

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface  
(Limestone)

Fatal Confined Space Accident  
December 6, 2021

Palm Beach Aggregates LLC  
Palm Beach Aggregates LLC  
Loxahatchee, Palm Beach County, Florida  
ID No. 08-01160

Accident Investigators

Michael LaRue  
Mine Safety and Health Inspector

James Fields  
Mine Safety and Health Inspector

Originating Office  
Mine Safety and Health Administration  
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Mary Jo Bishop, District Manager

## TABLE OF CONTENTS

OVERVIEW	1
GENERAL INFORMATION	1
DESCRIPTION OF THE ACCIDENT	2
INVESTIGATION OF THE ACCIDENT	3
DISCUSSION	4
Location of the Accident	4
Equipment Involved	4
Events Leading up to the Accident	4
Training and Experience	4
Weather	5
Workplace Examination	5
ROOT CAUSE ANALYSIS	5
CONCLUSION	6
ENFORCEMENT ACTIONS	7
APPENDIX A – Surge Pile Illustrations	8
APPENDIX B – Sketch of Stone Surge Pile and Equipment	9
APPENDIX C – Persons Participating in the Investigation	10



## OVERVIEW

On December 6, 2021, at approximately 6:40 p.m., Omar Thomas, a 39 year-old lead tech with over 17 years of mining experience, was fatally injured when he became engulfed in crushed limestone material while working in the confined space of a vibrating feeder and chute.

The accident occurred because the mine operator did not: 1) identify and correct hazards in the workplace before work began, and 2) provide mechanical devices, or other effective means of handling materials, so that miners are not required to enter an area where they are exposed to entrapment by caving or sliding of materials.

## GENERAL INFORMATION

Palm Beach Aggregates LLC owns and operates the Palm Beach Aggregates LLC (PBA) mine. PBA is a surface limestone mine located in Loxahatchee, Palm Beach County, Florida. PBA employs 56 miners and operates two 12-hour shifts, six days per week: a production shift from 5:00 a.m. to 5:00 p.m. and a maintenance shift from 4:00 p.m. to 4:00 a.m. After the limestone is blasted in a submerged open pit, a Bucyrus 1260 dragline is used for excavation. Overland belt conveyors transport the limestone to the surge pile and on-site processing facility (plant) where the rock is crushed and sized before it is stockpiled for sale.

The principal management official at this mine at the time of the accident was:

Travis Burke

Operations Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on July 1, 2021. The 2020 non-fatal days lost incident rate for Palm Beach Aggregates LLC was zero, compared to the national average of 1.41 for mines of this type.

## DESCRIPTION OF THE ACCIDENT

Thomas started his maintenance shift on Monday, December 6, 2021, at 4:00 p.m. Thomas' regular duties as a lead tech included directing a six-member crew to perform maintenance, repair, and clean-up functions at the mine.

After attending a safety meeting at shift change, Thomas, Christopher Case, Welder; Loren Samuels, Plant Tech; Rayon Hill, Plant Tech; and Richard Crooks, Plant Tech; traveled to the surge pile tunnel in the plant to replace the damaged wear plate liners in the vibrating pan feeder (feeder). The production shift miners had emptied the belt conveyors and shut down the plant in preparation for the maintenance shift's scheduled repairs to the feeder.

At approximately 5:00 p.m., Paul Evans, Maintenance Tech, arrived at the plant and joined the maintenance crew in the tunnel under the surge pile. Case, Thomas, Hill, Samuels, and Evans attempted to close the slide gate in the chute above the feeder by using the hydraulic cylinder levers. The slide gate isolates the feeder from the stone surge pile to prevent material from falling into the feeder during maintenance work or repairs. According to interviews, the miners could see that the slide gate was less than halfway across the four-foot opening, leaving a gap. They also saw material in the feeder. Samuels then left the tunnel to go to the control tower in case the feeder had to be turned on to empty it before replacing the wear plate liners. The remaining miners tried to close the slide gate again by opening it fully and closing it, but it still remained partially open. Thomas manually raked some material out of the feeder and looked inside. He observed a piece of steel angle iron (angle iron) blocking the slide gate (see Appendix A).

At approximately 5:45 p.m., Thomas directed Samuels to run the feeder to empty it out, but this did not dislodge the angle iron. Thomas instructed Case to climb inside the feeder and reach into the chute to cut off the angle iron with an oxygen acetylene torch. Case climbed inside the feeder, and as he began to cut the piece of angle iron, material began to fall on him. Case also noticed the piece of angle iron started to bend downward from the weight of the material. Case climbed out of the feeder, described the conditions to Thomas as unsafe, and recommended to Thomas that they operate the plant and feeder to remove all the rock from the surge pile above the feeder, and empty out the draw hole. Thomas agreed, and told Crooks, Hill, and Evans to leave the area to work on other assigned projects.

Thomas opened the slide gate completely and called Samuels to operate the plant and feeder to empty the surge pile draw hole, the feeder, and the tunnel belt conveyor. After approximately 20 minutes, Samuels turned everything off and left the area to work on other assigned tasks. After the plant was shut down, Case recommended to Thomas that they continue operating the feeder for a little longer to knock any potentially loose material down, but Thomas did not agree. Case and Thomas tried to close the slide gate again with no success. Thomas instructed Case to climb into the feeder and cut the angle iron to free the slide gate. Case climbed up and leaned inside the feeder to observe the conditions of the workplace. Case saw a four-foot diameter hole extending upward through the surge pile for approximately 30 feet. Case noticed that the walls of this hole were nearly vertical. This describes a condition known as "coning-out" or a "rat-hole," where material in a pile over an opening flows out and leaves a cylindrical hole or void in the pile with nearly vertical walls (see Appendix B). In such a condition, the material in the

surge pile is unstable, and can collapse into the void without warning. Case described this hole as “looking like a Pringles Potato Chip can.”

Without the slide gate to isolate the material in the surge pile, the potential for the material in the surge pile to collapse and fall into the feeder presented an imminent danger to miners entering the feeder to work. To have performed this work safely, the material in the surge pile should have been pulled back and removed.

Case refused the work assignment in the feeder, and Thomas instructed Case to get out of the feeder. Thomas then climbed inside the feeder and reached into the chute to work on removing the piece of angle iron. As Thomas began to cut the angle iron with the oxygen acetylene torch, the tip clogged with material. Thomas instructed Case to get a new tip from the truck, and Case turned to walk out of the tunnel. After taking two steps, Case heard a loud crash in the feeder. Case turned to see that a mass of material from the surge pile had fallen through the draw hole, filled the chute and feeder, and engulfed Thomas.

Case jumped onto the tunnel belt conveyor and immediately began to remove the material in the feeder by hand while yelling for Thomas and yelling for help. After approximately ten minutes, Evans returned to the feeder, and Case and Evans dug with shovels for another ten minutes. Crooks and Samuels also arrived to assist, and Samuels decided to run the feeder to remove the material. Samuels went to the motor control center and turned the feeder on, while Case left the tunnel at 6:57 p.m. to call 911. Running the feeder discharged enough material to expose Thomas’ feet, allowing the miners to pull Thomas out of the feeder and onto the tunnel belt conveyor. Upon first assessment, Thomas had no pulse and was not breathing. The miners took turns administering cardiopulmonary resuscitation (CPR). Evans left and returned with an Automated External Defibrillator (AED). Case went to the front entrance of the mine to escort Palm Beach County Emergency Medical Services personnel (EMS) to the accident site. Evans attached the AED to Thomas, but the AED advised that no shock be administered and to continue CPR.

EMS personnel arrived at 7:11 p.m., placed Thomas into an ambulance, and transported him to a helicopter pad at the mine. A life flight helicopter transported Thomas to St. Mary’s Medical Center, arriving at 7:54 p.m. Thomas was resuscitated during transport to St. Mary’s and was placed in the Intensive Care Unit (ICU). Thomas was monitored in ICU for the next four days until Thomas succumbed to his injuries and was pronounced dead by Dr. Matthew Ramseyer and Dr. Muneer Hassan at St. Mary’s Medical Center, at 6:42 a.m. on December 10, 2021.

## INVESTIGATION OF THE ACCIDENT

On December 6, 2021, at 7:14 p.m., Brian McNamara, Safety and Security Director, called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Brian Thompson, Assistant District Manager. Thompson contacted Kevin Hardester, Supervisory Mine Safety and Health Inspector. Hardester and Nicholas Vandergriff, Mine Safety and Health Inspector, traveled to the mine and Hardester 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. Hardester and Vandergriff returned on December 7, 2021, to continue the investigation. Also on December 7, 2021, Thompson contacted Michael LaRue, Mine Safety and Health Inspector, and

assigned him as the lead accident investigator. Additionally, Thompson contacted James Fields, Mine Safety and Health Inspector, to assist with the accident investigation.

On December 8, 2021, at 7:30 a.m., LaRue and Fields arrived at the mine to investigate the accident. MSHA's accident investigation team conducted an examination of the accident scene, interviewed miners, and reviewed conditions and work procedures relevant to the accident. See Appendix C for a list of persons who participated in the investigation.

## DISCUSSION

### Location of the Accident

The accident occurred beneath the surge pile draw hole, where the material discharges from the surge pile through a chute into the feeder, and flows onto the tunnel belt conveyor. At the time of the accident, the surge pile was approximately 30 feet in depth and approximately 100 feet in diameter at its base. The surge pile forms a cone of material on top of the feed tunnel, above the slide gate, feed chute, and feeder.

### Equipment Involved

The feeder is a Variable Speed Syntron Material Handling Mechanical Feeder; Model-MP 400 DD. The feeder was manufactured in August of 2019 and was installed sometime in late 2019 or early 2020. Investigators determined that the feeder was not a contributing factor to the accident.

The feeder is installed below an opening in the roof of the concrete surge pile tunnel. This square opening in the tunnel is approximately four-foot by four-foot and constitutes a draw hole or opening in the roof of the tunnel through which material in the surge pile can flow onto the feeder. Steel plates form a chute and bridge the gap between the draw hole and the feeder. The draw hole is framed with steel angle iron to prevent damage to the concrete opening. Just below the opening is a four-inch slot for the slide gate to close and open. This slide gate regulates the flow of material from the surge pile into the feeder, and can normally be fully closed, preventing any material from passing into the feeder. On the day of the accident, the angle iron prevented the slide gate from closing fully. This was a contributing factor to the accident.

### Events Leading up to the Accident

In October 2021, the surge pile was depleted to a level that exposed the top of the concrete tunnel. An excavator was used to remove the remnants of the surge pile to supply the feeder and continue plant operations. The piece of steel angle iron that blocked the slide gate from closing was part of the frame in the opening of the draw hole. Investigators believe that the teeth on the bucket of the excavator caught the lip and bent the steel angle iron down, blocking the slide gate. No report was made of this damage prior to the surge pile being resupplied, which concealed the damage.

### Training and Experience

Thomas had 17 years and 5 months of mining experience, all at the PBA mine. He was promoted to lead tech in August of 2020. Investigators reviewed the training records and determined that Thomas received training in accordance with MSHA Part 46 training regulations.

### Weather

The weather at the time of the accident was 74 degrees Fahrenheit with clear skies. Investigators do not believe weather contributed to the accident.

### Workplace Examination

The mine operator did not assure an adequate workplace examination was conducted. An adequate workplace examination would have determined that: 1) the slide gate would not fully close, and 2) the 30 foot high surge pile above the feeder would present a serious, significant, and imminent danger to any person who entered the feeder without the slide gate fully closed. After identifying the imminent danger, the mine operator should have barricaded the feeder from entry, withdrawn all miners from the affected area, and communicated the hazard to all miners involved in the task.

## 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 identify and correct hazards in the workplace before work began.

Corrective Action: The mine implemented a training and tracking process on workplace examinations, along with an on-site audit program. These measures assure competent persons are conducting workplace examinations, correcting hazards, and eliminating exposure to identified hazards prior to work beginning in a working place.

2. Root Cause: The mine operator did not provide mechanical devices, or other effective means of handling materials, so that miners are not required to enter or work in a place where they are exposed to entrapment by caving or sliding of materials.

Corrective Action: The mine operator removed the surge pile and repaired the slide gate. The mine operator also implemented a written confined space program which identifies confined spaces at the mine and the protective measures miners must take before entering confined spaces. The mine operator trained all affected employees on the new procedures.

## CONCLUSION

On December 6, 2021, at approximately 6:40 p.m., Omar Thomas, a 39 year-old lead tech with over 17 years of mining experience, was fatally injured when he became engulfed in crushed limestone material while working in the confined space of a vibrating feeder and chute.

The accident occurred because the mine operator did not: 1) identify and correct hazards in the workplace before work began, and 2) provide mechanical devices, or other effective means of handling materials, so that miners are not required to enter an area where they are exposed to entrapment by caving or sliding of materials.

Approved By:

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Mary Jo Bishop  
District Manager

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Date



## ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Palm Beach Aggregates LLC.

A fatal accident occurred on December 6, 2021, at approximately 6:40 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 the investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(d)(1) citation was issued to Palm Beach Aggregates LLC for a violation of 30 CFR 56.18002(a)(2).

A fatal accident occurred at this operation on December 6, 2021, when a lead tech entered a feeder and became engulfed in material that fell from the draw hole of a surge pile through a non-functional open slide gate. The surge pile had approximately 30 feet of mined material and the cylindrical walls that formed the draw hole above the open slide gate were almost vertical. This condition presented an imminent danger to any miners who entered the feeder.

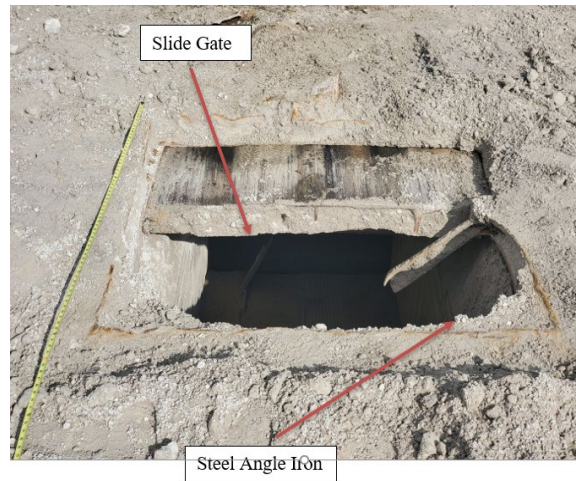
The mine operator was aware that a surge pile above the feeder, that fed through an opening, would present a serious, significant, and imminent danger to any miners who entered the feeder without the slide gate fully closed. The mine operator did not barricade the feeder from entry, withdraw all miners from the affected area, or communicate the hazard to all miners involved in the task when it became apparent that the slide gate was open.

The mine operator engaged in aggravated conduct constituting more than ordinary negligence in that the mine operator did not assure an imminent danger was removed prior to the lead tech entering, and directing another miner to enter, the location where the imminent danger hazard existed. This violation is an unwarrantable failure to comply with a mandatory standard.

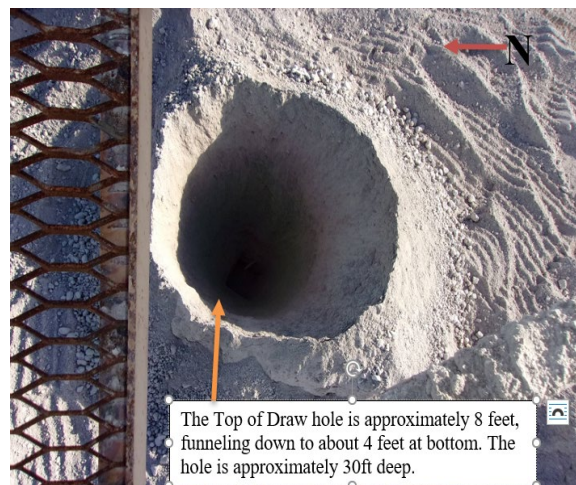
3. A 104(d)(1) order was issued to Palm Beach Aggregates LLC for a violation of 30 CFR 56.16002(a)(1).

A fatal accident occurred at this operation on December 6, 2021, when a lead tech entered a feeder and became engulfed in material that fell from the draw hole of the surge pile. The mine operator did not provide mechanical devices or other effective means to adequately protect the lead tech who entered an area where he was exposed to entrapment by caving or sliding materials. The mine operator engaged in aggravated conduct constituting more than ordinary negligence in that the lead tech entered, and directed a subordinate miner to enter, a confined space where caving and sliding of materials hazards existed, without an effective means of handling those materials. This violation is an unwarrantable failure to comply with a mandatory standard.

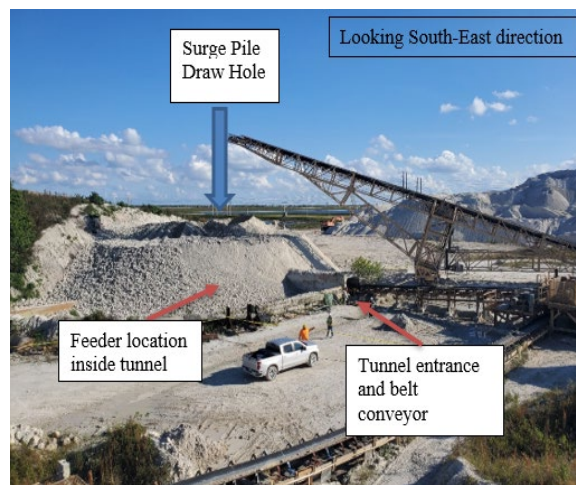
## APPENDIX A – Surge Pile Illustrations



Slide Gate Blocked by Steel Angle Iron (Photo taken after the surge pile was removed)

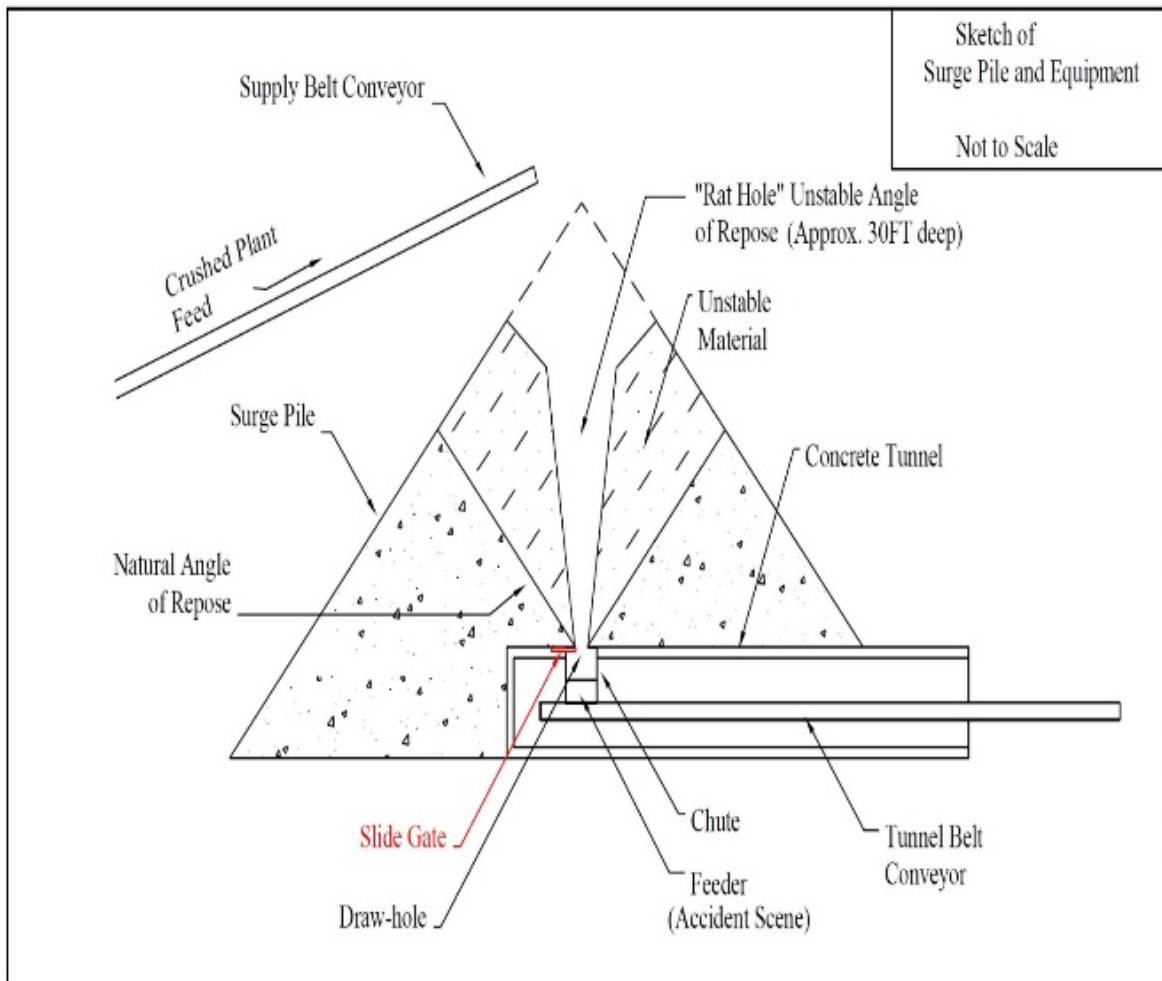


Photograph Looking Down into Surge Pile Draw Hole



Photograph of the Accident Site

APPENDIX B – Sketch of Stone Surge Pile and Equipment



APPENDIX C – Persons Participating in the Investigation

Palm Beach Aggregates LLC

Travis Burke	Operations Manager
Brian McNamara	Safety and Security Director
Paul Evans	Maintenance Tech
Richard Crooks	Plant Tech
Rayon Hill	Plant Tech
Loren Samuels	Plant Tech
Joshua Haden	Plant Operator
Christopher Case	Welder
Jason Day	Quality Control

Palm Beach Sheriff's Department

Christopher Morin	Deputy Sheriff
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Palm Beach County Coroner's Office

Heidi Reinhard	Coroner
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Mine Safety and Health Administration

Kevin Hardester	Supervisory Mine Safety and Health Inspector
James Fields	Mine Safety and Health Inspector
Michael LaRue	Mine Safety and Health Inspector
Nicholas Vandergriff	Mine Safety and Health Inspector