FAI-6462383-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface
(Coal)

Fatal Machinery Accident
July 21, 2021

Black Thunder
Thunder Basin Coal Company LLC
Wright, Campbell County, Wyoming
ID No. 48-00977

Accident Investigators

Lois Duwenhoegger
Mine Safety and Health Inspector

Kendell Whitman
Assistant District Manager

Originating Office
Mine Safety and Health Administration
West Region - Lakewood District
PO Box 25367, DFC
Denver, CO 80225-0367
Matthew Lemons, District Manager

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OVERVIEW

On July 21, 2021, at approximately 11:45 a.m., Jeffrey Wendland, a 31 year-old millwright with over 13 years of experience, died when a crane boom struck him, while he was working under it. The victim removed the last pin from the bottom boom, causing the boom to fall, and pinning him underneath the steel cross brace.

The fatality occurred because the mine operator did not: 1) make sure that the equipment was blocked against motion before performing work underneath the equipment, and 2) task train miners to properly change boom extensions.

GENERAL INFORMATION

Thunder Basin Coal Company LLC, a subsidiary of Arch Resources Inc, owns and operates the Black Thunder mine, a large surface sub-bituminous coal mine located in Wright, Campbell County, Wyoming. At the time of the accident, Black Thunder employed 899 miners and operated two shifts, seven days a week. The mine operator extracts coal using the open-pit

mining method. Large draglines and shovels remove the overburden by mining multiple benches to expose the coal. Electric shovels extract the coal, and large haulage trucks transport the coal to the crusher. The mine stores the coal in silos and ships it by train to consumers. As a millwright, J. Wendland installed and dismantled equipment, and performed equipment maintenance and repair.

The principal management official for Black Thunder at the time of the accident was:

Keith Williams	President

The Mine Safety and Health Administration (MSHA) completed the mine's last regular safety and health inspection on March 31, 2021. A regular safety and health inspection was ongoing at the time of the accident. The 2020 non-fatal days lost (NFDL) incident rate for Black Thunder was 0.10, compared to the national average of 0.77 for mines of the same type.

DESCRIPTION OF THE ACCIDENT

On July 21, 2021, at 7:00 a.m., Jeffrey Wendland arrived at the mine and started his shift by attending a crew meeting. Terry Wendland, Maintenance Supervisor, provided Jeffrey Wendland and Jesse Brown, Millwrights, their assignment for the day, which was to perform maintenance work at the Dragline #12 outage. J. Wendland and Brown departed the maintenance shop and drove their maintenance truck to the dragline pad located at the 7 North Pit. J. Wendland and Brown arrived and started working on the dragline.

At approximately 11:00 a.m., T. Wendland redirected J. Wendland and Brown to change the ten-foot extension on the FMC 258 Link-Belt, 200-ton lattice mobile crane boom to a 30-foot extension. T. Wendland also directed Lyle Senger, Millwright, to work with J. Wendland and Brown to change the boom extension. J. Wendland and Brown walked to the mobile crane located adjacent to the dragline and discussed the procedure for changing the boom extensions. The two worked together to lower the crane boom to the ground (see Appendix A). J. Wendland and Brown rested the tip of the boom on wooden blocks, with the base of the boom attached to the base of the dragline approximately four feet above the ground. Senger then arrived to help J. Wendland and Brown. After Senger arrived at the mobile crane, Justin Kolbeck and Matthew Miller, Millwrights, arrived at the dragline pad to perform their regular duties. Kolbeck and Miller saw J. Wendland, Brown, and Senger working on the mobile crane and went to help.

Brown positioned himself underneath the boom, kneeling between the two cross beams (ten inches apart), and started hammering on the bottom right pin. Brown successfully removed the bottom right pin and started working on the bottom left pin (see Appendix B) but could not remove it. J. Wendland asked Brown to switch positions so that he (J. Wendland) could attempt to finish removing the bottom left pin. J. Wendland positioned himself underneath the boom, knelt on the ground between the two cross beams, and started hammering on the bottom left pin (see Appendix C). J. Wendland instructed Kolbeck to get into the crane and raise the boom up and down to help loosen the pin, which Kolbeck did. According to Miller, at this point, the pin appeared to be flush with the boom. Miller held a pin driver in place while J. Wendland continued hammering on the pin. When the pin started to move, Miller handed the pin driver to

J. Wendland to finish removing the pin. At approximately 11:45 a.m., the pin dislodged, causing the steel boom structure to fall on J. Wendland.

Miller, Kolbeck, Senger, and Brown witnessed the boom collapse and fall on J. Wendland. Senger brought a forklift to the scene to raise the collapsed boom and free J. Wendland. Brown called over the mine radio for help. Kolbeck administered cardiopulmonary resuscitation (CPR). Kolbeck also placed an automatic external defibrillator (AED) on J. Wendland, which advised "no shock" and to continue with CPR. Kolbeck alternated between the CPR and the AED, but the AED never advised a shock.

At 11:52 a.m., the mine rescue team arrived in a mine ambulance and a fire rescue truck to take over the rescue efforts. Lynn Busskohl, Safety Manager, who is also an advanced emergency medical technician, arrived and began emergency medical assistance. The mine ambulance transported J. Wendland to the emergency helicopter pad. On the way to the helicopter pad, the mine ambulance met the Campbell County ambulance. The two paramedics from the Campbell County ambulance boarded the mine ambulance and proceeded to the helicopter pad. Once the ambulance arrived at the helicopter pad, the Campbell County paramedics met with the Campbell County Life-Flight paramedics and explained J. Wendland's condition. The Life-Flight paramedics called William Selde, M.D., Life-Flight Medical Director, who pronounced J. Wendland dead at 12:50 p.m., at the helicopter pad.

INVESTIGATION OF THE ACCIDENT

On July 21, 2021, at 11:46 a.m., Chad Simpson, Mine Safety and Health Specialist, was conducting a regular safety and health inspection at Black Thunder. At the time, Simpson was traveling with Nicholas Brooks, Safety Specialist. Simpson and Brooks responded to Brown's call for help. Brooks called the Department of Labor National Contact Center. Simpson issued an order under the provision of Section 103(k) of the Mine Act to assure the safety of the miners and preservation of evidence. Simpson called Wayne Johnson, Supervisory Mine Safety and Health Inspector, at 12:20 p.m. and John Lewis, Supervisory Mine Safety and Health Specialist, at 12:26 p.m. Johnson called Kendell Whitman, Assistant District Manager, who sent Lois Duwenhoegger, Mine Safety and Health Inspector, to the mine to lead the investigation. Simpson began the investigation shortly after the accident occurred.

On July 22, 2021, Kathy Cattles, Mine Safety and Health Training Specialist, arrived shortly before 10:00 a.m. to assist with reviewing training records, followed by Duwenhoegger, who arrived at 10:00 a.m. Whitman arrived at the mine at 3:30 p.m. MSHA investigators conducted an examination of the accident scene, interviewed miners, and reviewed conditions and work procedures relevant to the accident. Scotty Hayden, Utility Man, designated as the miners' representative, was present during the examination of the accident scene. Hayden and personnel from the Wyoming Department of Workforce Services – Mines Inspection & Safety participated in the interviews. See Appendix D for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at the 7 North Pit dragline pad for Dragline #12, a Bucyrus Erie's 2570 (see Appendix E). The dragline pad was dry and relatively flat and smooth. The crane was located on the pad adjacent to the dragline.

Weather

At the time of the accident, the weather was clear, with a temperature of approximately 90 degrees Fahrenheit. Investigators determined that weather was not a factor in the accident.

Equipment Involved

MSHA investigators examined the FMC 258 Link-Belt, 200-ton lattice mobile crane and found no defects that could have contributed to the accident.

Procedures for Changing the Boom Extension to the Crane

The procedure for changing the boom extensions to the crane as described in the crane manufacturer's manual is to lay the boom down, connect two ten-foot-long pendant lines to the boom (see Appendix F), and place blocks under the boom before removing the pins. A warning label on the boom states, "Avoid injury to yourself. Boom can fall when pins are removed. Do not remove pins until boom is supported properly by blocking or boom ropes are relocated as described in the manufacturer's manual. In the absence of sufficient information in the manual, consult your Link-Belt distributor" (see Appendix G).

All equipment and attachments required to change the boom extension on the crane safely were present on the dragline pad. The two ten-foot-long pendant lines were on a wooden pallet adjacent to the 30-foot boom extension (see Appendix E). Prior to removing the boom pins, temporary pendant lines were not installed and blocking the boom was not performed. Investigators determined that not following these steps in the crane manufacturer's manual contributed to the accident.

Training and Experience

Jeffrey Wendland had over 13 years of mining experience, all at the Black Thunder mine. His primary duty was performing routine equipment maintenance work throughout the mine. He also operated multiple pieces of equipment and had certifications to operate different types of equipment, including the crane involved in the accident.

According to training records, J. Wendland received training on work tasks and demonstrated safe operating procedures for 88 different pieces of equipment on March 13, 2019. The training record includes the operation of an FMC 258 Link-Belt, 200-ton lattice mobile crane. J. Wendland received additional task training specific to changing the boom extensions on July 12, 2021, when he assisted Joshua Robinson, Certified Crane Operator Trainer, and Bryant Belvilaqua, Millwright, and safely completed the task. Investigators determined that J. Wendland received all training in accordance with MSHA Part 48 training regulations.

A crane operator must be familiar with lifting suspended loads and the associated rigging to change the boom safely. According to the interviews conducted by MSHA investigators, the four millwrights that assisted J. Wendland did not receive task training for changing boom extensions. The manufacturer's manual states, "Read the operating instructions before operating the machine. They contain information that is vital for safe machine operation."

The four other millwrights said that they relied on J. Wendland's guidance during the task because he had previously performed the boom exchange and was a more experienced millwright. Appendix H shows the locations of the millwrights at the time of the accident. The mine operator did not verify that the millwrights recognized the hazard of boom collapse posed by pulling the boom pins without appropriate blocking (see Appendix I) and without installing the two temporary pendant lines (see Appendix J). Investigators determined that neglecting to take either step contributed to the accident.

ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes of the accident. The team identified the following root cause, and the mine operator implemented the corresponding corrective action to prevent a recurrence.

1. Root Cause: The mine operator did not make sure that miners blocked the equipment against motion before performing work underneath the equipment.

   Corrective Action: The mine operator modified the current written procedure to assure that miners block equipment against hazardous motion before performing work underneath the equipment. The mine operator trained all miners on the revised procedure.

2. Root Cause: The mine operator did not task train miners to properly change boom extensions.

   Corrective Action: The mine operator developed new written procedures that incorporate job safety analysis and include a procedural check sheet to use prior to performing the task of changing the boom extensions on their cranes. The procedural check sheet includes reviewing and understanding the crane manufacturer's manual. The mine operator trained all miners on these procedures.

CONCLUSION

On July 21, 2021, at approximately 11:45 a.m., Jeffrey Wendland, a 31 year-old millwright with over 13 years of experience, died when a crane boom struck him, while he was working under it. The victim removed the last pin from the bottom boom, causing the boom to fall, and pinning him underneath the steel cross brace.

The fatality occurred because the mine operator did not: 1) make sure that the equipment was blocked against motion before performing work underneath the equipment, and 2) task train miners to properly change boom extensions.

Approved by:

_____ _____

Matthew Lemons Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Thunder Basin Coal Company LLC.

   A fatal accident occurred on July 21, 2021 at approximately 11:45 a.m. This order is being issued under the authority of the Federal Mine Safety and Health Act of 1977, under Section 103(k) to insure the safety of all persons at the mine, and requires the operator to obtain the approval of an authorized representative of MSHA of any plan to recover any person in the mine or to recover the mine or affected area. This order prohibits any activity in the affected area. The operator is reminded of the obligation to preserve all evidence that would aid in investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(a) citation was issued to Thunder Basin Coal Company LLC for a violation of 30 CFR 77.405(b):

   On July 21, 2021, at approximately 11:45 a.m., a fatal accident occurred at the 7 North Pit, #12 Dragline Pad, when work was being performed to change boom extensions on the FMC 258 Link-Belt, 200-ton lattice mobile crane, company #374. This work was performed under the suspended boom without the required safety pendant lines and blocking material to securely block the boom in position. When the boom pins were removed, the boom moved and fatally injured a millwright. There were warning labels on each side of the boom stating the danger of: 1) not blocking the boom in position, and 2) not relocating the pendant lines to support the boom.

3. A 104(d)(1) citation was issued to Thunder Basin Coal Company LLC for a violation of 30 CFR 48.27(a).

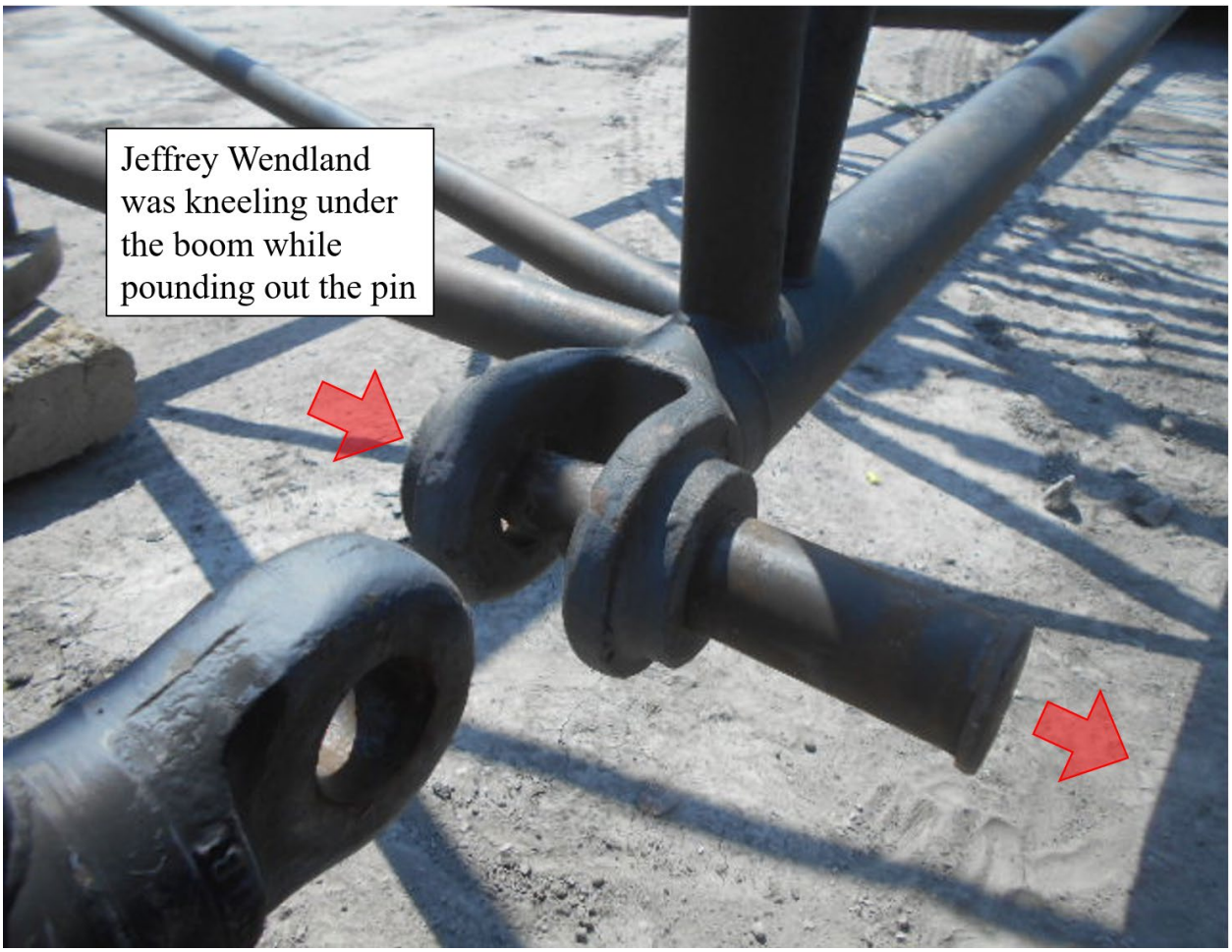
   On July 21, 2021, at approximately 11:45 a.m., a fatal accident occurred at the 7 North Pit, #12 Dragline Pad, when five millwrights attempted to change boom extensions to the FMC 258 Link-Belt, 200-ton lattice mobile crane, company #374. A millwright was fatally injured while performing this task. The mine operator did not provide adequate task training to two millwrights before assigning those millwrights the task of assisting the victim to change the boom extension. The mine operator did not assign this task to the other two millwrights. Only the victim had previously exchanged the boom extensions on the FMC 258 Link-Belt 200-ton lattice mobile crane, while the other four millwrights had not performed this task. The four other millwrights did not recognize the hazard associated with removing the lower pins while working underneath the suspended boom without the required safety pendant lines and blockages. The millwrights did not refer to the manufacturer's manual located in the crane's cab showing the proper procedure to perform the job. The millwrights also did not recognize the warning labels on each side of the boom depicting the dangers of not blocking the boom and not relocating the pendant lines, similar to the warning in the manufacturer's manual.

   This is an unwarrantable failure to comply with a mandatory standard.

APPENDIX A – Photo of Boom Laid Down and Location of the Forklift

APPENDIX B – Photo of Bottom Left Pin before Removal

APPENDIX C – Photo of Victim Position before the Accident



APPENDIX D – Persons Participating in the Investigation

Thunder Basin Coal Company LLC

Keith Williams	President
Douglas Conaway	Vice President of Safety
Kevin Hampleman	Mine Manager
Lynn Busskohl	Safety Manager
Nicholas Brooks	Safety Specialist
Terry Wendland	Maintenance Supervisor
Joshua Robinson	Certified Crane Operator Trainer
Bryant Belvilaqua	Millwright
Justin Kolbeck	Millwright
Lyle Senger	Millwright
Jesse Brown	Millwright
Matthew Miller	Millwright
Scotty Hayden	Utility Man, Designated Miners' Representative

Campbell County Sheriff Department

Harrold Vassar	Deputy Sheriff
Joshua Dedic	Deputy Sheriff

Campbell County Life-Flight

William Selde, M.D.	Life-Flight Medical Director

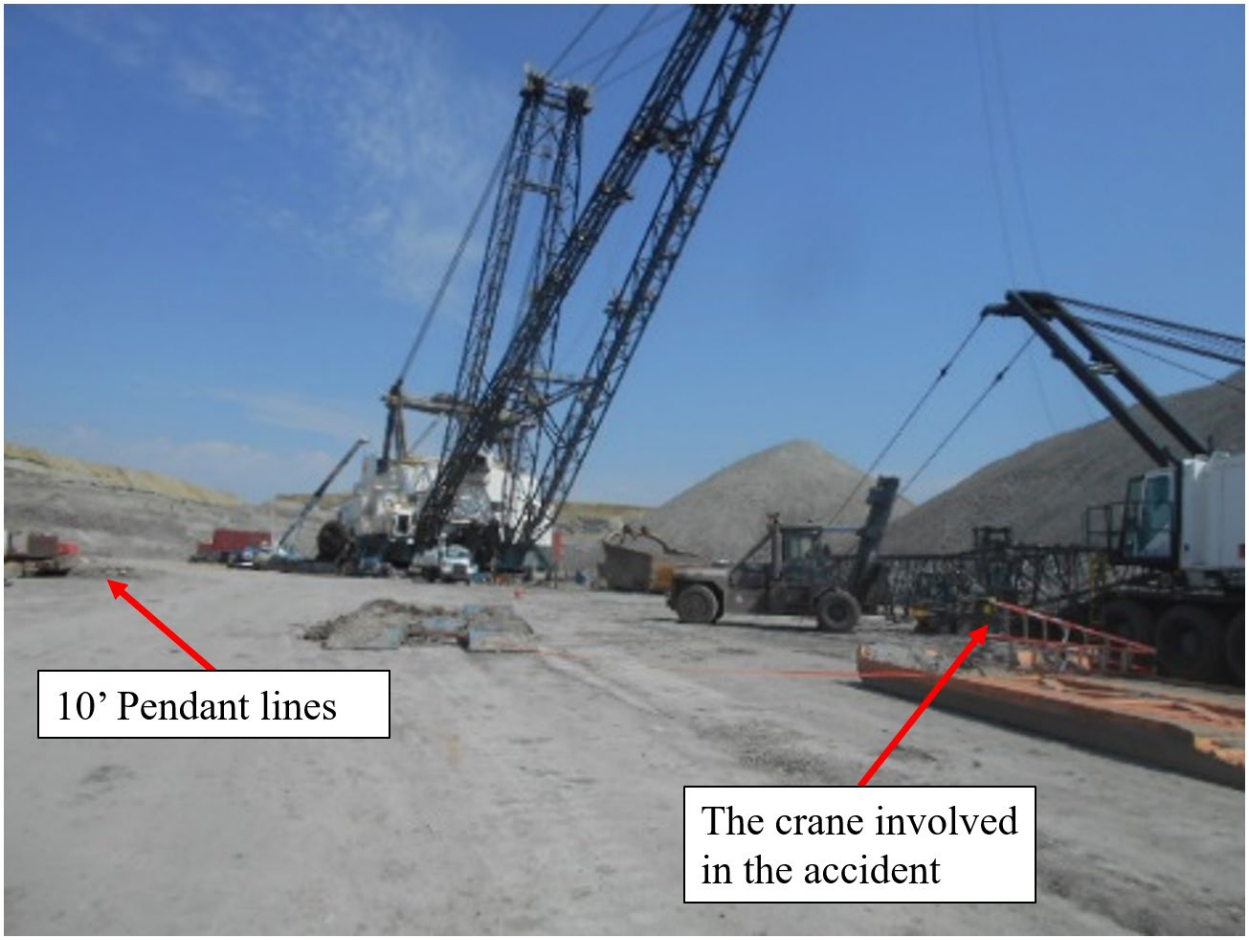
Wyoming Department of Workforce Services – Mines Inspection & Safety

Heather Kroup	State Inspector
Robert Solaas	Deputy State Inspector

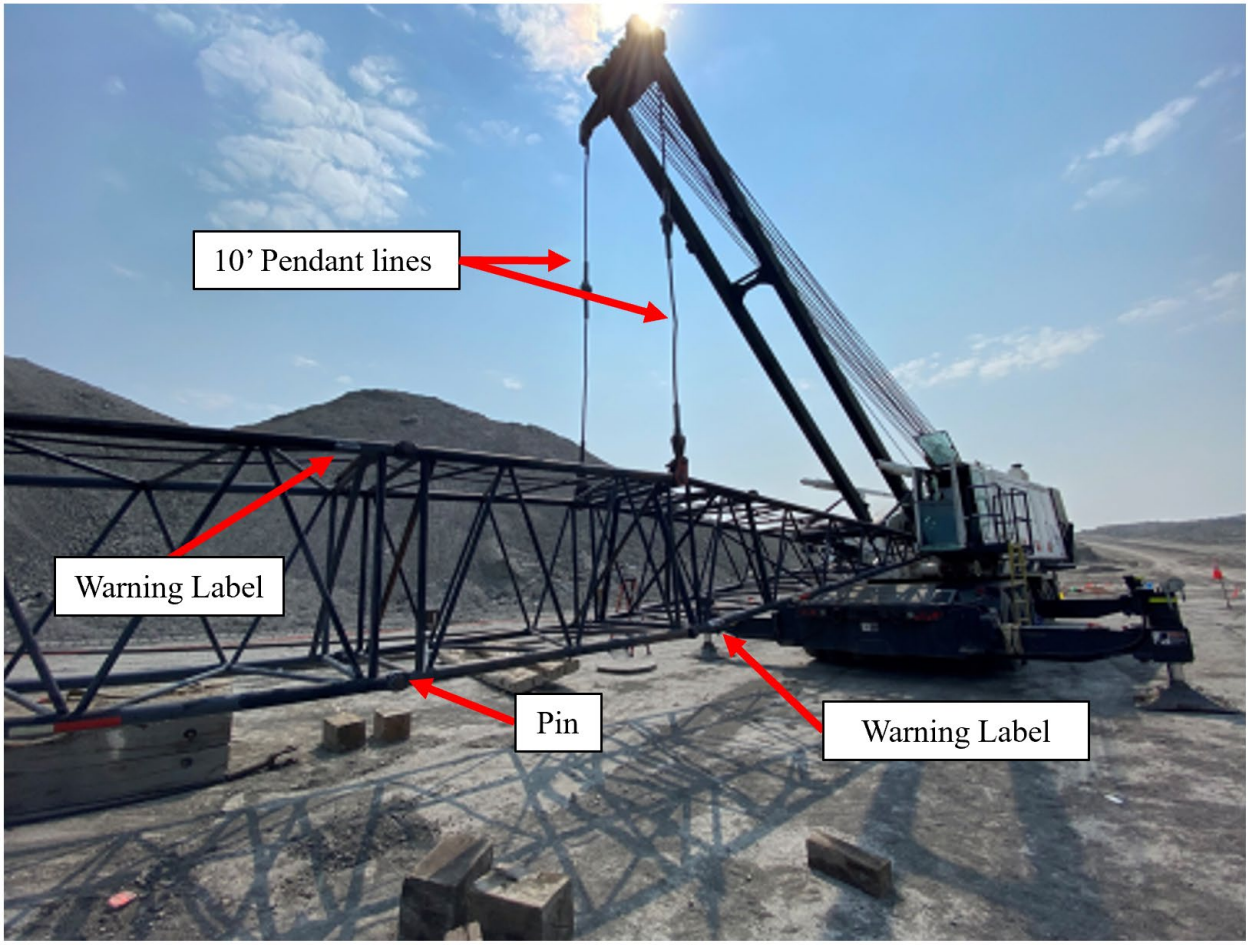
Mine Safety and Health Administration

Kendell Whitman	Assistant District Manager
John Lewis	Supervisory Mine Safety and Health Specialist
Wayne Johnson	Supervisory Mine Safety and Health Inspector
Chad Simpson	Mine Safety and Health Specialist
Lois Duwenhoegger	Mine Safety and Health Inspector
Kathy Cattles	Mine Safety and Health Training Specialist

APPENDIX E – Photo of the Crane and Pendant Lines on the #12 Dragline Pad

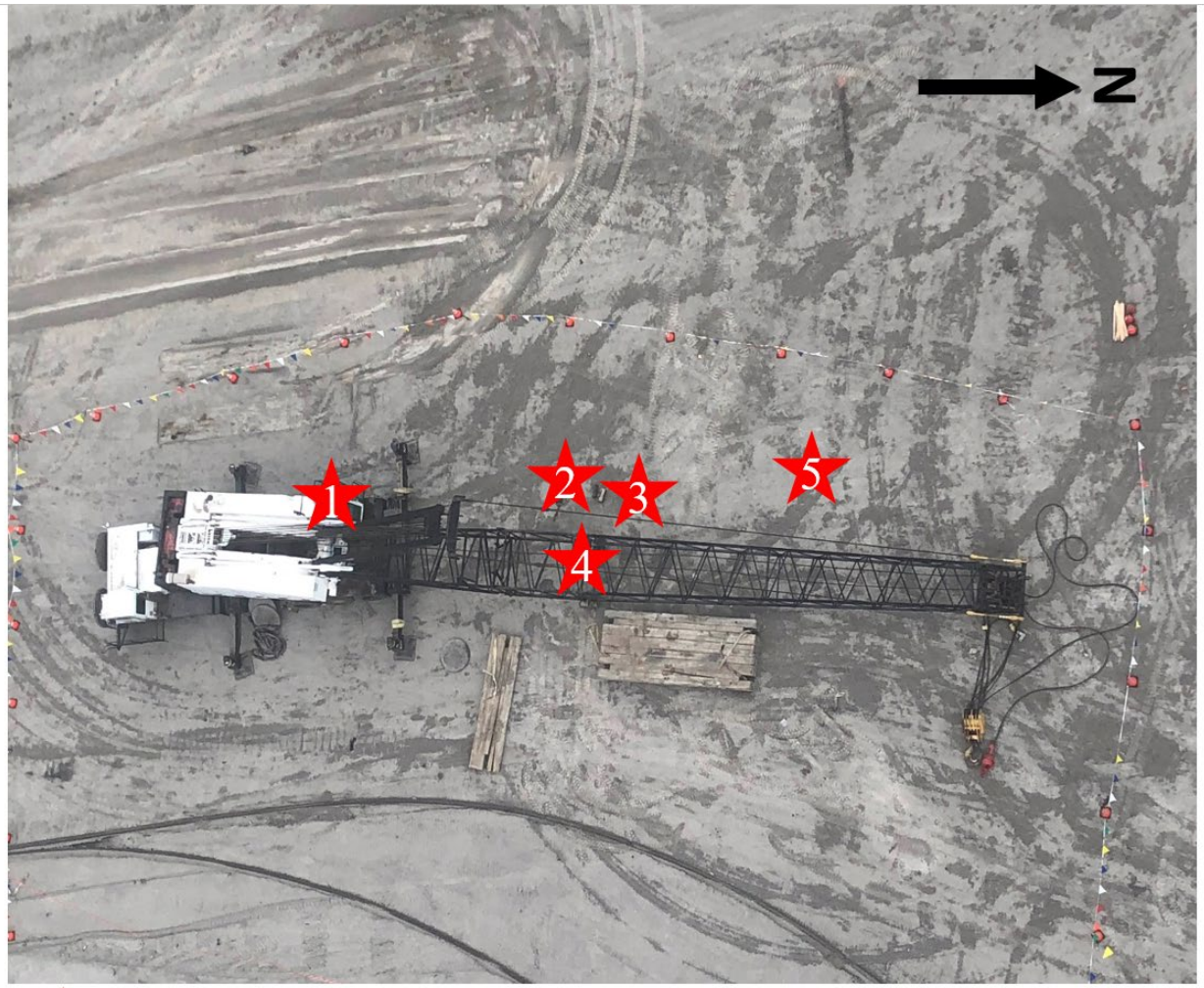


APPENDIX F – Photo of Correct Placement of Pendant Lines



APPENDIX G – Photo of the Warning Label on Boom

APPENDIX H – Aerial View of the Accident Scene



1 Justin Kolbeck

2 Matthew Miller

3 Lyle Senger

4 Jeffrey Wendland

5 Jesse Brown

APPENDIX I – Photo of Wooden Blocks Placed after Accident

APPENDIX J – Illustration in the Manufacturer's Manual

5. When is it permissible to remove pins with boom pendants in tension?

Do not remove any pins, top or bottom, on any section between the uppermost boom section and crane until all sections are supported and pendant lines relieved of tension.