

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface  
(Crushed, Broken Stone)

Fatal Handling Material Accident  
May 2, 2020

Enon Sand & Gravel  
Enon Sand & Gravel LLC  
Enon, Clark County, Ohio  
Mine ID No. 33-01466

Investigators

Rodney L. Rice  
Supervisory Mine Safety and Health Inspector

Leslie R. Tharp  
Mine Safety and Health Inspector

Originating Office  
Mine Safety and Health Administration  
East Region, Warrendale District  
Thorn Hill Industrial Park  
178 Thorn Hill Road, Suite 100  
Warrendale, Pennsylvania 15086-7573  
Peter J. Montali, District Manager

## TABLE OF CONTENTS

|  |    |
|--|----|
| OVERVIEW .....   | 1  |
| GENERAL INFORMATION.....   | 1  |
| DESCRIPTION OF ACCIDENT .....  | 2  |
| INVESTIGATION OF ACCIDENT .....  | 3  |
| DISCUSSION .....   | 3  |
| Location of Accident.....  | 3  |
| Weather .....  | 3  |
| Equipment Involved .....   | 3  |
| Material Processed .....   | 3  |
| Method of Clearing Blockages in the hopper.....                          | 3  |
| Training and Experience .....  | 4  |
| ROOT CAUSE ANALYSIS.....   | 4  |
| CONCLUSION.....  | 5  |
| ENFORCEMENT ACTIONS.....   | 6  |
| Appendix A - Location of Hopper and Victim at the Time of Accident ..... | 8  |
| Appendix B - Photo of Hopper and Feed Belt.....                          | 9  |
| Appendix C - Persons Participating in the Investigation.....             | 10 |



## OVERVIEW

On May 2, 2020, at 8:54 a.m., Rodger A. Zimmerman, a 56-year-old front-end loader operator with over eight years of total mining experience, died when he was engulfed by material inside the #1 hopper (hopper) at Enon Sand & Gravel mine. Zimmerman entered the hopper to clear a blockage caused by material in the hopper. Once inside, a large amount of material dislodged, engulfing Zimmerman.

The accident occurred because the mine operator did not: establish safe procedures to clear blockages in the hopper; provide access to areas from which blockages could be cleared safely; provide mechanical devices or other effective means to prevent and/or safely clear blockages; ensure the discharge belt conveyor was locked out prior to efforts to clear blockages; and train all employees on safe procedures for entry into bins, hoppers, tanks or other similar areas.

## GENERAL INFORMATION

Enon Sand & Gravel LLC owns and operates the Enon Sand & Gravel mine (Enon), in Enon, Clark County, Ohio. Enon employs nine miners and operates one twelve-hour shift, five days a week and one ten-hour shift on Saturday. Enon uses a floating clamshell dredge to mine material. Mined material is screened and crushed on the dredge then transported to shore by belt conveyor where it is either stockpiled or conveyed directly into the hopper. Raw material is also transported from another mine to be processed at this site. This material is loaded into the hopper by a front-end loader. Material is transported from the hopper, by belt conveyor, to the main plant to be crushed and sized for a variety of commercial uses.

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

|                            |                          |
|----------------------------|--------------------------|
| Jason R. Jurgensen .....   | Chief Operating Officer  |
| Dennis J. Garrison.....    | President                |
| Jacqueline J. Alf.....     | Executive Vice President |
| James P. Jurgensen II..... | Chief Executive Officer  |

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on February 19, 2020. The 2019 non-fatal days lost (NFDL) incident rate for Enon is 0, compared to the national average of 1.03 for mines of this type.

## DESCRIPTION OF ACCIDENT

On May 2, 2020, at 6:00 a.m., Zimmerman began work performing his normally assigned task, operating a Caterpillar 972K front-end loader. At 6:24 a.m., Zimmerman began loading raw material, which had been transported from another mine site, into the hopper to be processed (see Appendix A). At 6:35 a.m., Zimmerman positioned a radial stacker to begin feeding material from the dredge into the hopper. At 8:30 a.m., Zimmerman observed the flow of material from the hopper had stopped and determined there was a blockage in the hopper. Zimmerman parked the front-end loader, walked over to the radial stacker controls, and repositioned the radial stacker away from the hopper.

At 8:31 a.m., Ryan Frey, Equipment Operator, arrived at the radial stacker in a maintenance truck. At 8:35 a.m., Frey climbed onto the belt conveyor that runs underneath the hopper (see Appendix B). The belt conveyor was not de-energized, locked out, or otherwise blocked against hazardous motion. Frey began striking the side of the hopper with a hammer in an effort to free the blockage. At 8:46 a.m., Zimmerman climbed onto the conveyor support structure to assist Frey. At 8:47 a.m., Zimmerman climbed off the structure, retrieved a tool, and climbed back onto the structure with Frey. At 8:49 a.m., Zimmerman began striking the outer walls of the hopper with a hammer, attempting to dislodge the material inside.

At 8:51 a.m., after removing the cover plate at the bottom of the hopper, with Frey's assistance, Zimmerman climbed onto the belt conveyor and crawled inside the hopper in an attempt to remove the blockage. At 8:52 a.m., Frey handed a bar through the belt conveyer entrance to Zimmerman for him to use to help dislodge the blockage. Frey contacted Gerald V. Rees, Plant Operator, over the mine-wide radio and asked Rees to start the belt conveyor while Zimmerman was still inside the hopper. At 8:54 a.m., after the belt conveyor started, a large amount of material dislodged, engulfing Zimmerman and trapping him in the hopper.

After attempting to remove material and free Zimmerman, Frey again called Rees, notifying him of the emergency. At 9:01 a.m., Rees called 911 for assistance. At 9:08 a.m., emergency medical services (EMS) arrived and assisted in recovery. EMS checked Zimmerman for a pulse, but were unable to detect one. At 10:03 a.m., EMS removed Zimmerman from the hopper. At 10:27 a.m., Susan Brown, M.D., Clark County Coroner, arrived on site and confirmed Zimmerman's death.

## INVESTIGATION OF ACCIDENT

On May 2, 2020, at 9:33 a.m., Wayne Spriggs, Safety Manager, called the Department of Labor National Contact Center (DOLNCC). The DOLNCC notified Thomas Rasmussen, Acting Assistant District Manager, who immediately contacted Carl R. Graham, Supervisory Mine Safety and Health Inspector. A section 103(j) order was issued to protect persons at the accident scene. Graham dispatched Glendon P. Kussmaul, Mine Safety and Health Inspector, to the mine site, and then traveled to the mine.

On May 2, 2020, at 1:37 p.m., Graham arrived on site, began work to secure the area, and modified the existing 103(j) order to a 103(k) order. Kussmaul arrived shortly after to assist Graham. On May 3, 2020, Rodney L. Rice, Supervisory Mine Safety and Health Inspector, and Leslie R. Tharp, Mine Safety and Health Inspector, arrived at the mine and continued the investigation. Rice and Tharp conducted a physical examination of the accident scene and interviewed witnesses. MSHA conducted the investigation in cooperation with mine management and the Ohio Division of Natural Resources. See Appendix C for a list of persons who participated in the investigation.

## DISCUSSION

### Location of Accident

The accident occurred at the hopper on the east side of Enon Road, between the hopper dump ramp and the dredging pond.

### Weather

The weather at the time of the accident was fair with a temperature of 79° F. Weather was not a factor in the accident.

### Equipment Involved

The equipment involved in the accident was a Harman Fabco Feed Hopper which discharged onto a 48-inch-wide belt conveyor. The hopper was not equipped with mechanical devices or other effective means to size the material or to break up agglomerations of material that had a propensity to cause blockages in the hopper.

### Material Processed

The plant processes material consisting of a mixture of crushed and screened river sand from the onsite dredge and uncrushed stockpiled sand obtained from another mine site. The materials from both mines have a propensity for causing blockages in a hopper. The river sand from the onsite dredge contained clay nodules along with large triangular rocks, and the sand obtained from the other site contained clay nodules and uncrushed, unsized rock. The frequency of blockages occurring in the hopper increased significantly when the mine began processing the material from the other site.

### Method of Clearing Blockages in the hopper

Video evidence from the mine's surveillance system verified entry into the hopper to dislodge blockage from underneath was a common practice and occurred repeatedly during the several days captured on the video. The surveillance video showed miners on the belt structure and/or inside the hopper, not

wearing safety belts or harnesses and not equipped with lifelines, while the belt was operating and without engaging in lock-out-tag-out (LOTO) procedures.

Interviews with employees and review of production records show mine management was aware that the feed material caused blockages in the hopper, and the frequency of blockages had increased after the mine began processing the material from the other mine. Despite this knowledge, management did not provide access to areas from which blockages could be cleared safely, establish procedures to safely clear blockages in the hopper, and provide mechanical devices or other effective means to prevent and/or to safely clear blockages, and require miners to lock out the discharge belt conveyor prior to clearing blockages.

#### Training and Experience

Rodger Zimmerman had over eight years of mining experience, with over 15 months of experience at Enon operating a front-end loader and maintaining the hopper area. Investigators determined Zimmerman's annual refresher training was current, but identified contributory task training deficiencies. Mine management did not train the victim or any other miners on how to safely clear blockages in the bin. Additionally, even though mine management knew the frequency of blockages had increased, no procedures, mechanical devices, access points, or other effective and safe means to prevent and clear blockages were provided or implemented.

### ROOT CAUSE ANALYSIS

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

Root Cause: Management did not have safe procedures to clear blockages in the hopper.

Corrective Action: Mine management permanently removed the #1 hopper and belt conveyor from service. The mine operator acquired a portable crusher and placed it into service. Mine management developed and implemented written procedures for safe entry, operation, and maintenance of hoppers in accordance with 30 CFR § 56.16002.

Root Cause: Mine management did not task train any of their miners on how to safely clear blockages in the hopper. The miner entered the bottom of the hopper when loose unconsolidated material, which ultimately engulfed him, was present inside the hopper.

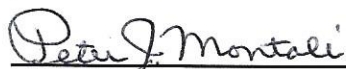
Corrective Action: Mine management established written procedures for the maintenance of the new portable crusher and any hoppers. All miners who operate this equipment were trained in the written procedures in accordance with 30 CFR § 46.7(b), and this training was documented in accordance with 30 CFR § 46.9.

## CONCLUSION

On May 2, 2020, at 8:54 a.m., Rodger A. Zimmerman, a 56-year-old front-end loader operator with over eight years of total mining experience, died when he was engulfed by material inside the #1 hopper. Zimmerman entered the hopper to clear a blockage caused by material in the hopper. Once he was inside, a large amount of material dislodged, engulfing Zimmerman.

The accident occurred because the mine operator did not: establish safe procedures to clear blockages in the hopper; provide access to areas from which blockages could be cleared safely; provide mechanical devices or other effective means to prevent and/or clear blockages; ensure the discharge belt conveyor was locked out prior to efforts to clear blockages; and train all miners on safe procedures for entry into bins, hoppers, tanks or other similar areas.

Approved By:



Peter J. Montali  
District Manager

07/08/2020

Date

## ENFORCEMENT ACTIONS

- 1) A section 103(j) Order number 9520144 was issued to Enon Sand & Gravel and was subsequently modified to a 103(k) Order.

An accident occurred at this operation on 05/02/2020, at 9:04 a.m. This order is being issued under section 103(j) of the Federal Mine Safety and Health Act of 1977, to prevent destruction of any evidence which would assist in investigating the cause of causes of the accident. It prohibits all activity at the area of dredge/surge plant where the accident occurred until MSHA deems it is safe to resume normal mining operations in this area. This order was initially issued orally to Wayne Spriggs, Safety Manager, at 10:09 a.m. and has now been reduced to writing.

The initial order is modified to reflect 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 including those involved in rescue and recovery operations or investigation of the accident. The mine operator shall obtain prior approval from an authorized representative of the Secretary for all actions to recover and/or restore operations in the affected area. Additionally, the mine operator is reminded of its existing obligations to prevent the destruction of evidence that would help in investigating the causes of the accident.

- 2) A section 104(d)(1) Citation Number 8577926 was issued to Enon Sand & Gravel for a violation of 56.16002

On May 2, 2020, a fatal accident occurred at this mine when a miner was engulfed by material while inside the hopper. Loose, unconsolidated material became lodged in the hopper as it loaded, preventing material from flowing onto the feed belt conveyor located directly below the hopper. Two miners removed an inspection plate, located at the bottom of the hopper, and one miner entered in an attempt to dislodge the blockage. Once inside the hopper, the loose, unconsolidated material dislodged and engulfed/entrapped the victim inside the hopper. The feed belt was not locked out and was operating at the time of the accident. The operator did not provide safe access to areas from which blockages could be cleared safely, and neither the miner who entered the hopper nor the miner who remained outside the hopper was wearing a safety belt, harness, or a lifeline.

Management engaged in aggravated conduct constituting more than ordinary negligence in that management was aware the feed material frequently plugged the hopper, yet they did not: establish safe procedures to clear blocked material in the hopper, provide access to areas from which blockages could be cleared safely, provide mechanical devices or other effective means to prevent and to safely clear blocked material, or ensure supply and discharge equipment was locked out prior to efforts being undertaken to clear blockages. Video evidence obtained from the mine site verified entry from underneath the hopper to dislodge the blockage was a common practice and occurred repeatedly prior to the accident. The surveillance video showed miners on the belt structure and/or inside the hopper, not wearing safety belts or harnesses and not equipped with lifelines, while the belt was operating.

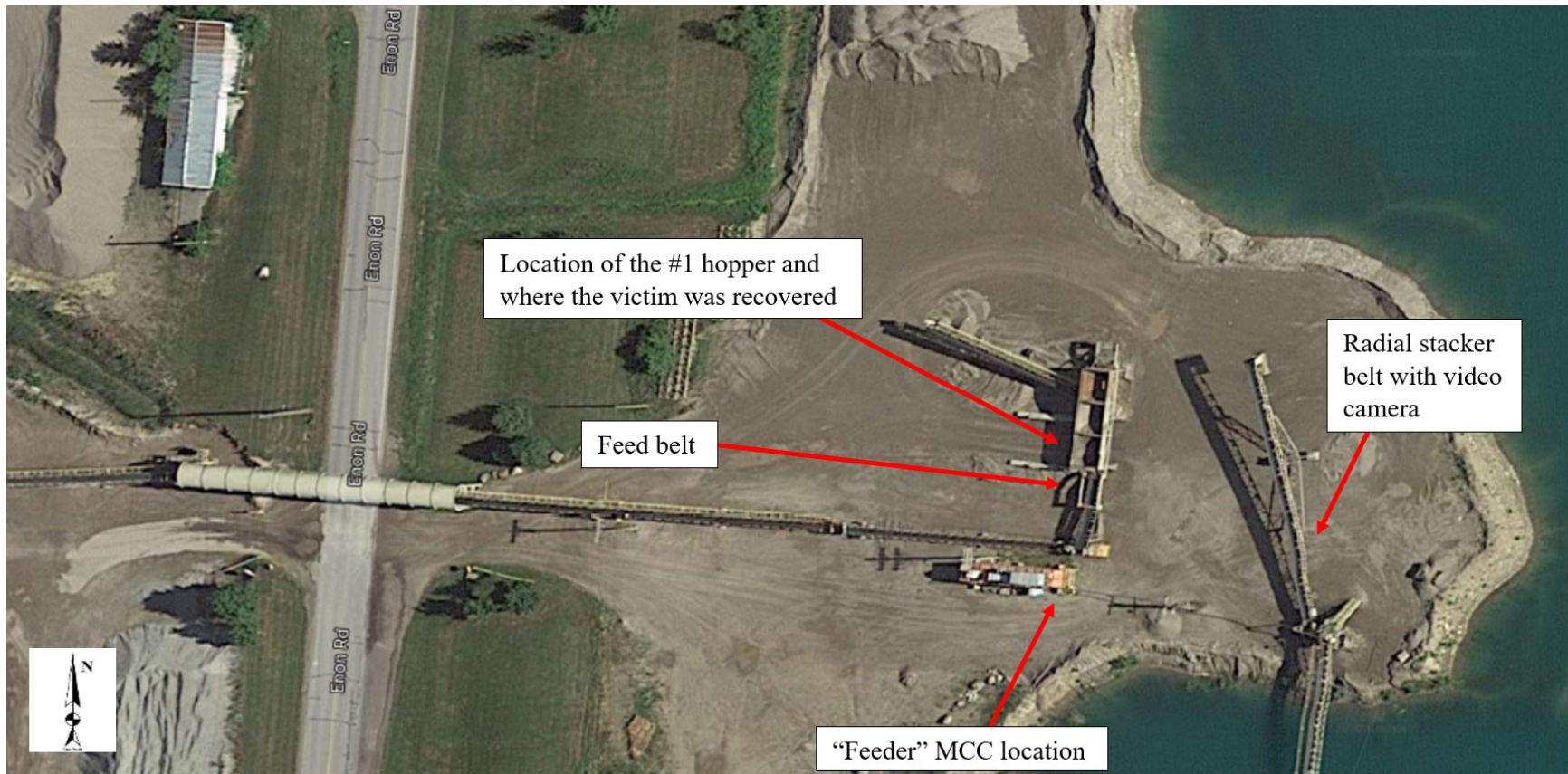


- 3) A section 104(d)(1) Order Number 8577927 was issued to Enon Sand & Gravel for a violation of 46.7 (b)

On May 2, 2020, a fatal accident occurred at this mine when a miner entered the hopper and was engulfed/entrapped by sliding material. Loose, unconsolidated material became lodged in the hopper as the miner was loading it with material. The victim, assisted by another miner, removed an inspection plate located at the bottom of the hopper, and the victim entered in an attempt to dislodge the plugged material. Once inside the hopper, loose unconsolidated material dislodged and engulfed/entrapped the victim. The feed belt was not locked out and was operating at the time of the accident. The miner was not trained to safely enter confined spaces and clear out loose unconsolidated material that plugged the hopper.

Management engaged in aggravated conduct constituting more than ordinary negligence in that management was aware material frequently plugged the hopper and did not develop procedures or train miners to safely clear blockages in the hopper. Video evidence obtained from the mine's surveillance system indicated that entry into the hopper from underneath was a common practice that repeatedly occurred.

Appendix A  
Location of #1 Hopper and Victim at the Time of Accident



Appendix B  
Photo of #1 Hopper and Feed Belt



Appendix C  
Persons Participating in the Investigation

Enon Sand & Gravel LLC.

|                        |                              |
|------------------------|------------------------------|
| David Coniglio.....    | Safety Director              |
| Wayne Spriggs.....     | Safety Manager               |
| Clinton Worley.....    | Plant Superintendent         |
| Nicholas W. Scala..... | Attorney                     |
| Ryan Frey.....         | Equipment Operator           |
| Cameron M. Rank.....   | Dredge Operator              |
| Garald V. Rees.....    | Plant Operator               |
| Alan McKinley.....     | Aggregate Foreman            |
| Cory Yingst.....       | Dredge Operator              |
| Rodney A. Bullen.....  | Yard Loader Operator         |
| Steve Hobson .....     | Plant Operator/General Labor |

Jurgensen Aggregates

|                    |                      |
|--------------------|----------------------|
| Ed Muhlenkamp..... | Prior Superintendent |
|--------------------|----------------------|

Ohio Division of Natural Resources

|                      |                        |
|----------------------|------------------------|
| Becky Newberry ..... | Surface Mine Inspector |
| Steven McKee.....    | Surface Mine Inspector |

Mine Safety and Health Administration

|                           |  |
|---------------------------|--|
| Rodney L. Rice .....      | Supervisory Mine Safety and Health Inspector |
| Carl R. Graham .....      | Supervisory Mine Safety and Health Inspector |
| Glendon P. Kusssmaul..... | Mine Safety and Health Inspector             |
| Leslie R. Tharp.....      | Mine Safety and Health Inspector             |