

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Lead-Zinc Ore)

Fatal Machinery Accident

May 18, 2021

Madisonville Mining, LLC (B5045)
Madisonville, Kentucky

at

Young Mine
Nyrstar Tennessee Mines, Strawberry Plains LLC
New Market, Jefferson County, Tennessee
ID No. 40-00168

Accident Investigator

Ronald Caudill
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Central Region - Barbourville District
3837 South U.S. Hwy 25E
Barbourville, Kentucky 40906
Samuel Creasy, District Manager

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OVERVIEW

On May 18, 2021, at 4:30 p.m., Brandon Roski, a 35 year-old contract laborer with one year of mining experience, died when he was struck by a trailer-mounted pump (trailer). Contract miners were using a Telehandler (similar to a forklift with a telescoping boom, used to lift materials) to tow the trailer up an inclined, underground roadway when the tow hitch broke, causing the trailer to roll back down the roadway, striking the victim.

The accident occurred because the contractor did not: 1) use suitable towing equipment for towing applications; and 2) conduct an adequate pre-operational examination before towing the trailer.

GENERAL INFORMATION

Nyrstar Tennessee Mines, Strawberry Plains LLC (Nyrstar), operates the Young Mine, an underground lead-zinc mine in New Market, Jefferson County, Tennessee. The Young Mine has 113 miners and operates two twelve-hour production shifts, seven days per week. The mine extracts lead-zinc ore by blasting. Front-end loaders load the blasted material and transport it to a hopper. Locomotives transport the ore to an underground dump and a skip hoist takes it to the surface.

Madisonville Mining, LLC, is a mining contractor hired by Nyrstar to perform utility work at the Young Mine. There were seven contract miners from Madisonville Mining, LLC working at the mine at the time of the accident. The contractor is not involved in the ore mining process.

The principal officers for Nyrstar at the time of the accident were:

Daniel Vanin
Chris Michael
Jason Davis

Chief Executive Officer
Operations Manager
General Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on March 8, 2021. The 2020 non-fatal days lost incident rate for the Young Mine was zero, compared to the national average of 1.30 for mines of this type.

DESCRIPTION OF ACCIDENT

On May 18, 2021, at approximately 6:00 a.m., six Madisonville Mining, LLC miners (contract miners) traveled underground at the Young Mine and met at the underground mine shop with Clint Gipson, Foreman/Project Manager of Madisonville Mining, LLC, to discuss the tasks to be performed by the two crews of contract miners during the shift. Gipson divided the contract miners into two work crews to complete the assignments. The first crew was Roy Isom, Supervisor/Telehandler Operator; Jorge Hiromato, Laborer; and Roski. The second crew was Joshua Lucas, Laborer; Joshua Newsome, Laborer; and Jordan Godsey, Laborer. The first crew conducted a pre-operational examination on the Telehandler in the shop, then traveled through the mine to move a pump using the Telehandler and construct a ventilation control. The second crew cleaned and organized materials in the shop.

At approximately 4:15 p.m., Gipson met with the contract miners on both crews to set a back-up pump in the 14-48 sump area, which is on a downward slope from the belt roadway (see Appendix A). A diesel pump mounted on a dual-axle trailer was parked beside the back-up pump prior to the contract miners working in the 14-48 sump area. Contract miners attached a basket to the forks of the Telehandler and loaded the back-up pump into the basket. Because of the diesel pump's placement in relation to the Telehandler and back-up pump, Isom was unable to extend the stabilizing jacks on the front of the Telehandler. Consequently, the contractor crew decided to move the trailer with the diesel pump out of the area to allow more room to work on the back-up pump. Isom set the basket, which was loaded with the back-up pump, down, and turned the Telehandler around in order to move the trailer with the diesel pump.

The trailer was equipped with a lunette ring and the Telehandler was equipped with a hitch pocket and pin. Due to the muddy ground at the sump area, the jack on the trailer was unable to lift the trailer's lunette ring high enough to connect it to the Telehandler's hitch. Isom placed the forks of the Telehandler under the lunette ring and lifted the tongue of the trailer. While Isom lifted the trailer, Lucas placed blocks under the jack to keep it elevated. Gipson and Lucas then connected the trailer to the Telehandler by placing the pin through the lunette ring (see Appendix B). The trailer was equipped with safety chains and a breakaway trailer brake system (see

Appendix C), but the crews could not use these safety features because the Telehandler was not equipped with connection points for the safety chains.

When Isom started tramping the Telehandler up the inclined roadway with the trailer and diesel pump in tow, all contract miners except Roski congregated at the back-up pump area. According to interviews with the contract miners, no one realized that Roski was walking behind the trailer and diesel pump.

As the Telehandler reached the top of the incline, Isom swung the Telehandler wide toward the left rib to turn onto the right roadway. This placed the Telehandler on the level roadway while the trailer with the diesel pump remained on an inclined section of the roadway (see Appendix D). The positioning of the Telehandler and trailer with the diesel pump on different planes put stress on the lunette ring. The lunette ring's lug broke, causing it to lose connection with the trailer. According to interviews, the contract miners heard a loud popping sound which was later verified as the lunette ring breaking. At the time that the connection broke, Roski was located approximately ten feet behind the trailer. Gipson stepped out from the sump area after he heard the loud popping sound, saw the trailer with the diesel pump rolling toward the contract miners, and yelled for them to move out of the way. The contract miners then huddled on the catwalk adjacent to the sump. While the trailer rolled down the incline, Godsey stepped out of the sump area to see what was happening and saw Roski crouched down to brace for impact as the trailer struck him. After hitting Roski, the trailer struck the left rib, flipped, and then came to rest on its side along the right rib, approximately 120 feet from the Telehandler. Gipson, Godsey, and Lucas rushed to check on Roski. Realizing Roski's injuries were critical, Gipson obtained a nearby personnel carrier and drove to the top of the incline to find help.

Wes Calton, Mine Foreman, was driving a pickup truck in the belt roadway at the top of the incline. Gipson met Calton and told him to call for an ambulance. Calton contacted Dale Burris, Hoist Man, who called 911 at 4:40 p.m. Gipson asked Calton to transport Roski to the surface. Gipson moved the Telehandler out of the way, clearing a path for Calton to back his truck down to Roski's location. Lucas and Isom put Roski in the back seat of the pickup truck, and Isom got in the truck with Calton. Calton notified Burris that he was on his way to the surface with Roski, and to confirm that no one was blocking the slope entrance to the mine.

Four officers with the Jefferson County Sheriff's Office and two paramedics with Jefferson County Emergency Medical Services' (EMS) Medic 8 unit arrived at the mine at 4:51 p.m. Calton and Isom arrived on the surface with Roski at approximately 5:00 p.m. EMS conducted an examination of Roski and determined that he had no cardiac activity. Mark Holland, Medical Examiner, arrived at the mine and pronounced Roski dead at 6:57 p.m.

INVESTIGATION OF THE ACCIDENT

On May 18, 2021, at 5:03 p.m. Steven Turaski, Nyrstar Safety, Health, and Environmental Manager, contacted the Department of Labor National Contact Center (DOLNCC) to report the accident. At 5:32 p.m., DOLNCC notified James Proffitt, Supervisory Mine Safety and Health Specialist, of the accident. Proffitt then notified Samuel Creasy, District Manager. After receiving the report of the accident, Creasy sent Ronald Caudill, Mine Safety and Health Specialist, to the mine to serve as the lead accident investigator. Creasy also directed Mark Muse, Mine Safety and Health Inspector, to travel to the mine to assist with the investigation. Muse arrived at the mine at 6:15 p.m. and issued an order under the provisions of Section 103(k) of the Mine Act to assure the safety of the miners and preservation of evidence. At 9:05 p.m., Caudill and Argus Brock, Supervisory Mine Safety and Health Specialist, arrived at the mine to begin the initial investigation of the accident.

On May 19, 2021, MSHA conducted interviews with miners employed by Nyrstar and Madisonville Mining, LLC, at the Young Mine. See Appendix E for a list of persons participating in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at an area of the Young Mine referred to as the 14-48 sump area. The sump is located 216 feet from the belt roadway. The roadway leading from the belt conveyor to the sump is on a downward, 15.4 percent grade. The roadway entry is approximately 18 feet high and 25 feet wide. A steady stream of water was flowing down the right side of the roadway towards the sump.

Utility Work Performed by Madisonville Mining, LLC

Nyrstar has a contract with Madisonville Mining, LLC to perform utility work at the Young Mine on a daily basis. For information purposes, management from both companies attend a weekly planning meeting and daily crossover meetings in between shifts. On the day of the accident, the mine operator displayed a list of tasks to be completed by Madisonville Mining, LLC on a whiteboard located in the mine office. It was the responsibility of Madisonville Mining, LLC, to determine how to complete the job. Nyrstar did not provide direction to the contractor on how to complete the tasks.

Equipment Involved

At the time of the accident, the contract miners were using a leased JLG Telehandler, model 1055 (see Appendix F).

The diesel pump on the trailer is a Godwin Dri-Prime Extreme High Head model HL130M pump, powered by a John Deere diesel engine. The weight of the diesel pump and trailer was 13,070 pounds, which is below the trailer's gross vehicle weight rating of 13,200 pounds.

Towing Deficiencies

MSHA determined the Telehandler was not manufactured for towing and an ineffective hitching system was used to tow the trailer. According to JLG's Operation and Safety Manual, the hitch pocket and pin in the frame of the Telehandler were retrieval devices used for recovering the machine in the event it became disabled, not for trailer towing.

The trailer was equipped with two safety chains. The chains connect to a towing vehicle in order to prevent runaway in the event of a primary tow rigging failure. The use of safety chains is not specific to any industry, however, the contractor could not use the safety chains because the Telehandler did not have an adequate connection point for them.

The breakaway trailer brake system cable was not connected because the Telehandler did not have an adequate connection point. This breakaway braking system is designed to set the trailer brakes if the trailer becomes disconnected from the towing vehicle.

After an inspection of towing vehicles at the mine, MSHA determined that no towing vehicles in service at the time of the accident had: 1) suitable connection points for safety chains; and 2) an effective means to tow a trailer with a hitch of this type.

Tow Hitch Failure

MSHA took the broken lunette ring, broken anchor, and hitch mounting bolt into evidence and sent them to the Approval and Certification Center's Mechanical Engineering & Safety Division of MSHA Technical Support for testing and analysis.

Russell Stackpole, II, Mechanical Engineer, examined, measured, tested, and analyzed the items. Stackpole's findings were consistent with the investigation team's findings that the trailer's hitch system was incompatible with the Telehandler's hitch pocket and pin.

The manufacturer designed the lunette ring for towing with equipment outfitted with a pintle hitch receiver (see Appendix G). During the towing process, a pintle hitch allows the lunette ring to move freely in each direction and prevents applied pressure to the side of the ring. A pintle hitch receiver also has connection points for the safety chains and brake cable. The hitch on the Telehandler was a simple pin style, which is not designed to tow the lunette ring. When the trailer was connected to the Telehandler, the pin was inserted through the lunette ring. This connection did not allow the lunette ring to move laterally or vertically, placing additional stress on the already vulnerable connection.

Additionally, the lunette ring is designed to be secured to the tongue of the trailer by two grade 8 bolts. Only one severely bent grade 8 bolt was recovered after the accident. The operator stated that an anchor bolt was used instead of a grade 8 bolt. During the accident investigation, a severely bent and fractured anchor bolt was found along the trailer's travel path. This anchor bolt did not have the required strength, nor the proper size as the required grade 8 bolt (see Appendix H).

After an inspection of towing vehicles at the mine, MSHA determined that no towing vehicles in service at the time of the accident had effective means to tow a trailer with a hitch of this type.

Examinations

Madisonville Mining, LLC, did not conduct an adequate pre-operational examination before attempting to tow the trailer with the Telehandler. Investigators determined that the pre-operational examiner should have observed the following safety hazards indicating that the Telehandler was not equipped for towing applications:

1. The Telehandler used to tow the diesel pump trailer did not have the proper hitch.
2. The Telehandler did not have connection points for safety chains.
3. The breakaway trailer brake module was not connected to the Telehandler prior to towing.

An adequate pre-operational examination would have found these safety hazards prior to towing the trailer up the inclined roadway with the Telehandler, and they could have been corrected. The pre-operational examiner did not take appropriate action to correct the conditions that adversely affected the safety of the contract miners.

Training and Experience

Randall Dye, Mine Safety and Health Training Specialist, reviewed the training records at the mine. Roski had approximately one year of mining experience, with seven weeks at Madisonville Mining, LLC. Roski worked as a contract miner at the Young Mine since May 4, 2021.

Isom had approximately three years of mining experience with over two years at Madisonville Mining, LLC as a Telehandler operator. Isom worked as a contract miner at the Young Mine since March 30, 2020.

The contract miners employed by Madisonville Mining, LLC work at the Young Mine for frequent and extended periods and are regularly exposed to mine hazards. Consequently, they should have received experienced miner training before beginning work duties in the mine. Nyrstar provided hazard training to the contract miners, but not experienced miner training. Investigators do not believe this violation of MSHA Part 48 regulations 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 causes, and the mine operator implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The contractor did not use equipment suitable for towing applications, did not use safety chains or breakaway modules, and used an improper hitch.

Corrective Action: The contractor developed procedures for safely towing loads and trained all contract miners on these procedures. The mine operator also developed procedures for safely towing loads. The mine operator trained all miners and will verify that all contract miners are trained on:

- a. the use of towing equipment, safety chains, and breakaway modules.
 - b. the selection and use of hitches used at the mine
 - c. how to examine hitches, cables, straps, safety chains, safety hooks, tires on the trailer, and all equipment involved in towing.
2. Root Cause: The contractor did not conduct an adequate pre-operational examination before towing the trailer.

Corrective Action: The contractor trained all of the contract miners that may conduct pre-operational examinations on hazard recognition and corrective measures.

CONCLUSION

On May 18, 2021, at 4:30 p.m., Brandon Roski, a 35 year-old contract laborer with one year of mining experience, died when he was struck by a trailer-mounted pump (trailer). Contract miners were using a Telehandler (similar to a forklift with a telescoping boom, used to lift materials) to tow the trailer up an inclined, underground roadway when the tow hitch broke, causing the trailer to roll back down the roadway, striking the victim.

The accident occurred because the contractor did not: 1) use suitable towing equipment for towing applications; and 2) conduct an adequate pre-operational examination before towing the trailer.

Approved by:

Samuel Creasy
District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Nyrstar Tennessee Mines, Strawberry Plains LLC.

A fatal accident occurred on May 18, 2021, at 4:51 p.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(d)(1) citation was issued to Madisonville Mining, LLC, for violation of 30 CFR § 57.14205.

A fatal accident occurred when a contract miner was struck by a runaway trailer carrying a diesel pump. The trailer was being towed up an inclined roadway by a Telehandler when the tow hitch broke, causing the trailer to roll toward the victim. MSHA determined the Telehandler was not manufactured for towing and an ineffective hitching system was used to tow the trailer, with the following deficiencies observed:

1. The safety chains installed on the trailer could not be used while towing this trailer because the Telehandler did not have an adequate connection point for the safety chains.
2. The breakaway trailer brake system cable was not connected because the Telehandler did not have an adequate connection point. This breakaway braking system is designed to set the trailer brakes if the trailer becomes disconnected from the towing vehicle.
3. Neither a properly sized tow bar nor other effective means of control were used to tow this trailer with the Telehandler. The trailer was equipped with a lunette ring style tow hitch. The hitch on the Telehandler was a simple pin style, which is not designed to tow the lunette ring. When the trailer was connected to the Telehandler, the pin was inserted through the lunette ring. This connection did not allow the lunette ring to move laterally or vertically, placing additional stress on the already vulnerable connection. Additionally, the lunette ring is designed to be secured to the tongue of the trailer by two grade 8 bolts. Only one severely bent grade 8 bolt was recovered after the accident. The operator stated that an anchor bolt was used in place of the missing grade 8 bolt. A severely bent and fractured anchor bolt was found along the trailer's travel path, during the accident investigation. This anchor bolt does not have the required strength, nor the proper size as the required grade 8 bolt.

The contractor engaged in aggravated conduct constituting more than ordinary negligence by allowing the trailer to be towed by a Telehandler that was not manufactured for towing and an ineffective hitching system used to tow the trailer. The contract miner

operating the Telehandler and one of the contract miners who connected the trailer to the Telehandler were supervisors at Madisonville Mining, LLC. After an inspection of towing vehicles at the mine, MSHA determined that no towing vehicles in service at the time of the accident had suitable connection points for safety chains nor an effective means of control to tow a trailer with a hitch of this type. This violation is an unwarrantable failure to comply with a mandatory standard.

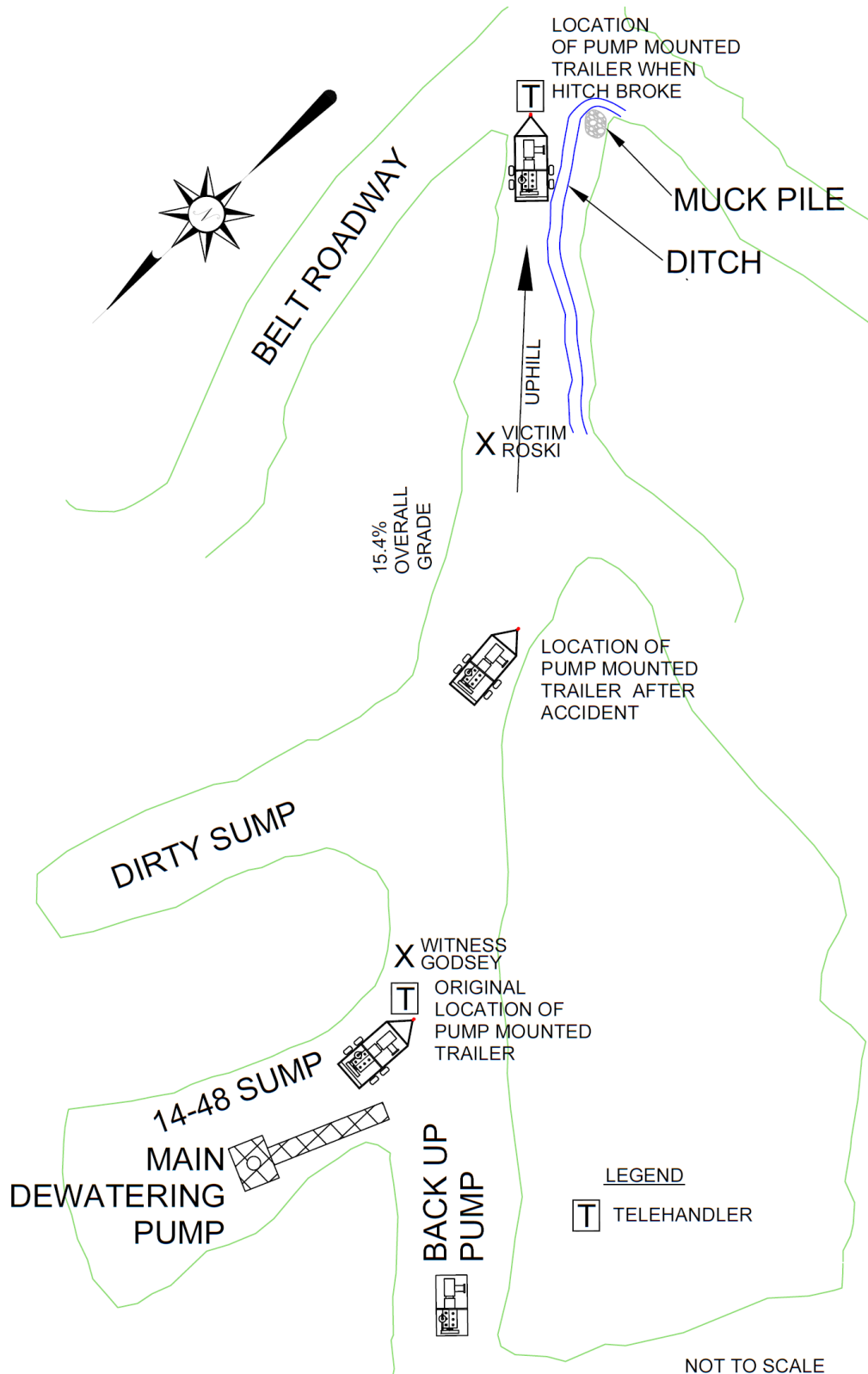
3. A 104(d)(1) order was issued to Madisonville Mining, LLC, for violation of 30 CFR §57.14100(a).

A fatal accident occurred when a contract miner was struck by a runaway trailer carrying a diesel pump. On May 18, 2021, a pre-operational examination was not conducted of the telehandler after it was coupled to the pump mounted trailer. After coupling the telehandler to the trailer, the trailer became part of the telehandler, therefore a pre-operational examination of both pieces of equipment became necessary. When inspected after the accident, no record was discovered for the results of the examination and the following safety hazards were observed:

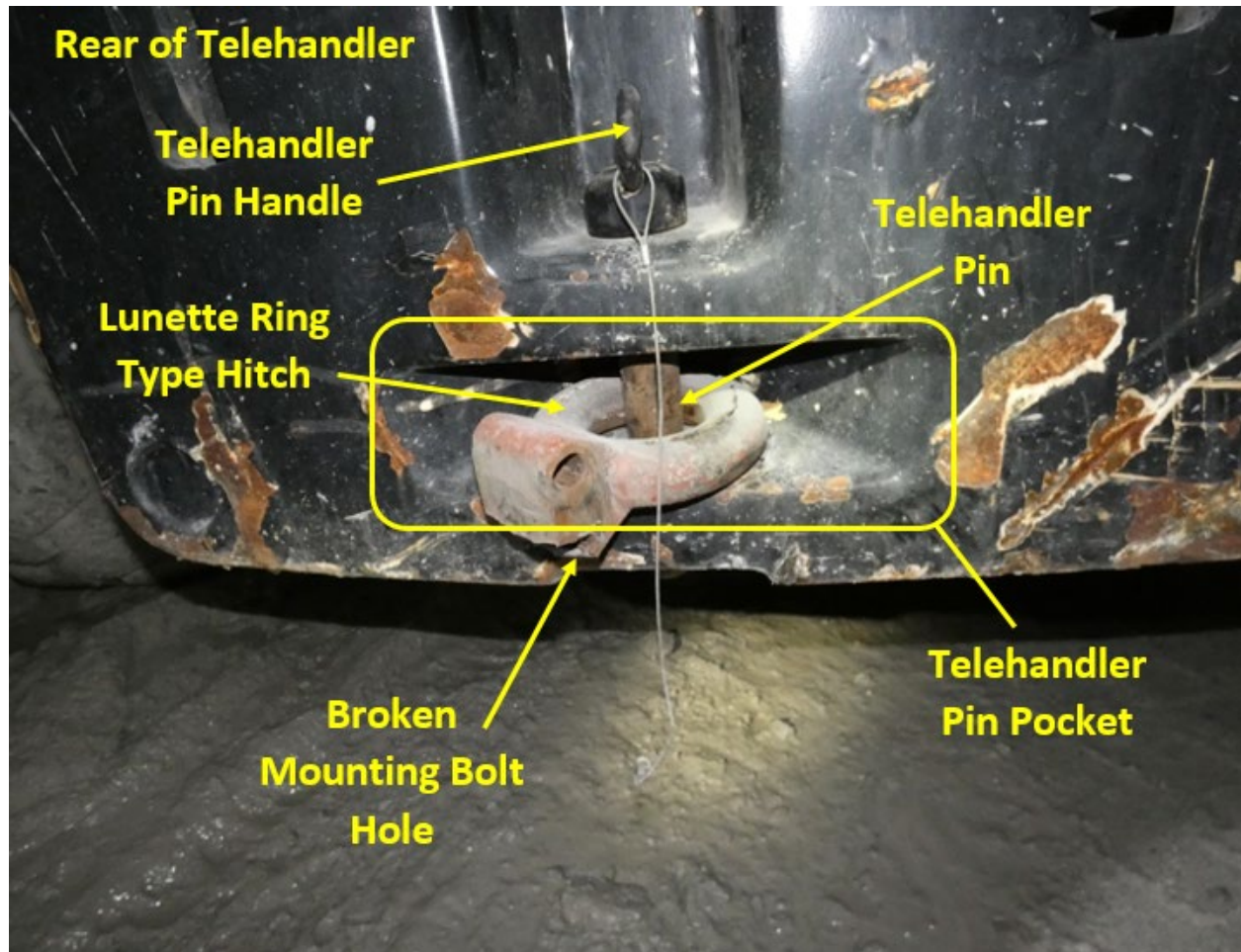
1. The Telehandler used to tow the diesel pump trailer did not have the proper hitch.
2. The Telehandler did not have connection points for safety chains.
3. The breakaway trailer brake module was not connected to the Telehandler prior to towing.

The contractor engaged in aggravated conduct constituting more than ordinary negligence in that contract miners were not notified of safety hazards present with the telehandler and pump-mounted trailer and these hazards were not corrected before work began. An adequate pre-operational examination would have found and corrected these safety hazards prior to towing the diesel pump up the inclined roadway with the Telehandler. An agent of Madisonville Mining, LLC was in the area and assisted in connecting the trailer to the Telehandler for towing purposes. The agent knew that the Telehandler did not have connection points for safety chains. The use of safety chains is not specific to any industry and the contractor should have recognized the hazard of not using them, especially on an inclined roadway. This violation is an unwarrantable failure to comply with a mandatory standard.

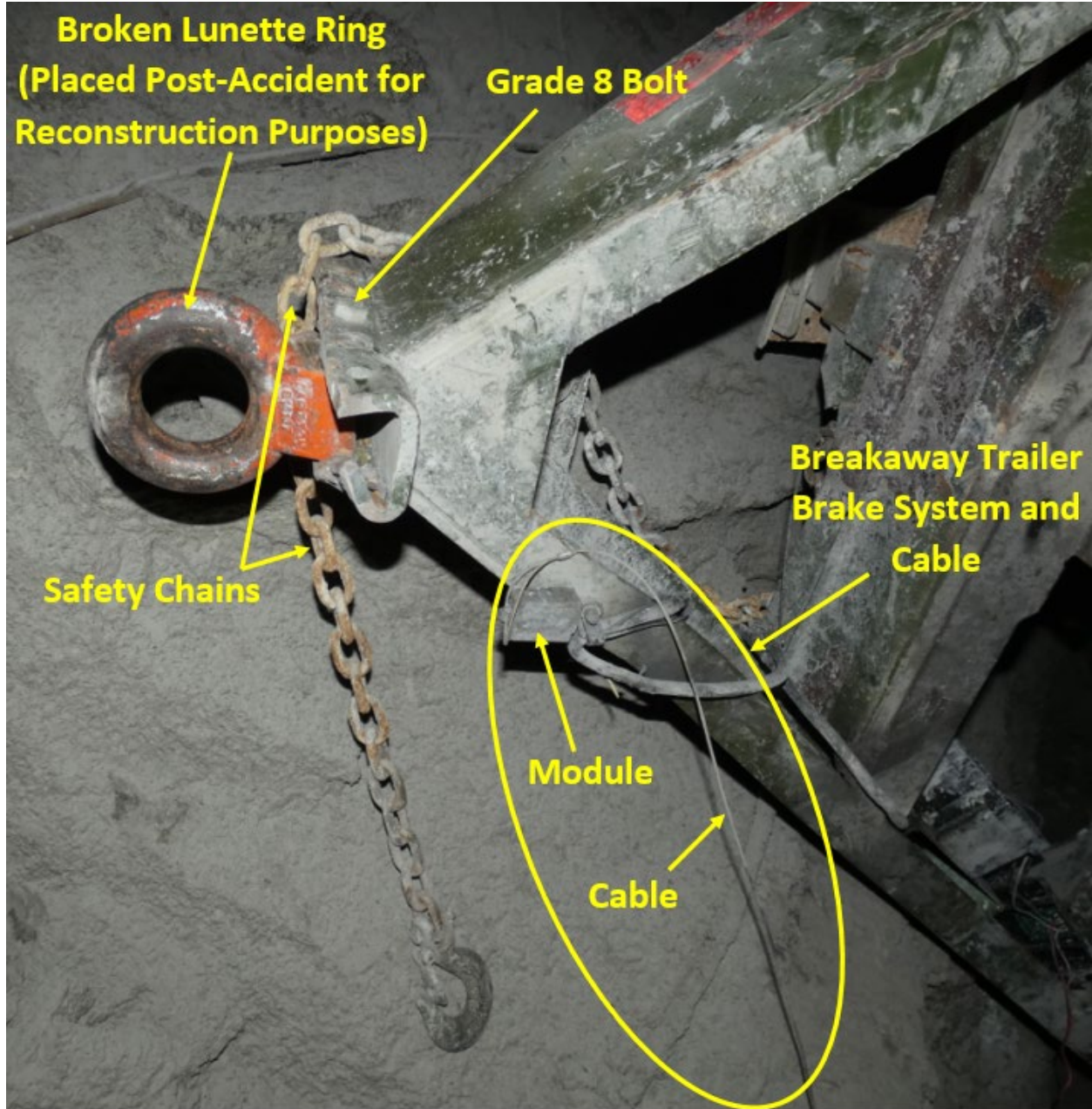
APPENDIX A - Overview of Accident Scene



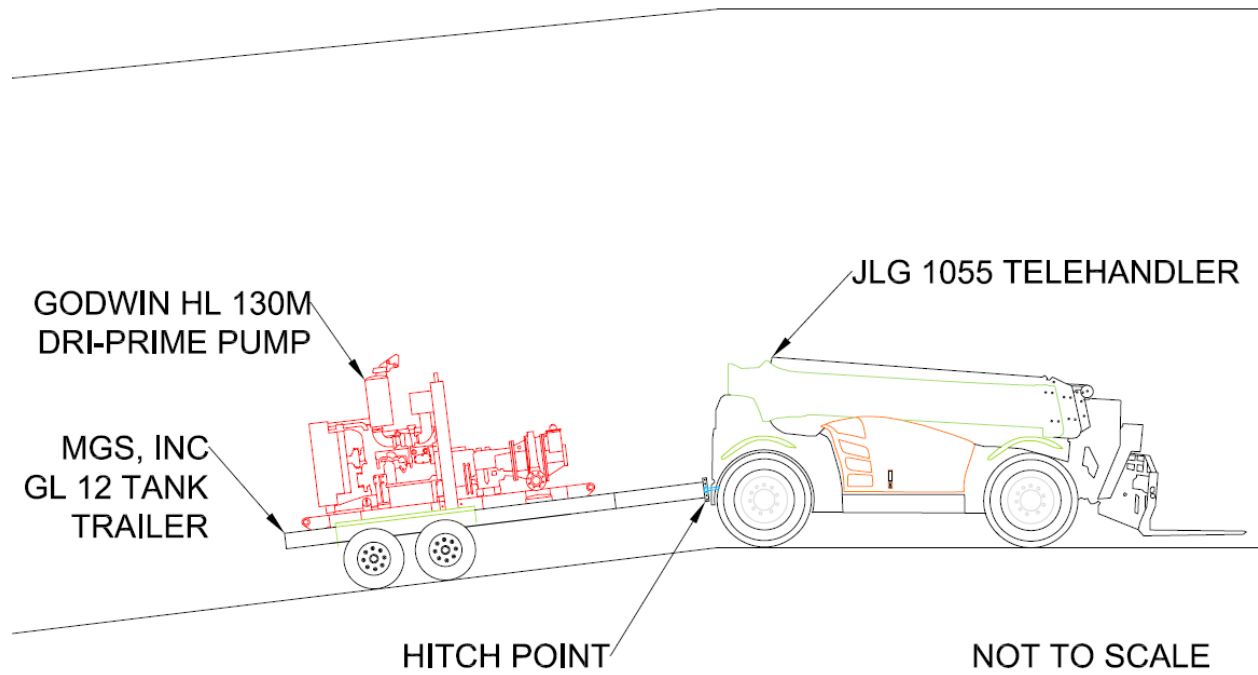
APPENDIX B - Lunette Ring on Telehandler



APPENDIX C - Post-Accident Photo of Trailer on its Side



APPENDIX D - Sketch of Telehandler and Trailer at Apex of Incline



APPENDIX E - Persons Participating in the Investigation

Nyrstar Tennessee Mines, Strawberry Plains LLC

Jason Davis	General Manager
Brad Davenport	Safety, Health, and Environmental Superintendent, Middle TN Mines
Steven Turaski	Safety, Health, and Environmental Manager
Wes Calton	Mine Foreman
Brian Millington	Health & Wellness/Mine Rescue Coordinator
Dale Burris	Hoist Man

Madisonville Mining, LLC

Robert Sandidge	Owner
Robert Sandidge, Jr.	President/General Manager
Clint Gipson	Foreman/Project Manager
Roy Isom	Supervisor/Telehandler Operator
Jordan Godsey	Laborer
Joshua Lucas	Laborer
Joshua Newsome	Laborer
Jorge Hiromato	Laborer

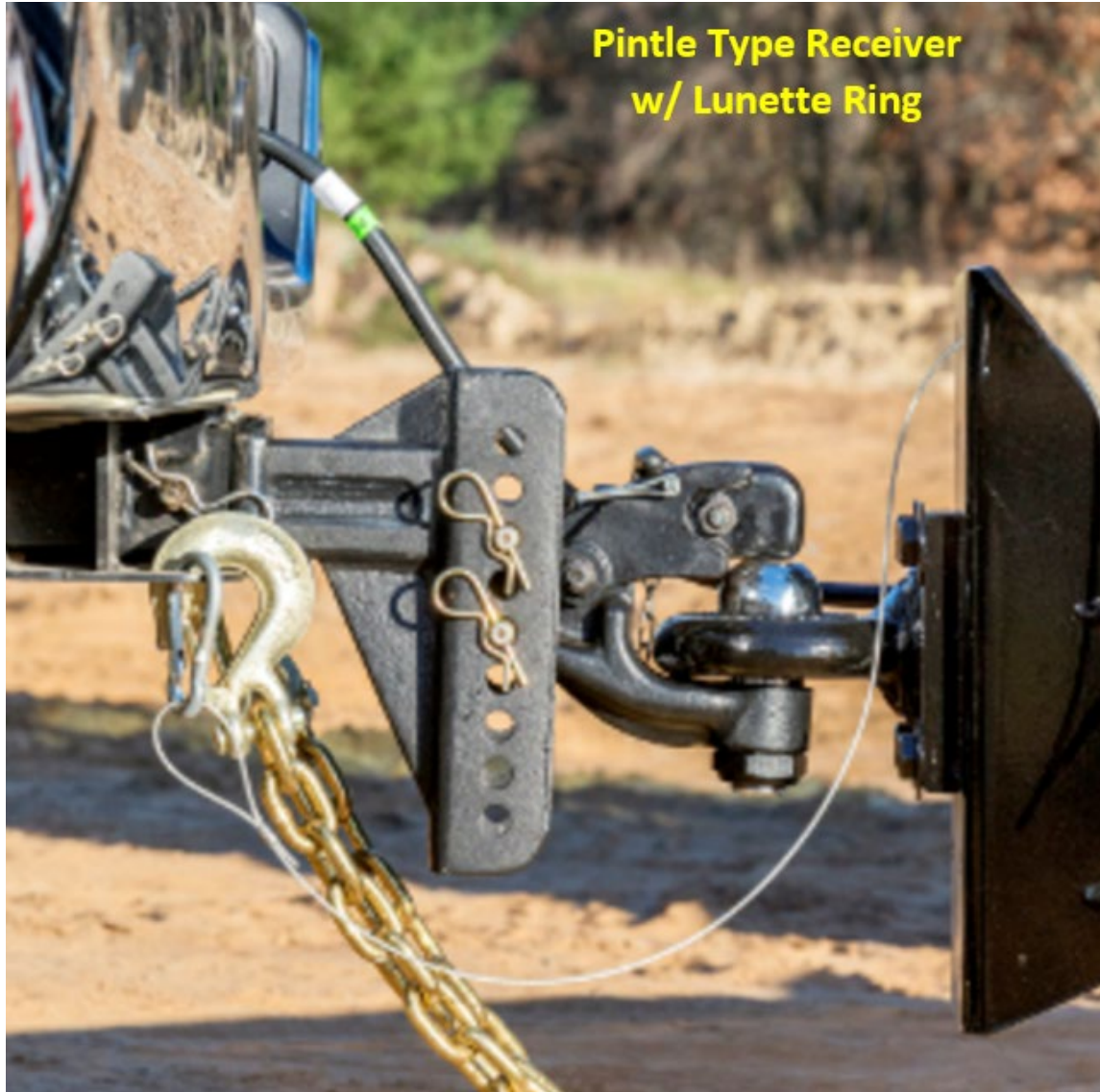
Mine Safety and Health Administration

Samuel Creasy	District Manager
Argus Brock	Supervisory Mine Safety and Health Specialist
James Proffitt	Supervisory Mine Safety and Health Specialist
Ronald Caudill	Mine Safety and Health Specialist
Kevin Doan	Mining Engineer
Mark Muse	Mine Safety and Health Inspector
Randall Dye	Mine Safety and Health Training Specialist
Russell Stackpole, II	Mechanical Engineer, Technical Support

APPENDIX F - Example of JLG 1055 Telehandler



APPENDIX G - Example of Pintle Receiver and Lunette Ring



APPENDIX H - Comparison of Grade 8 Bolt and Anchor Bolt

