

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Silver Ore)

Fatal Fall of Roof Accident
April 11, 2023

Galena
U.S. Silver-Idaho, Inc.
Wallace, Shoshone County, Idaho
ID No. 10-00082

Accident Investigators

Steven Polgar
Supervisory Mine Safety and Health Inspector

Lee Hughes
Staff Assistant

Originating Office
Mine Safety and Health Administration
Denver District
1 Denver Federal Center
Denver, CO 80225
Brad Breland, Acting 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 |
| Mining Methods | 3 |
| Ground Support | 4 |
| Examinations | 4 |
| Training and Experience | 5 |
| ROOT CAUSE ANALYSIS | 5 |
| CONCLUSION | 6 |
| ENFORCEMENT ACTIONS | 7 |
| APPENDIX A – Sketch of 3200-033 Stope Profile and Failure Geometry | 8 |
| APPENDIX B – Persons Participating in the Investigation | 9 |



OVERVIEW

On April 11, 2023, at approximately 10:35 a.m., Blaik Nutting, a 26 year-old stope miner with over five years of experience, died when a 20 to 25-ton rock from the hanging wall fell and struck him.

The accident occurred because the mine operator did not: 1) design, install, and maintain ground support to control the ground in places where miners work or travel to perform their assigned tasks, and 2) conduct adequate ground condition examinations in areas where work was to be performed.

GENERAL INFORMATION

U.S. Silver-Idaho, Inc. owns and operates the Galena mine. This is an underground silver ore mine located near Wallace, Shoshone County, Idaho. The mine employs 270 miners and operates two ten-hour shifts, seven days per week. The Galena mine extracts silver ore using the stope mining method. The mine drills and blasts the ore laden rock. A two-foot slusher is then used to pull the ore to a vertical ore shaft where it falls to the haulage level and is transported by train to a shaft. At the shaft, the mined ore is hoisted to the surface. A surface milling operation processes the ore, and the mine sells the finished products (silver, gold, and lead) to various

commercial industries. A water-based sand slurry is pumped into the cavity left in the stope after the ore is extracted.

The Galena mine minimizes processing and handling of low-grade rock by mining the stopes as narrowly as possible to selectively extract economic ore and leave low-grade mineralization and barren rock in place. The Galena mine uses both overhand (mining starts at the lower level and works upward) and underhand (work progresses from the top downward) cut-and-fill mining methods, depending on vein width and ground conditions.

The principal management officials at the Galena mine at the time of the accident were:

David Riggleman
Michael Weaver
Gary Garner

General Manager
Safety Superintendent
General Foreman

The Mine Safety and Health Administration (MSHA) was performing a regular safety and health inspection at this mine at the time of the accident. The 2022 non-fatal days lost injury incident rate for the Galena mine was 3.64, compared to the national average of 1.23 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On April 11, 2023, at approximately 5:00 a.m., Nutting arrived at the Galena mine to begin his shift. Ryan Jurado, Shifter, met with the production crew. Based on information obtained from interviews, Nutting and Jason Lauck, Stope Miner, traveled down the shaft to the 3200 level. From there, Nutting and Lauck climbed a ladder to the 3200-033 stope (see Appendix A). Nutting and Lauck then checked the results of the explosive rounds shot during the previous shift and started their normal mining cycle.

According to interviews, prior to 9:30 a.m., Jurado visited the 3200-033 stope, spoke with both miners, and signed their examination cards. At approximately 9:30 a.m., Kelly Gallogly, Geologist, visited the stope and witnessed Nutting moving a jackleg drill in the 001A Vein. Nutting appeared to be in between the scaling and bolting steps of the mining cycle. Lauck had climbed down to the 3200 level to try to unplug a chute and get some drill oil. Lauck returned and briefly spoke with Gallogly as she was leaving the area. Just before 10:00 a.m., Lauck returned to the stope and found Nutting pinned beneath a fallen wedge of rock in the 001A Vein that was 12 feet long by 4 feet wide by 5 feet thick. Nutting was unresponsive, grey in color and had no pulse. Lauck used a pager phone to call for help and alerted mine management that an accident had occurred.

According to interviews, Jason Bauer and Jonathan Bauer, Stope Miners, from nearby areas responded to the call and traveled with Lauck to Nutting's location. Michael Weaver, Safety Superintendent, notified Travis Lindskog, Mine Safety and Health Inspector, who was at the mine. Central Mine Rescue (CMR) was alerted and arrived at the accident scene at 11:41 a.m. Richard Smith, Laborer 1/Galena Mine Rescue Team Member/Shoshone County Coroner, pronounced Nutting dead at 1:55 p.m.

INVESTIGATION OF THE ACCIDENT

On April 11, 2023, at 10:35 a.m., Weaver notified Lindskog that there had been a serious injury accident. At 10:52 a.m., Joseph Jolley, Safety Supervisor, called the Department of Labor National Contact Center (DOLNCC). Beverly Rice, Mine Safety and Health Inspector, was on site conducting a regular inspection when the accident occurred. Rice issued an order under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners and preservation of evidence. DOLNCC contacted Thaddeus Sichmeller, Acting District Manager, who assigned Steven Polgar, Supervisory Mine Safety and Health Inspector, and Lee Hughes, Staff Assistant, to conduct the accident investigation. Sandin Phillipson, Ph.D., Senior Geologist, and Todd Kostecki, Ph.D., Mining Engineer, from MSHA Technical Support assisted with the investigation.

MSHA's accident investigation team, along with the United Steel Workers Local 5114, conducted an examination of the accident scene, interviewed miners and management, and reviewed conditions and work procedures relevant to the accident. See Appendix B for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred in the 001A Vein at the 3200-033 stope, which used a conventional overhand cut-and-fill method of mining (see Appendix A). The stope was approximately four to eight feet wide, eight feet high, and 100 feet long. The accident occurred approximately 16 feet from the end of the stope, this area was approximately four and half feet wide.

Mining Methods

Appendix A shows how the 001A Vein at the 3200-033 stope was mined. The vein dips at a 75-degree angle, which creates a hanging wall above the vein and a footwall below the vein. The hanging wall and footwall are composed of metamorphic rock. Below Cut 16, Cut 15 was backfilled with sand. The 001A Vein in Cut 16 had a slickenside (smoothly polished surface caused by frictional movement between rocks along a fault) on the hanging wall side.

Most of the ore produced at the mine is mined by the stope mining method, more specifically known as the conventional overhand cut-and-fill method. In conventional overhand stoping, the vein is accessed by crosscuts developed from drifts that are driven along the vein structure. Development of the vein is accomplished by driving near vertical, timbered three-compartment raises along the vein from one level to the next level above. A typical overhand stope extends 100 feet or more horizontally along the vein on either side of a raise. In a cut-and-fill stope, a cut of ore, from six to 12 feet in height, is mined over the length of the stope. After all the broken ore is removed from the stope, the void is filled with a slurry of mill tailings by a process referred to as sand filling. After the sand filling is completed, another cut can be mined from the stope using the sand fill in the previous cut as a floor.

Ground Support

The Galena mine's Ground Control Plan (GCP) specified the use of bolting in a three-foot pattern where stope widths exceeded five feet. In stopes with narrower widths, the GCP states to use bolts, wire, wire mesh, and stulls (sideways wood bracing) when necessary, but does not specify when support should be used, how often, or include design criteria for the stulls. For overhand cut-and-fill stopes, the GCP states "the back will be supported with 4-foot bolts and holy boards or monster mats," and that "generally, bolt spacing of at most three quarters the bolt length should be adequate" with reference to a cross sectional diagram for stopes less than 5 feet wide showing a single bolt installed in the crown and a single wood support member wedged between the hanging wall and footwall. The reference to spacing based on three quarters the length of a 4-foot bolt suggests bolts should be installed on 3-foot centers. Jurado had the authority to direct the application of ground support but was not aware of the ground control plan or its provisions. In the area where the accident occurred, Nutting had installed two bolts. He installed one bolt in the rock that fell and another bolt near the same rock. Nutting was preparing to install a third bolt in or near the same rock when the fall occurred.

Investigators performed an extensive visual examination of the area and tested the ground competency using sound and vibration. Investigators noted considerable loose material, open apertures of joints, and "drummy" conditions, indicating an unstable rock mass. Investigators determined that 14 bolts and one stull were installed in the approximately 100 foot-long stope, during the mining cycle. One of those bolts had been installed in the rock wedge that fell prior to failure but had insufficient anchorage to control the rock. The bolts installed in the crown (roof) were obviously more than three feet apart. According to interviews, the stull was installed during a shift prior to the accident. Investigators determined an additional stull was installed by the mine rescue team.

The stulls, which were three inches by eight-inch wood boards cut to the width of the stope at their installed locations, were not hitched in the footwall. The stulls had been installed on an individual basis, rather than as part of a regular support system with a defined spacing. Proper installation and adequate support density, or spacing, are both elements of a support system that has been designed to control the ground.

Investigators determined that the ground control plan was not adequately designed for narrow stopes. The necessary ground support systems were not adequately designed or installed to control the ground where the miner was working. Investigators determined that inadequate ground support contributed to the accident.

Examinations

Investigators reviewed ground condition examination records from April 5, 2023, to the date of the accident. Nutting conducted the ground condition examinations of the stope at the start of his shifts and documented the same hazard and corrective measure each day using the terms "Loose ground" and "Bar down." Jurado examined the area all the way to the face and back daily, and the examination cards were signed by both Nutting and Jurado. Investigators determined that inadequate ground condition examinations and inadequate testing of ground conditions contributed to the accident. Adequate ground condition examinations are conducted by visually

checking for cracks. Adequate testing of ground conditions is conducted by tapping on the rock mass to listen for hollow sounds which indicate loose ground.

Training and Experience

Nutting had over five years of mining experience, with nearly three years of experience as an underground stope miner. Investigators determined that the mine operator was not aware of the hitching and cap block aspects of stull installation. However, investigators also determined that the mine operator and miners, including Nutting, were adequately trained on ground condition examinations and testing, taking down hazardous ground, and installing bolts for ground support. Phillip Dahl, Mine Safety and Health Training Specialist, reviewed the mine operator's training plan, including Nutting's training records, and determined that all training was completed 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 design, install, and maintain ground support to control the ground in places where miners work or travel to perform their assigned tasks.

Corrective Action: The mine operator updated the ground control plan to include ground support in narrow stope mining. The revised ground control plan contains additional information about proper installation, spacing, and maintenance of ground support bolts and stulls. The mine operator revised their training plan and trained miners on these changes.

2. Root Cause: The mine operator did not conduct adequate ground condition examinations and testing in areas where work was to be performed.

Corrective Action: The mine operator retrained their designated persons on what constitutes proper and thorough ground condition examinations and testing.

CONCLUSION

On April 11, 2023, at approximately 10:35 a.m., Blaik Nutting, a 26 year-old stope miner with over five years of experience, died when a 20 to 25-ton rock from the hanging wall, fell and struck him.

The accident occurred because the mine operator did not: 1) design, install, and maintain ground support to control the ground in places where miners work or travel to perform their assigned tasks, and 2) conduct adequate ground condition examinations in areas where work was to be performed.

Approved By:

Brad Breland
Acting District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to U.S. Silver-Idaho, Inc.

A fatal accident occurred on April 11, 2023, at approximately 10:35 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. This order 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.

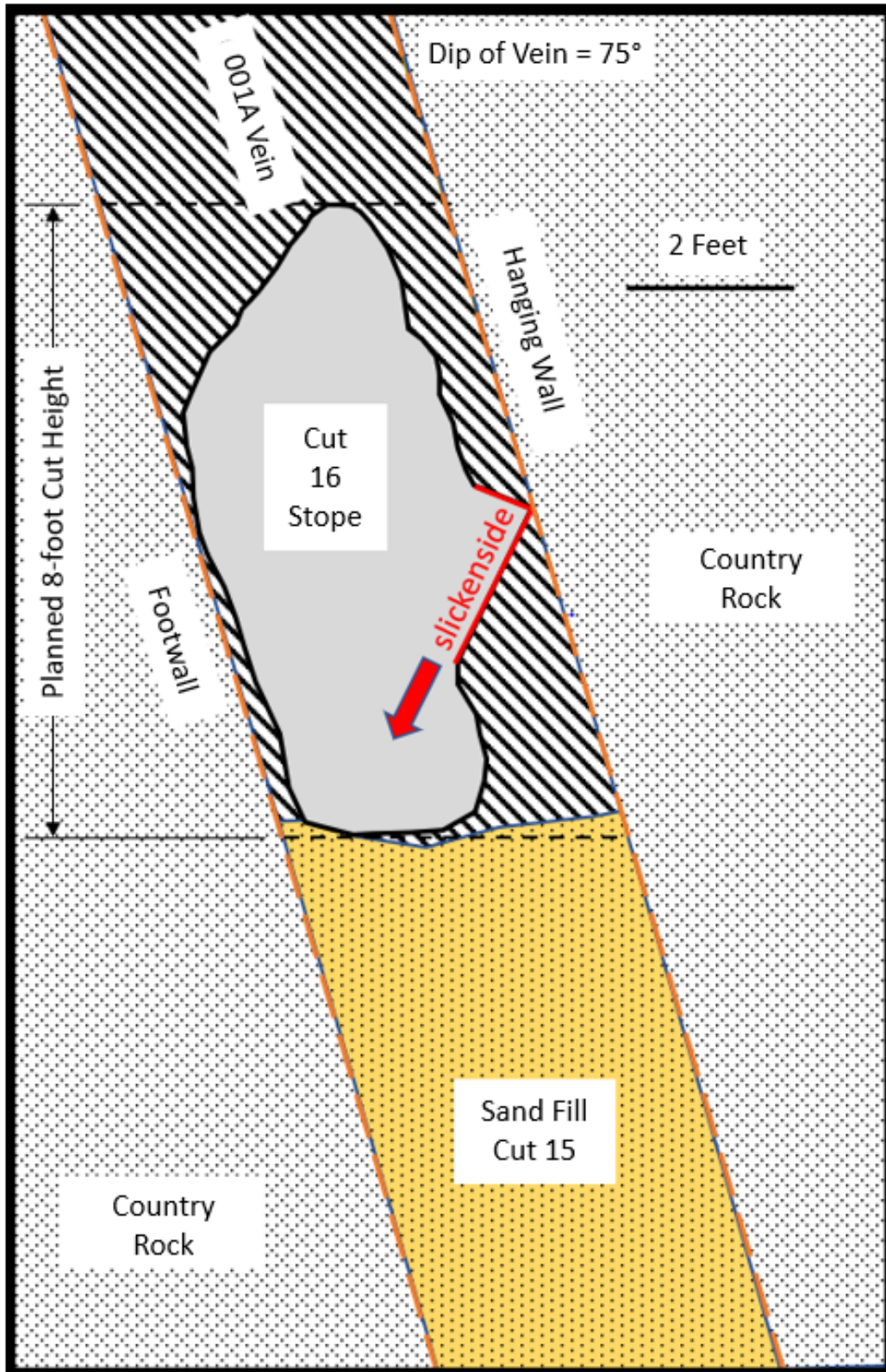
2. A 104(d)(1) citation was issued to U.S. Silver-Idaho, Inc. for a violation of 30 CFR 57.3360.

A fatal accident occurred at this operation on April 11, 2023, when a miner was crushed by a fall of material from the hanging wall in the 001A vein of the 3200-033 stope. The necessary ground support systems were not adequately designed or installed to control the ground where the miner was working. The mine operator engaged in aggravated conduct constituting more than ordinary negligence by assigning miners to work without adequate ground support systems in place for narrow vein mining. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 104(d)(1) order was issued to U.S. Silver-Idaho, Inc. for a violation of 30 CFR 57.3401.

A fatal accident occurred at this operation on April 11, 2023, when a miner was crushed by a fall of material from the hanging wall in the 001A vein of the 3200-033 stope. Appropriate supervisors or other designated persons did not adequately examine and test ground conditions prior to work commencing or as ground conditions changed during the work shift. The mine operator engaged in aggravated conduct constituting more than ordinary negligence by not ensuring that adequate examinations and testing of ground conditions was being conducted as warranted throughout the mining cycle. This violation is an unwarrantable failure to comply with a mandatory standard.

APPENDIX A – Sketch of 3200-033 Stope Profile and Failure Geometry



APPENDIX B – Persons Participating in the Investigation

U.S. Silver-Idaho, Inc.

| | |
|--------------------|--|
| Michael Weaver | Safety Superintendent |
| Katherine Dehn | Chief Engineer |
| Christopher Morgan | Chief Geologist |
| Gary Garner | General Foreman |
| Marlon Allmer | Safety Supervisor |
| Joseph Jolley | Safety Supervisor |
| Ryan Jurado | Shifter |
| Catherine Samson | Ore Control Geologist |
| Kelly Gallogly | Geologist |
| Jason Bauer | Stope Miner |
| Jonathan Bauer | Stope Miner |
| Jason Lauck | Stope Miner |
| Richard Smith | Laborer 1/Galena Mine Rescue Team Member/Shoshone County Coroner |

United Steel Workers Local 5114

| | |
|-------------------|---|
| Griffyn Rasmussen | United Steel Workers Local 5114, Miners' Representative |
| Austin Travis | United Steel Workers Local 5114, Miners' Representative |
| Neil Travis | United Steel Workers Local 5114, Miners' Representative |

Mine Safety and Health Administration

| | |
|--------------------------|--|
| Lee Hughes | Staff Assistant |
| Steven Polgar | Supervisory Mine Safety and Health Inspector |
| Travis Lindskog | Mine Safety and Health Inspector |
| Beverly Rice | Mine Safety and Health Inspector |
| Phillip Dahl | Mine Safety and Health Training Specialist |
| Sandin Phillipson, Ph.D. | Senior Geologist, Technical Support |
| Todd Kostecki, Ph.D. | Mining Engineer, Technical Support |