CAI-2011-12

UNITED STATES DEPARTMENT OF LABOR MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Preparation Plant

Fatal Electrical Accident July 27, 2011

Mike Dover Corporation (LVQ)

at

Superior Processing, Inc. Superior Cleaning Plant I.D No. 46-03303

Accident Investigators

Robert H. Hatfield Mine Safety and Health Inspector/Electrical Specialist

> Matilda R. Collins Mine Safety and Health Inspector

Originating Office Mine Safety and Health Administration

District 12 1301 Airport Road Beaver, West Virginia, 25813 Timothy R. Watkins, District Manager

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OVERVIEW

At approximately 8:40 p.m. on Wednesday, July 27, 2011, Jason E. Stacey (Victim), a 40 year old superintendent for Mike Dover Corporation with 22 years experience, with 1 year and 26 days at this plant, was killed while performing welding procedures to join two 10 inch pipes together in the ceiling of a filter room of a preparation plant. The victim was electrocuted when he contacted an energized welding electrode.

The accident occurred because the area where the welding was being conducted was confined to the point that the victim had to perform the welding procedure in a dangerous position. The area around where the welding was being conducted had been washed down, was wet, with inadequate lighting, and the temperature in the plant was abnormally hot. In addition, the welding electrode cable the victim was using prior to the accident was in poor condition.

GENERAL INFORMATION

The Superior Processing Cleaning Plant is located near Superior, McDowell County, West Virginia and is owned by Southern Minerals, Inc. of Bluefield, Virginia. The plant employs 15 workers and operates two production shifts and one maintenance shift. The facility operates five to six days a week, depending on the amount of raw coal available. The plant prepares coal from five underground mines and one surface mine. Mike Dover Corporation was in a contractual agreement with Superior Processing, Inc. to construct a new preparation facility beside the old plant and to perform modifications to the facility where the accident occurred. The Mike Dover Corporation employed five persons at this construction site. The contract employees normally worked ten hour shifts, four days per week, in the construction of the new plant and the modification of the old plant.

The principal officers for both entities at the time of the accident were:

Superior	Processing, Inc.
-	<u> </u>

Edward A. Asbury	President
Dick Johnson	. Sec/Treasurer
Jackie Ratliff	. Superintendent
Donnie Coleman	Safety Director/Southern Safety

Mike Dover Corporation

Mike Dover	President
Keith Dover	Sec/Treasurer
Jason Thrash	Safety Manager

The last regular inspection of this operation by the Mine Safety and Health Administration (MSHA) was completed March 28, 2011. The Non Fatal Days Lost (NFDL) incidence rate in 2010 for this facility was 7.87, compared to the national average of 1.35 for facilities of the same type.

DESCRIPTION OF THE ACCIDENT

The Superior Processing Cleaning Plant was in idle status on Wednesday, July 27, 2011, when the accident occurred. The Mike Dover Corporation employees started work at 7:00 a.m. in the plant. The old plant had been idle since July 1, 2011 to allow the connection of the old plant to the new plant in order for coal processing to resume. The construction, welding, and plant fabrication work were being directed by the victim, Jason E. Stacey, who was the contractor's field superintendent. Stacey supervised four employees on the day of the accident. Normally, the employees supervised by Stacey worked a ten hour schedule. On this day the employees were working more hours, to have a longer weekend. The accident occurred during the thirteenth hour of work.

Marcus Green, Crane Operator/Welder, and Kevin Riley, Laborer/Welder, were assisting Stacey with tying in pipe, by welding, from the sump in the floor of the plant, up to the thickener tank. Stacey made actual connections of the two pipes, as all agreed he was the better welder. Green and Riley assisted Stacey by fabricating small sections of metal pipe, referred to as "pie pieces," using a cutting torch and grinder. These fabricated pipe sections were used by Stacey to fill gaps between the two pipes (See Photo 1 in Appendix B).

At approximately 8:00 p.m. Stacey, who had been up on a ladder in the area where the accident occurred, climbed down to cool off. According to witnesses, he stated that it was, "hot up there." Stacey went outside to cool off and make a phone call. When Stacey returned, he climbed the ladder providing access into the area where the pipes were to be joined. Green and Riley prepared a 90degree section (elbow) of pipe for Stacey. The pipe was positioned with a chain hoist in preparation for welding. Stacey then cut a hole in the opposing pipe with a torch to make the final connection of the pipes.

Green went to get drinking water. Stacey yelled that he needed a welding hood. Green handed him his welding hood and the welding "stinger" (electrode holder).

Green and Riley were standing near the ladder on the floor level. They both noticed that Stacey struck an arc to start welding. Green and Riley were talking to each other and after several minutes they noticed that it was quiet in the area where Stacey was positioned. Green and Riley asked Stacey if anything was wrong. They received no answer. Riley reached and shook Stacey by the leg and got no response. The area where Stacey was positioned was dark, causing Green to leave the scene and retrieve a flashlight. When Green returned, he shined the light towards Stacey. Stacey's eyes were closed and he was slumped over, with the welding electrode (attached to the electrode holder) in his mouth. Green yelled for Lonnie Riley (brother of Kevin Riley) to cut the power to the welder and get help. Green and Kevin Riley climbed up to Stacey's location and tried to remove the electrode holder from Stacey's mouth, but were unsuccessful. Green had to unlatch the electrode holder from the welding electrode. Green and Riley removed the welding shield and tilted Stacey's head back.

Green ran over to the new plant for help and for someone to call 911. As help was arriving, Green and Kevin Riley lowered Stacey to Plant Electrician Tom Blankenship, who had just arrived. Blankenship could not detect a pulse. After positioning Stacey on the filter room floor, Blankenship started Cardio-Pulmonary Resuscitation (CPR) on Stacey. After a short time, an ambulance arrived from the McDowell Ambulance Service. Because of the high temperature inside, the ambulance personnel and the plant workers removed the victim to an area outside the plant to facilitate resuscitation efforts. Stacey was transported to the Welch Emergency Hospital where he was pronounced dead.

INVESTIGATION OF THE ACCIDENT

On July 27, 2011, at 9:34 p.m. the accident was reported to MSHA's National Call Center by Jason Thrash (Mike Dover Corp. Safety Manager). At 9:40 p.m. David S. Mandeville, MSHA Assistant District Manager, received notification from the call center that a serious accident had occurred at the Superior Cleaning Plant. A verbal 103(j) Order was issued by Mandeville to Donnie Coleman, Safety Director, to prevent the destruction of evidence and to preserve the accident scene. Inspectors from the Princeton, Field Office and the Mount Hope District, Office traveled to the accident site. Upon arrival, the 103(j) Order was reduced to writing and modified to a 103(k) Order, to ensure the safety of persons at this operation.

An accident investigation was conducted in cooperation with MSHA Technical Support, the West Virginia Office of Miners Health and Safety Training, (OMHS&T), with assistance of the plant operator and the contractor. The persons participating in the accident investigation are listed in Appendix A. The accident scene was photographed, studied, and interviews were conducted. Five persons were interviewed in relation to the accident. The onsite portion of the accident investigation was completed on August 2, 2011.

DISCUSSION

Location of the Accident

The accident occurred in the filter room section of the old cleaning plant that was being modified by the contractor. This floor was located several levels above the ground floor. The victim was working in an area 42 inches high, by 48 inches wide, and 85 inches above the filter room floor. Various pipes and apparatus were within this work area. To work in this area, the victim had to rest his left foot on a circular gate valve (see Overview Photo on Page 3) with his body situated in a squatting position on his right leg leaning against the large pipe, while resting his back against the plant structure.

Environmental and Human Factors

This area was wet because the victim had washed out coal dust prior to welding and cutting to help prevent fire from occurring. The temperature the day of the accident was hot and the humidity in the plant was high. The workers, including the victim, had been sweating profusely throughout the day. Workers had to cool down frequently while working in this area.

Lighting in the area where the accident occurred was very limited because power had been removed from the two lights in the filter room. The victim had a small light emitting diode (LED) commercial-type battery light on his hard hat, but the hard hat was removed while welding. When welding ceased, the victim had little or no lighting available until he could retrieve his hard hat, which was lying near him. The area in the ceiling of the filter room where the victim was electrocuted was dark. When fellow workers were investigating the condition of the victim, a flashlight was necessary to see him.

Welding Machine

The plant welder in use when the accident occurred was a Miller model 250, Serial No. 70-543883. This welder was located in an abandoned shop area on the ground floor of the plant called the "Old Shop," according to plant officials. Examination and testing of this welder was conducted by MSHA inspection personnel along with an MSHA Technical Support engineer.

Secondary		
Maximum Rated	ac	dc (direct current)
Volts		
Amps	250	
Duty Cycle	40%	40%
Max OCV	80	

The welder was set to weld with a dc secondary set for reverse polarity when the accident occurred.

Testing of the welder revealed the following:

Primary voltage delivered to the welder measured 513 volts ac line to line, which also measured 296 volts ac line to neutral. The open circuit voltage (OCV) measured 71.8 volts dc, between the electrode and the work receptacle on the secondary output. The idling primary current of this welder measured 2.7 amps.

With the secondary electrode shorted at 180 amps, the dc welding voltage decreased to 28.8 volts dc. The primary ac current increased from 2.7 amps idling, to 30 amps.

A test of the voltage/current measurements while welding was conducted by using the same type of 5/32-inch, 7018 welding electrode the victim was using when the accident occurred. The actual secondary voltage while welding occurred was 40 volts dc, at 115-125 amperes.

Welding Electrode Cable

The electrode cable or "hot" lead measured approximately 198 feet in length and was a No.1 size American wire gauge (AWG) welding wire. Examination of this welding electrode (hot) lead began by measuring the total resistance from the electrode cable where it attached to the welder back through the plant structure to the "work" or ground lead where it attached to the welder. The electrode lead was attached to the pipe that was being welded by the electrode holder at the area where the victim was working. This measurement indicated 18 to 20 ohms of resistance. It was indicated upon inspection of the electrode (hot) and work (ground) leads that the high resistance in this circuit was the result of two different circumstances. First, the work (ground) lead was only 4-feet in length and was attached to a plant I-beam structure near the welder. A lug was not used for this attachment and the work lead was attached to the plant by twisted copper wires beneath a washer and bolt on the I-beam. The area was rusty and the copper wire was frayed and appeared deteriorated. This connection measured 3 ohms resistance. Resistance in the 198-foot long, No.1 AWG electrode (hot) lead measured 3 ohms. This is an unusually high resistance for a copper conductor of this size and length. Upon investigation, it was determined that this electrode lead was actually 2 electrode cables combined by clamping an electrode holder of the first lead to the lug of the second lead and taping up the connection for insulation protection. When this connection was taken apart and examined, the 3 ohm resistance was reduced to 0.1 ohms when the two leads were reconnected. This indicated that the initial 3 ohms resistance in the electrode (hot) lead was caused by this poor connection between the two cables. In addition, this electrode (hot) lead had 32 places that had been repaired by using electrical tape and there were 18 damaged places, where the copper conductors were exposed. Two of these damaged places were 68 and 72 inches from the victim and measured $\frac{1}{4}$ inch, by $\frac{3}{4}$ inch (See Photo 2 in Appendix B). Witnesses interviewed stated that the victim had excess electrode welding lead pulled up close to him while he was welding in this area of the filter room.

Examinations

Inspection of the records of the monthly examinations of electrical equipment and discussions with agents of the operator indicated that examinations of the Miller model 250 welder had not been conducted as part of the monthly electrical examinations at this plant.

Training and Experience

MSHA Educational Field Services (EFS) reviewed training records and the training program for this site. Stacey had received Hazard Training for work at the cleaning plants. Stacey had also received specialized Confined Spaces training to address safe practices for working in confined areas.

Stacey was an experienced welder, with 22 years experience in the task (welding) that he was performing at the time of the accident.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the underlying cause of the accident that was correctable through reasonable management controls. Listed below are root causes identified during the analysis and the corresponding corrective actions implemented to prevent recurrence of the accident.

<u>Root Cause</u>:

Location of the accident and environmental factors caused the victim to be in a dangerous situation in order to weld these two pipes together. The confined work area and the temperature and humidity lowered the victim's body resistance to the effects of electric shock.

Corrective Action:

The plant operator and contractor developed and implemented procedures for persons who weld to use an insulating safety mat/blanket when welding in confined areas and or wet spaces. In addition, weekly safety meetings will include topics such as:

- Proper personal protective equipment (PPE)
- Inspection of welding equipment
- Work area examination
- Safe practices for working in confined spaces

Root Cause:

The damaged and deteriorated condition of the welding electrode lead along its entire length, especially within 72 inches of the victim, was a factor that contributed in this accident. Witnesses interviewed stated that the victim had excess electrode welding lead pulled up close to him while he was welding in this area of the filter room.

Corrective Action:

The plant operator and contractor developed and implemented procedures indicating that during any shift in which welding is being performed, the welding electrode lead will be examined for defects and any defects found will be repaired prior to use.

Root Cause:

Complete and thorough examinations of electric equipment were not being conducted at this plant. The Miller model 250 welder was not being examined monthly for hazards affecting safety. Had this welder been examined, the condition of the electrode lead would have been identified and corrected, and most likely would not have contributed to this accident.

Corrective Action:

The operator is aware that this was a violation of a mandatory standard and that continuous review of examination records by plant management is vital to assure all required examinations are being conducted at this plant.

Root Cause:

The quality of lighting in the area where the accident occurred was poor. Two lights in this area were not burning because the power in this area was removed. The victim had a small LED commercial-type battery light on his hard hat, but the hard hat was removed while welding. When welding ceased, the victim had little or no lighting available until he could retrieve his hard hat, which was lying near him.

Corrective Action:

The operator is aware that this was a violation of § 30 CFR, 77.207, which is a mandatory standard. The operator and the contractor implemented a comprehensive safety program, which required, in part, that persons welding will be instructed that work areas shall be adequately illuminated. If other means of adequate lighting is not available in the immediate area, temporary lighting will be provided.

CONCLUSION

This accident occurred because Stacey was exposed to a combination of hazards in his immediate environment, while working in close proximity to 70 volts dc welding, open circuit voltage. The victim was attempting to weld in an area that was in a confined space, in hot humid conditions, with wet surfaces, inadequate lighting, and a damaged welding electrode lead.

Approved By:

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Timothy R. Watkins District Manager

1-3-2012

Date

ENFORCEMENT ACTIONS

1. A 103(j) Order, No. 8080725, was issued over the phone verbally at approximately 10:16 p.m. on July 27, 2011, to Superior Processing Inc.

<u>Condition or Practice</u>: An accident occurred at this operation on 07/27/2011 at approximately 2040 hrs. This order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity in the Superior Processing Cleaning Plant until MSHA has determined that it is safe to resume normal operations in this area. This order was initially issued orally to the operator at 2216 hours and has now been reduced to writing.

The 103(j) Order, No. 8080725 was modified to a 103(k) Order to ensure the safety of workers until the investigation could be completed.

<u>Condition or Practice:</u> The initial order is modified to reflect that MSHA is now proceeding under the authority of Section 103(k) of the Federal Mine Safety and Health Act of 1977. This Section 103(k) Order is intended to protect the safety of all persons on-site, including those involved in rescue and recovery operations or investigation of the accident. The operator shall obtain prior approval from an Authorized Representative of the Secretary for all actions to recover and/restore operations in the affected area. Additionally, the operator is reminded of its existing obligations to prevent the destruction of evidence that would aid in investigating the cause or causes of the accident.

2. A 104(d) (1) Order No. 8080745 was issued to Superior Processing Inc. for violation of 30 CFR § 77.502.

<u>Condition or Practice</u>: The Miller Model 250 welder, serial number 70-543883, located on the ground floor of the Superior Processing plant and which is available for use, is not being maintained to assure a safe operating condition. The No.1 AWG electrode or "hot" lead has 18 damaged areas in its 198 foot length, in which the energized copper conductor is exposed while the welder is energized. Two (2) of these damaged bare areas measure 1/4 inch, by 3/4 inch and are located at 68 and 72 inches from the electrode holder that was involved in a fatal electrical accident on 07/27/2011. These two damaged areas have experienced arc damage from contacting the work or plant structure. This damage is obvious and extensive. These damaged areas in this energized electrocution

hazard while the welder is energized. 32 additional repaired areas had been taped from previous damage or contact with the plant structure while energized. This indicated that damage to this electrical lead is a common occurrence. Agents of the operator are frequently in this area where the plant modifications are being made, to conduct daily examinations of working places for hazardous conditions. The operator has engaged in aggravated conduct constituting more than ordinary negligence by allowing this welder electrode lead to be allowed to exist in this dangerous condition. This is an unwarrantable failure to comply with a mandatory standard.

3. A 104(d) (1) Order No. 8080746 was issued to Superior Processing Inc. for violation of 30 CFR § 77.502.

<u>Condition or Practice:</u> The Miller Model 250 welder, serial no. 70-543883, available for use in the Superior Cleaning plant is not being frequently examined, by a qualified person to assure safe operating conditions. Inspection of records as well as discussion with agents of the operator indicate that this welder has not been examined as required by regulation since this operator has been processing coal at this plant. Potentially dangerous conditions were observed during the inspection of this welder that exposes plant personnel and contract workers to electrocution hazards (see Order No. 8080745). Agents of the operator are frequently in this area where the plant modifications are being made to examine workplaces for hazardous conditions. The operator has engaged in aggravated conduct constituting more than ordinary negligence by not examining this welder as required by regulation. This is an unwarrantable failure to comply with a mandatory standard.

4. A 104 (a) citation No.8080747 was issued to Superior Processing Inc. for violation of 30 CFR § 77.207.

<u>Condition or Practice</u>: Illumination sufficient to provide safe working conditions is not being provided in the filter room area of this plant where a fatal electrical accident occurred on 07/27/2011. Two of the area lights in this area were not working while work was being performed in the ceiling area of the filter room. The quality of light that was available was a small LED battery light attached to a hard hat.

APPENDIX A Persons Participating in the Investigation

Superior Processing Inc

Eddie Asbury	President
Jackie Ratliff	Plant Superintendent
*Tom Blankenship	Electrician
*Kyle McCoy	Plant Operator

Mike Dover Corporation

*Marcus Green	Crane operator
*Kevin Riley	Construction worker
*Lonnie Riley	Construction worker
Gilbert Goff	Construction worker
Jason Thrash	Safety Manager

Southern Safety

Donnie Coleman	.Safety	Director
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Jackson Kelly PLLC

Melissa Robinson.....Attorney

West Virginia Office of Miners Health and Safety Training

Kendall Smith	Chief Electrical Inspector
Steve Stanley	Electrical Inspector
Randall Meadows	Electrical Inspector
Greg Norman	Inspector at Large
John O'Brien	Assistant Inspector at Large
Eugene White	Deputy Director

Mine Safety and Health Administration

Robert Hatfield	Mine Safety and Health Inspector (Electrical)
Matilda Collins	Mine Safety and Health Inspector
Joseph Presley	Mine Safety and Health Inspector (Electrical)
Larry Cook	Supervisory Electrical Engineer

Mike Dickerson.....Staff Assistant Steven Dubina.....Pittsburgh Technical Support Preston WhiteEducational Field Services

* Persons Interviewed

APPENDIX B



Photo 1 – Location where welding was being conducted





APPENDIX C Victim Information

Accident Investigation Data	a - Victim Info	rmation		U.S Min	5. Departm le Safety and	ent of Lab Health Admi	oor nistration	<>>
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Name of Injured/III Employee:	2. Sex 3. Vic	tim's Age	4. Degree of	f Injury:				
Jason E. Stacey	м	40	01 Fata	1				
5. Date(MM/DD/YY) and Time(24 Hr.)	Of Death:			6. Date and Time Started:				
a. Date: 07/27/2011 b.Time	: 20:40			a. Date: 07/27/20	11 b. Time: 7:00	Was this work activ	vity part of re	gular job?
7. Regular Job Title: 149 Superintendent		8, Work A 093 We	ctivity when I	njurea:		Yes	X No	
10. Experience Years Weeks	Days b Ren	Years	Weeks	Days Years	Weeks Da	ys d. Total	Years V	Veeks Days
a. This Work Activity: 22 0	0 Job T	itle: 0	0 0	0 Mine: 1	3 5	Mining:	22 0	0
11, What Directly Inflicted Injury or Illne	iss?			12. Nature of Injury	or lliness:			
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13. Training Deficiencies		edenood Minor		Annual:	1 Т	ask:		
Hazard: New/N	ewiy-Employed Exp	operator)						
14. Company of Employment: (if different Mike Dover Corporation	sit from production i	oporatory			Independent Contr	actor ID: (if applica	ible) LVQ	
15. On-site Emergency Medical Treatr	nent		. 1					
Not Applicable: First	-Aid: X	CPR: X	EMT:	X Medical Profe	essional:	None:	Adillatian	
16. Part 50 Document Control Number	r: (form 7000-1)			17. Union Affiliation of Vict	im: 9999	None (No Union)	Artillation)	
Victim Information:								
1. Name of Injured/III Employee:	2, Sex 3. Vi	ctim's Age	4. Degree	of injury:				
) Of Death:			6. Date and Time Start	ed:			
5. Date(MW/DD/TT) and time(24 m	.) Of Death.							
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