrick Hand
Jerry Hunt	Driller, Supervisory Engineer

NORTH ANTELOPE ROCHELLE MINE

Keith Engle	Safety Trainer
Bryan Hansen	Environmental Engineer

Appendix C: Accident Photographs

FIGURE 1: Tong Wrench Configuration



FIGURE 2: Demonstration of Tong Installation



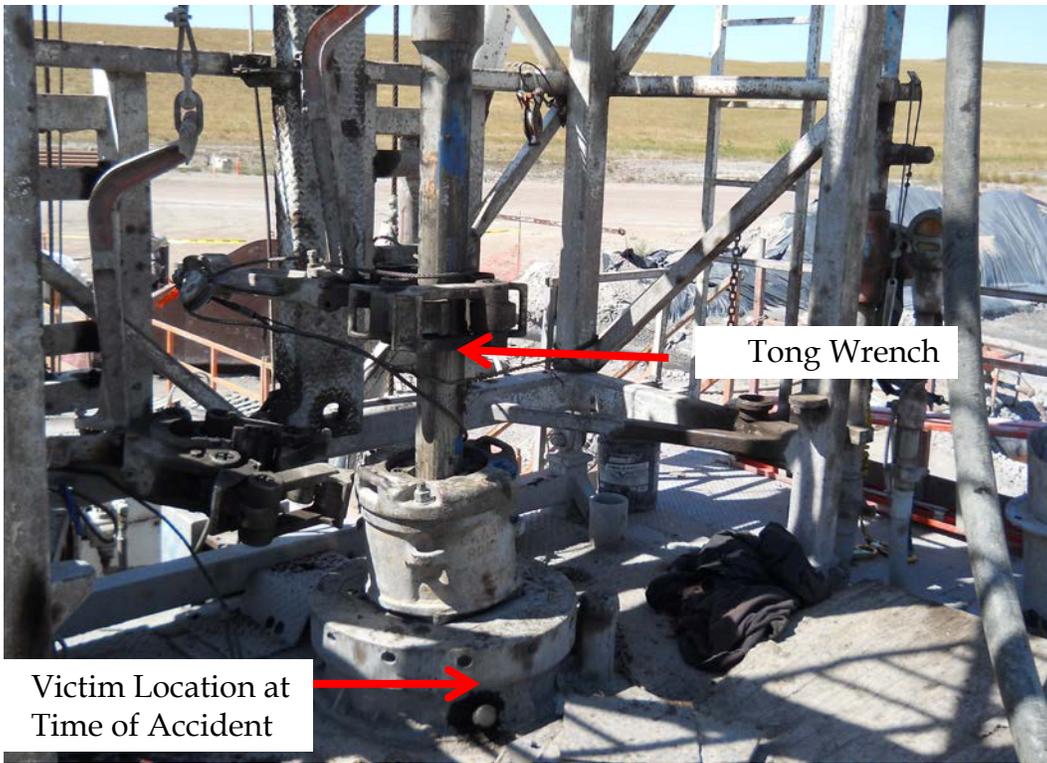


FIGURE 4: Tong Location after Accident

FIGURE 5: Snub Cable after Failure



Appendix D: Victim Information

Accident Investigation Data - Victim Information

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



Event Number: 4 2 6 8 0 0 8

Victim Information: 1																	
1. Name of Injured/Ill Employee: <i>Cody A. Brown</i>				2. Sex <i>M</i>		3. Victim's Age <i>29</i>		4. Degree of Injury: <i>01 Fatal</i>									
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 09/01/2011 b. Time: 10:36</i>						6. Date and Time Started: <i>a. Date: 09/01/2011 b. Time: 8:00</i>											
7. Regular Job Title: <i>134 Water Well Driller</i>				8. Work Activity when Injured: <i>098 Driller helper</i>				9. Was this work activity part of regular job? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No									
10. Experience																	
a. This			b. Regular			c. This			d. Total								
Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days			
<i>7</i>	<i>12</i>	<i>0</i>	<i>0</i>	<i>36</i>	<i>0</i>	<i>0</i>	<i>36</i>	<i>0</i>	<i>0</i>	<i>36</i>	<i>0</i>	<i>0</i>	<i>36</i>	<i>0</i>			
11. What Directly Inflicted Injury or Illness? <i>050 Tong (retaining) wrench</i>						12. Nature of Injury or Illness: <i>170 Crushing injury</i>											
13. Training Deficiencies:																	
Hazard:				New/Newly-Employed Experienced Miner:				Annual:		Task:							
14. Company of Employment: (If different from production operator) <i>Weston Engineering, Inc.</i>																	
											Independent Contractor ID: (if applicable)		<i>WT9</i>				
15. On-site Emergency Medical Treatment:																	
Not Applicable:			First-Aid:			CPR:			EMT:			Medical Professional:			None: <input checked="" type="checkbox"/>		
16. Part 50 Document Control Number: (form 7000-1)																	
											17. Union Affiliation of Victim: <i>9999</i>		<i>None (No Union Affiliation)</i>				