

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Coal)

Fatal Machinery Accident
January 7, 2022

Oaktown Fuels Mine No. 1
Sunrise Coal, LLC
Oaktown, Knox County, Indiana
ID No. 12-02394

Accident Investigators

Bub Whitfield
Mine Safety and Health Electrical Specialist

Craig Arnold
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
Vincennes District
2300 Willow Street Suite 200
Vincennes, IN 47591
Ronald Burns, District Manager

TABLE OF CONTENTS

OVERVIEW	1
GENERAL INFORMATION	1
DESCRIPTION OF THE ACCIDENT	2
INVESTIGATION OF THE ACCIDENT	3
DISCUSSION	3
Location of the Accident	3
Equipment Involved	3
Proximity Detection System	4
Roof Control Plan	6
Examinations	6
Training and Experience	7
ROOT CAUSE ANALYSIS	7
CONCLUSION	8
ENFORCEMENT ACTIONS	9
APPENDIX A – Persons Participating in the Investigation	10
APPENDIX B – Section Map	12
APPENDIX C – Photograph of the Accident Scene	13
APPENDIX D – Photograph of a PDS Driver	14
APPENDIX E – Photograph of Rodriguez’s MWC	15
APPENDIX F – Red Zones Illustration	16



OVERVIEW

On January 7, 2022, at 10:35 p.m., Brian Rodriguez, a 35 year-old continuous mining machine (CMM) operator with over nine years of mining experience, was fatally injured when he became pinned between the CMM and the coal rib while repositioning the CMM.

The accident occurred because the mine operator did not: 1) assure miners followed provisions in the approved Roof Control Plan to prevent them from working or traveling in the Red Zone of the CMM while it was being moved or repositioned, and 2) assure the miner wearable component (MWC) was being worn in accordance with the manufacturer's recommendation.

GENERAL INFORMATION

Sunrise Coal, LLC owns and operates Oaktown Fuels Mine No. 1. The mine is an underground bituminous coal mine located in Oaktown, Knox County, Indiana. Oaktown Fuels Mine No. 1 employs 355 miners and operates three eight-hour shifts, five days per week. Miners extract coal from the Indiana No. 5 coal seam with eight mechanized mining units (MMUs). Each MMU consists of continuous mining machines, coal haulers, roof bolters, scoops, and belt feeders. Coal is transported by belt conveyors from the feeders to an onsite processing facility.

The principal management officials at Oaktown Fuels Mine No.1 at the time of the accident were:

Rick Pigg
Terry Dowell
Brandon Flath

Senior Vice President of Mining Operations
Vice President of Underground Mining Operations
Safety Director

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on December 27, 2021. The 2021 non-fatal days lost incident rate for Oaktown Fuels Mine No. 1 was 4.36, compared to the national average of 3.48 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On January 7, 2022, Rodriguez reported to work for the second shift at the Oaktown Fuels Mine No. 1 main portal as one of the two CMM operators assigned to the MMU 008-0. The MMU 008-0 crew, including Rodriguez, entered the mine slope at 3:05 p.m. and traveled in a personnel carrier to the section. The MMU 008-0 crew arrived at the section at 3:28 p.m. and began production.

Andrew Taylor, CMM Operator, started operating the No. 4 CMM on the MMU 008-0 at the beginning of the shift and mined coal in the face of the No. 11 and No. 12 entries. Rodriguez took over operating the CMM from Taylor at approximately 7:00 p.m. and started mining in the face of the No. 7 entry. At 10:35 p.m., Rodriguez was cutting coal in the face of the No. 11 entry on MMU 008-0 and loaded a coal hauler operated by Ian Jones, Coal Hauler Operator. Jones traveled to the unit feeder to unload the coal.

At 10:37 p.m., Kristin Dickerson, Coal Hauler Operator, pulled the coal hauler into the intersection of the No. 40 crosscut and the No. 11 entry to wait to be loaded. Dickerson noticed the conveyor tail boom was in the down position on the CMM and she could not see Rodriguez. Dickerson turned off the coal hauler, heard the pump motor running on the CMM, and yelled for Rodriguez. When Dickerson did not get a response, she got out of the coal hauler to approach the CMM as Taylor walked into the No. 11 entry. As Taylor and Dickerson walked toward the CMM, they saw Rodriguez pinned between the CMM and the coal rib. Both Dickerson and Taylor reported seeing the proximity detection system (PDS) warning lights flashing yellow as they approached the CMM, even though Rodriguez was clearly within the PDS “shutdown” zone, and the lights should have been flashing red.

Dickerson ran to get help and Taylor used the CMM remote control to reposition the CMM to free Rodriguez from between the CMM and the coal rib. Taylor reported the PDS warning lights continued to flash yellow as he turned the CMM away from Rodriguez. Dickerson and Taylor called the surface to report the accident, cleared the roadway for the underground ambulance, and retrieved first aid supplies. Scott Latshaw, Leadman, and Dustin Moore, Section Mechanic, assisted by others, placed Rodriguez on a backboard and then on an underground diesel ambulance to transport him to the surface. Latshaw and Moore began performing

cardiopulmonary resuscitation (CPR) on Rodriguez in the ambulance, after leaving the section because they could no longer detect a pulse.

Derek Smith, Examiner/Emergency Medical Technician, met the ambulance underground and took over performing CPR on Rodriguez. When Rodriguez arrived on the surface at 11:16 p.m., Carlisle Lions Community Ambulance Service personnel took over treatment and continued CPR. Carlisle Lions Community Ambulance Service personnel contacted Sullivan County Community Hospital, and Raymundo Rosales, M.D., Emergency Room Doctor, pronounced Rodriguez dead at 11:20 p.m.

INVESTIGATION OF THE ACCIDENT

On January 7, 2022, at 11:02 p.m., Nathan Ashley, Assistant Shift Manager, called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Bradley Smith, Supervisory Mine Safety and Health Inspector. Smith contacted David Stepp, Assistant District Manager, who informed Christopher Persinger, Supervisory Mine Safety and Health Inspector, of the accident. Stepp contacted Bub Whitfield, Mine Safety and Health Electrical Specialist, and assigned him as the lead accident investigator. Persinger sent Craig Arnold, Mine Safety and Health Inspector, to the mine.

On January 8, 2022, at 12:35 a.m., Arnold arrived at the mine 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 2:10 a.m., Whitfield and Stepp arrived at the mine site to continue the investigation. MSHA's accident investigation team, along with Brian Lett, Deputy Commissioner of the Indiana Bureau of Mines, conducted interviews and obtained written statements from miners and mine management, examined the accident scene, and reviewed conditions and work procedures relevant to the accident. Whitfield, Arnold, Anthony DiLorenzo, Supervisory Mine Safety and Health Inspector, and MSHA Technical Support personnel conducted additional examinations at the mine on January 11, 2022; March 8, 2022; and March 9, 2022. Between January 11 and March 8, 2022, investigators analyzed the PDS data and conducted additional interviews, as necessary. See Appendix A for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at the face of the No. 11 entry on MMU 008-0 (see Appendix B). The mine height in the entry where the accident occurred was 71 inches. The mine floor was dry. The mine roof had metal screen wire installed in the entry. See Appendix C for photograph of the accident scene.

Equipment Involved

The No. 4 CMM involved in the accident was a Joy Global, Inc., Model 14CM15-11DX. The mine operator placed the CMM in service at the mine on November 30, 2021, after a routine rebuild by Joy Global, Inc. The mine operator equipped the CMM with a Joy Gen 2 SmartZone

PDS manufactured by Matrix Design Group. The No. 4 CMM was equipped with the Joy Network Architecture (JNA) control system.

Proximity Detection System

The purpose of the PDS is to stop the CMM before contacting miners when the CMM is being trammed from place to place or is being repositioned. The PDS activates audio and visual warnings when a CMM approaches a miner and disables the tram and conveyor boom swing functions of the CMM before the CMM contacts a miner. The PDS relies on signals from MWCs worn by miners, and components installed on the CMM called machine mounted components (MMCs).

The MMCs include four electromagnetic field generators, referred to as drivers. Two drivers are located near the front of the CMM, one on each side, and two drivers are located near the rear of the CMM (see Appendix D), one on each side. The PDS uses the drivers' electromagnetic fields and radio signals from the MWCs to determine the location of the MWCs relative to the CMM. When an MWC enters a certain area in the electromagnetic field, the MMCs and MWC recognize the intrusion and relay the appropriate signal to the system. See Appendix E for Rodriguez's MWC.

The PDS has warning and shutdown zones. When the system is working properly and a miner enters the warning zone while wearing an MWC, yellow lights flash on all four drivers, and a yellow light flashes on the MWC and sounds a slow beeping signal. If a miner, wearing an MWC, enters the shutdown zone, red lights flash on all four drivers, the MWC flashes a red light and sounds a fast-beeping signal, and the PDS disables the "tram" and "conveyor boom swing" functions of the CMM.

Investigators reviewed electronic data stored on the PDS and JNA control system. PDS and JNA data revealed the following:

1. Rodriguez was wearing his MWC throughout the shift on January 7, 2022.
2. At 10:36:14 p.m. and 10:36:15 p.m., the CMM was trammed so that the left rear of the CMM turned toward the left rib, pinning Rodriguez.
3. At 10:37:06 p.m., the PDS showed the MWCs worn by Dickerson and Taylor to be in close proximity of the CMM.
4. Between 10:38:42 p.m. and 10:38:54 p.m., Taylor moved the CMM away from Rodriguez.

Taylor and Dickerson told investigators that Taylor had to reach over the rear corner of the CMM and use the remote-control transmitter that was located on Rodriguez. Both Rodriguez and Taylor were in an area that should have been a shutdown zone, and as such, Taylor should not have been able to tram the CMM. At 10:39:00 p.m., Taylor turned off the pump motor on the CMM.

PDS data shows that Taylor was able to tram the CMM because the PDS assigned both Rodriguez's and Taylor's MWCs to a location outside of the warning zone at the rear of the CMM conveyor boom, instead of in the shutdown zone where the MWCs were actually located.

On January 11, 2022, investigators made static measurements and conducted dynamic tests on the PDS on the No. 4 CMM. Static measurements are performed by positioning MWCs in warning and shutdown zone locations around the CMM while the CMM is not moving. This is done to measure the warning and shutdown zone distances around the CMM. Dynamic tests are performed by trammings the CMM toward an MWC that is stationary. The dynamic tests replicated the conditions, locations, and movements at the time of the accident.

During static testing, investigators observed that the PDS stopped the CMM before the CMM contacted the MWC at the rear half of the CMM where the victim was located, including around the conveyor boom. Dynamic testing was performed with Rodriguez's MWC at the location of the accident, and at other locations around the CMM.

When Rodriguez's MWC was placed at the location of the accident, the PDS stopped the CMM before the CMM contacted the MWC each time this dynamic test was conducted. To simulate the conditions at the time of the accident during these dynamic tests, investigators placed Rodriguez's MWC in a pouch on his miner's belt, along with other items that were on the belt at the time of the accident: a self-contained self-rescuer, an electronic tracker, and a battery for the CMM remote control transmitter. Investigators placed the miner's belt along the left rib at the accident location and hung a continuous personal dust monitor from the roof mesh in a location consistent with witness statements.

Investigators performed additional dynamic tests by placing Rodriguez's MWC in stationary positions around the CMM. The PDS stopped the CMM from contacting the MWC during some of the tests, but not in others. However, during all dynamic tests, the left front driver did not illuminate any warning lights and the PDS was unable to determine an accurate distance from the left front driver to the MWC. PDS data showed that the left front driver was malfunctioning during the shift of the accident and on the shift prior to the accident. The PDS should prevent movement of the CMM if any machine-mounted component, such as a driver, is not functioning properly. The PDS involved in the accident did not detect the malfunctioning driver and allowed movement of the CMM. During the dynamic tests with Rodriguez's non-shielded MWC at the location of the accident, the PDS stopped the CMM before contacting the MWC, even though the left front driver was malfunctioning. Therefore, investigators determined that the malfunctioning left front driver did not prevent the PDS from stopping the CMM at the time of the accident.

On March 8, 2022, the mine operator installed Matrix Design Group's optional machine-mounted locator (MML) on the No. 4 CMM. A MML is designed to prevent trammings or swinging the conveyor boom of a CMM if the electromagnetic signal from a driver changes by a certain percentage. After the MML was installed, investigators determined that the MML detected the malfunctioning driver and enabled the PDS to prevent trammings or swinging the boom of the CMM.

Terry Dowell, Vice President of Underground Mining Operations, told investigators that a CMM operator at Sunrise Coal, LLC's Oaktown Fuels Mine No. 2 placed metallic shielding around his MWC to defeat the PDS. Dowell learned this information after the accident on January 21, 2022. Metallic shielding creates an electromagnetic shield that causes the PDS to assign

locations outside the shutdown zone to MWCs within the shutdown zone. According to Dowell, the bottom half of metal (aluminum) cans were used to cover the bottom half of MWCs.

On March 9, 2022, investigators conducted additional tests with MWCs shielded as described, and with non-shielded MWCs. Investigators placed metallic shielding around Rodriguez's MWC and put it in the shutdown zone where he was struck by the CMM. PDS real-time images from the PDS software showed Rodriguez's shielded MWC assigned to a location outside the shutdown zone and outside the warning zone. This location was consistent with the locations assigned by the PDS to Rodriguez's and Taylor's MWCs at the time of the accident and until 10:41:54 p.m. The location assigned to Rodriguez's MWC inside the shutdown zone after 10:41:54 p.m. was consistent with non-shielded MWCs. Investigators concluded that Rodriguez's MWC was defeated by metallic shielding at the time of the accident and contributed to the accident. Investigators also determined that the MWC worn by Taylor was also defeated by metallic shielding.

PDS data described in the previous paragraph shows that Rodriguez's MWC was shielded at the time of the accident and that the metallic material was removed from his (Rodriguez's) MWC at 10:41:54 p.m., prior to MSHA's arrival on-site to conduct the accident investigation. Therefore, the scene of the accident was altered before MSHA began its investigation.

Roof Control Plan

The Roof Control Plan was approved on September 17, 2018. Appendix B Sketch 7 of the Roof Control Plan addresses the Red Zone provisions. It was submitted on May 6, 2019 and approved on May 22, 2019. The Plan states "Red Zones Stay Out of the 'Danger Zones!' No one shall be in the 'Danger Zone' when the miner is tramming from place to place or being repositioned in the working place." See Appendix F for illustrations of Red Zones around CMMs.

The Roof Control Plan Red Zone provisions were not followed. The accident occurred when the victim was in the Red Zone and became pinned between the CMM and the coal rib while repositioning the CMM in the working place. Investigators determined that this contributed to the accident.

Examinations

The accident investigation revealed that Taylor performed an inadequate check of the MMCs during the pre-shift examination on January 7, 2022. This conclusion was based on PDS data showing no MWC movement around the No. 4 CMM that would depict a valid static check or dynamic test of the PDS before mining started at 3:48:19 p.m.

Additionally, the check for proper operation of the MWCs did not occur at the beginning of the second shift on January 7, 2022. Rodriguez's MWC was last checked by the surface dispatcher at 10:25 a.m. on the first shift of January 7, 2022, and it passed. Prior to the accident, the mine operator's practice was to check the MWCs for proper operation on the shift preceding the shift it was to be used.

The last electrical examination of the No. 4 CMM was conducted by Getchell on January 3, 2022, and the examination report states that a damaged cable was repaired.

Training and Experience

Rodriguez had over nine years of underground mining experience with approximately seven years at Oaktown Fuels Mine No. 1. Rodriguez had four years of experience operating a CMM and received PDS training annually since 2015. Investigators determined Rodriguez received all training in accordance with MSHA Part 48 training regulations.

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 mine operator did not assure miners followed provisions in the approved Roof Control Plan to prevent them from working or traveling in the Red Zone of the CMM while it is being moved from place to place or repositioned between cuts.

Corrective Action: The mine operator developed and implemented procedures for PDS examinations and Red Zone safety. The procedures include making static measurements and conducting dynamic tests of all PDS components, including MMCs and MWCs, on each CMM at the beginning of each shift, following Joy Global, Inc.'s Smart Zone Proximity Systems User Guide. The mine operator retrained miners on all eight working sections on: 1) the Red Zone area of the CMM, and 2) how to be safe on the working sections, including when repositioning, cable handling, and moving the CMMs. Additionally, a MML was installed on the No. 4 CMM and will be engaged when the CMM is in service.

2. Root Cause: The mine operator did not assure the MWC was being worn in accordance with the manufacturer's recommendation.

Corrective Action: The mine operator retrained all miners on the proper use and location of their MWCs as recommended by the manufacturer. The mine operator revised their Roof Control Plan to require CMM operators to wear their MWC on their chest area, unobscured by a pouch or other material.

CONCLUSION

On January 7, 2022, at 10:35 p.m., Brian Rodriguez, a 35 year-old CMM operator with over nine years of mining experience, was fatally injured when he became pinned between the CMM and the coal rib while repositioning the CMM.

The accident occurred because the mine operator did not: 1) assure miners followed provisions in the approved Roof Control Plan to prevent them from working or traveling in the Red Zone of the CMM while it was being moved or repositioned, and 2) assure the MWC was being worn in accordance with the manufacturer's recommendation.

Approved By:

Ronald Burns
District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Sunrise Coal, LLC.

A fatal accident occurred on January 7, 2022, at 10:35 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(a) citation was issued to Sunrise Coal, LLC for a violation of 30 CFR 50.12.

On January 7, 2022, at 10:35 p.m., a fatal accident occurred on the MMU 008-0. A continuous mining machine (CMM) operator was pinned between the CMM's left side cable clamp near the rear of the CMM and the coal rib, while repositioning the CMM in the No. 11 entry face between mining cuts. Analysis of the proximity detection system PDS data indicates the CMM operator's miner wearable component (MWC), Serial No. D55B, was compromised with metallic shielding at the time of the accident which was removed from the MWC prior to MSHA's arrival on-site to conduct an accident investigation. Additionally, information obtained in the accident investigation revealed the MWC, Serial No. 1BA3, worn by another CMM operator at the time of the accident was compromised by metallic shielding which was removed from the MWC prior to MSHA's arrival on-site to conduct an accident investigation.

3. A 104(a) citation was issued to Sunrise Coal, LLC for a violation of 30 CFR 75.220(a)(1).

On January 7, 2022, at 10:35 p.m., a fatal accident occurred on the MMU 008-0. A continuous mining machine (CMM) operator was pinned between the CMM's left side cable clamp near the rear of the CMM and the coal rib, while repositioning the CMM in the No. 11 entry face between mining cuts. The operator did not comply with provisions of the approved Roof Control Plan on the MMU 008-0, specifically on Appendix B Sketch 7: "Red Zones Stay Out of the 'Danger Zone!' No one shall be in the 'danger zone' when the CMM is tramming from place to place or being repositioned in the working place."

4. A 104(a) citation was issued to Sunrise Coal, LLC for a violation of 30 CFR 75.1732(b)(1).

On January 7, 2022, at 10:35 p.m., a fatal accident occurred on the MMU 008-0. A continuous mining machine (CMM) operator was pinned between the CMM's left side cable clamp near the rear of the machine and the coal rib, while repositioning the CMM in the No. 11 entry face between mining cuts. Based on results from PDS testing with both shielded and non-shielded MWCs, investigators concluded that Rodriguez's MWC was metallically shielded at the time of the accident, preventing the CMM from stopping before it contacted the victim when the miner entered the hazardous area.

APPENDIX A – Persons Participating in the Investigation

Sunrise Coal, LLC

Rick Pigg	Senior Vice President of Mining Operations
Terry Dowell	Vice President of Underground Mining Operations
Brandon Flath	Safety Director
Timothy Cox	Leadman
Scott Latshaw	Leadman
Jeremy Ward	Maintenance Supervisor
Nathan Ashley	Assistant Shift Manager
Christopher Leffler	Continuous Mining Machine Operator
Andrew Taylor	Continuous Mining Machine Operator
Kristin Dickerson	Coal Hauler Operator
Ian Jones	Coal Hauler Operator
Christopher Stafford	Coal Hauler Operator
Kyle Wright	Coal Hauler Operator
Terry Baker	Safety Technician
Troy Wolfe	Safety Technician
Dakota Dobbins	Roof Bolter
Luis Mendez	Roof Bolter
Dustin Moore	Section Mechanic
Michael Morgan	Section Mechanic
Easton Jackson	Utility
Bo Ray	Maintenance
Derek Smith	Examiner/Emergency Medical Technician

Joy Global, Inc.

Thomas Schaefer	On-site Representative
Scott Stevens	Sales Engineer

Matrix Design Group

Jacob James	Field Service Technician
-------------	--------------------------

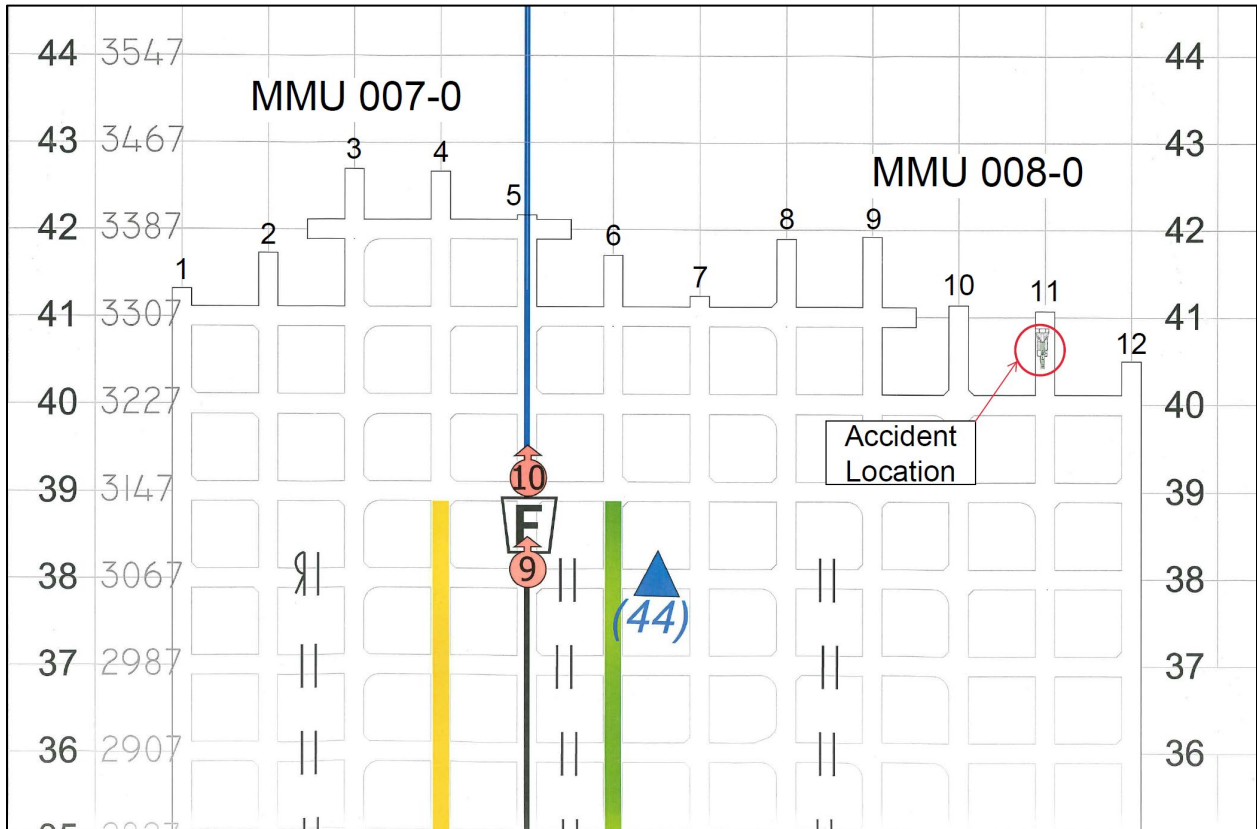
Indiana Bureau of Mines

Brian Lett	Deputy Commissioner
------------	---------------------

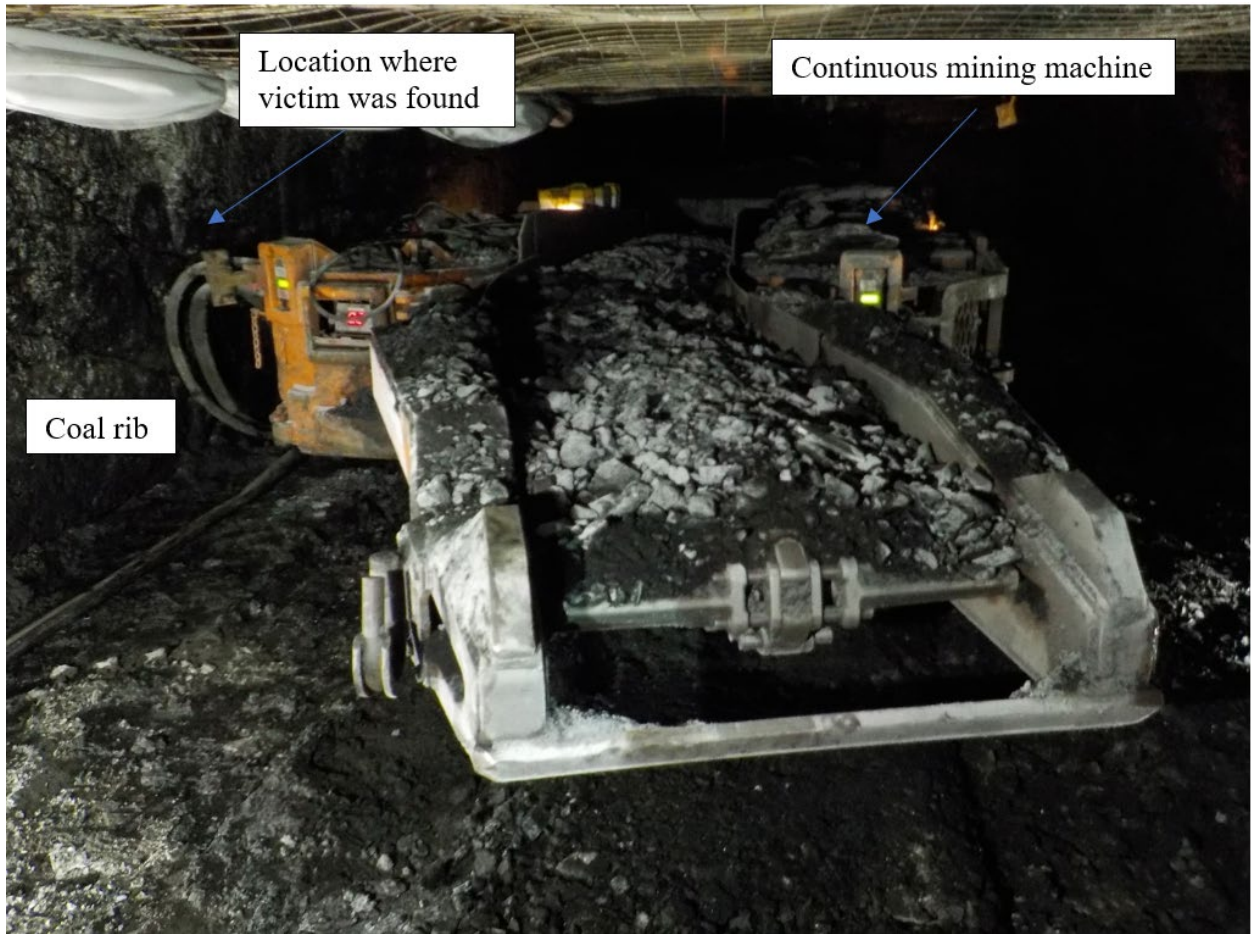
Mine Safety and Health Administration

David Stepp	Assistant District Manager
Anthony DiLorenzo	Supervisory Mine Safety and Health Inspector
Christopher Persinger	Supervisory Mine Safety and Health Inspector
Bradley Smith	Supervisory Mine Safety and Health Inspector
Rodney Adamson	Mine Safety and Health Specialist
Bub Whitfield	Mine Safety and Health Electrical Specialist
Craig Arnold	Mine Safety and Health Inspector
John Dagner	Mine Safety and Health Training Specialist
Kenneth Darby	Electrical Engineer
Nicholas Fallova	General Engineer
Matthew Wharry	General Engineer
Samantha Zeigler	Mechanical Engineer

APPENDIX B – Section Map



APPENDIX C – Photograph of the Accident Scene



APPENDIX D – Photograph of a PDS Driver



APPENDIX E – Photograph of Rodriguez’s MWC



RED ZONES ARE NO ZONES FOR MINING WITH REMOTE CONTROL CONTINUOUS MINERS

