

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION  
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Underground Metal Mine  
(Gold)

Fatal Slip or Fall of Person Accident  
August 31, 2012

Exodus  
Newmont USA Limited  
Carlin, Eureka County, Nevada  
Mine I.D. No. 26-02661

Investigators

Steven Kidwell  
Mine Safety and Health Inspector

Charles Snare  
Mine Safety and Health Inspector

Dean Nichols  
Physical Scientist

John O'Brien  
Mine Safety and Health Specialist

Originating Office  
Mine Safety and Health Administration  
991 Nut Tree Road, Second Floor  
Vacaville, California 95687  
Wyatt Andrews, District Manager



Photo taken from the right side of drift looking toward open hole.

## OVERVIEW

On August 31, 2012, Allen Campbell, Miner, age 49, was killed when he fell through a hole that had developed beneath bridged material in an open stope. Campbell was assigned to prepare a work area to set up a long-hole bench drill and was working near the open stope when he fell down the stope into a muck pile. Campbell was inadvertently loaded out with the material and transported by a haul truck to a surface stockpile where he was later discovered.

The accident occurred due to management's failure to ensure that the victim used fall protection when working near an open stope where there was a danger of falling.

## GENERAL INFORMATION

Exodus, a multi-level, underground gold mine, owned and operated by Newmont USA Limited, was located approximately 25 miles from Carlin, Eureka County, Nevada. The principal operating official was Mark Ward, Manager of Underground Operations. The mine normally operated two 12 hour shifts per day, seven days a week. Total employment was 114 persons.

Gold bearing ore was drilled and blasted in long hole stopes. Broken material was transported from the bottom of the stopes with diesel powered load-haul-dump units and haul trucks to surface stockpiles for processing and refining. The finished products were sold to commercial industries.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this mine on August 21, 2012.

## DESCRIPTION OF ACCIDENT

On the day of the accident, Allen Campbell, victim, reported for work at 6:00 a.m., his normal starting time. Pat Keogh, Shifter/Foreman, assigned Campbell to go to the 4500-315 stope to prepare for the next set of holes to be drilled.

Shortly after 7:00 a.m., Campbell entered the mine on a tractor and traveled down to the 4410-307 stope to assist Zach Wright, Driller, who was working on his drill. Campbell then traveled to the 4500-315 stope. He inspected the area and noticed the shot material had bridged over the hole. Campbell called Keogh to inform him of the condition and Keogh headed to examine the 4500-315 stope.

Before Keogh arrived, Campbell and Robert Kennedy, Loader Operator, who was backfilling in the 4500-311 stope, went in the 4500-315 stope to look at the bridged material. Both men went down to the 4410-315 level to check the bottom and then went back up to the 4500-315 stope. Kennedy left and Campbell went to meet Keogh.

Keogh arrived about 8:00 a.m. to examine the stope. Keogh and Campbell decided to measure back from the location of the last blasted drill holes and mark the rib. This mark would correspond to where the next set of holes would be drilled and would delineate the lines for subsequent mucking. Before Keogh left, he instructed Campbell to apply water to the bridged material to try to move it. He also told Campbell to have the mucking crew muck from below the stope.

At approximately 8:30 a.m., Campbell called Kennedy to clean the floor in preparation for drilling. Kennedy drove a mucker into the drift and began pushing the material forward to clear the floor for the next set of drill holes. During this process, Kennedy positioned the mucker bucket with its front tilted down, allowing him to find the edge of the stope.

Kennedy finished cleaning the floor of the 4500-315 stope and returned to the 4500-311 stope to continue backfilling. Keogh returned to the stope at approximately 9:30 a.m. and went with Campbell to locate another mucker to clean up. Between 9:45 a.m. and 10:00 a.m., Kennedy observed Campbell return with a mucker. About 11:00 a.m., Kennedy went to check on Campbell because he did not see the mucker's lights moving in the 4500-315 stope. Kennedy stated he observed a miner's cap light shining in front of the mucker and returned to his work area.

Steve Kranovich, Mechanic, and David Edson, Drill Operator, arrived on the 4500-315 level and met with Keogh. Kranovich told Keogh he was there to talk to Campbell about working on the drill. Kranovich then went to the 4500-315 stope to check on Campbell but could not locate him.

About 12:00 p.m., Keogh returned to the 4500-315 stope to check on Campbell and met Kranovich. Keogh observed Campbell's mucker parked in the heading of the 4500-315 stope and noticed a hose stretched down into the open stope hole, but did not see Campbell. Keogh went up to the 4500-319 stope to see if Campbell was working in that area. He found Campbell's tractor but could not locate Campbell. Keogh asked Kennedy if he had seen Campbell.

Kranovich and Edson walked back into the 4500-315 stope to look for Campbell but did not find him. They noticed an open hole, 3 to 4 feet in diameter, had developed in the bridged material and found a 1-inch water hose laying over the edge of the open hole with water running in it. Keogh asked other miners in the area if they had seen Campbell but they had not seen him.

Wright arrived, donned fall protection, and went into the 4500-315 stope to look over the edge but did not see Campbell. Edson called Thomas Cruce, Mucker Operator, who was working at the bottom of the open stope hole on the 4410-315 level, to immediately stop mucking. Keogh and Wright went to the 4410-315 level and met Cruce. Cruce told them he did not see Campbell but stated a truck had just recently been loaded. Keogh ordered an immediate evacuation of the mine and called to the surface to stop all trucks from dumping.

The mine was evacuated and a search of the surface started. At approximately 1:40 p.m., Campbell was located on top of the high grade ore pile. He was checked but was

nonresponsive. The ambulance crew arrived at approximately 2:45 p.m. Campbell was pronounced dead by Kenneth Jones, Eureka County Sheriff. The cause of death was attributed to traumatic asphyxia.

MSHA received notification that a miner was missing at 1:57 p.m. on August 31, 2012, by a telephone call from Doug Nelson, Newmont Health Safety and Loss Control, to MSHA's National Call Center. The National Call Center notified James Fitch, Western District Safety Specialist. MSHA issued an order under the provisions of 103(j) of the Mine Act to ensure the safety of the miners. This order was later modified to 103(k) of the Mine Act when the first Authorized Representative arrived at the mine.

## INVESTIGATION OF ACCIDENT

MSHA's accident investigation team was assembled on September 1, 2012. The investigators traveled to the mine and conducted a physical inspection of the scene, interviewed miners, and reviewed documents and work procedures relevant to the investigation. The investigation was conducted with the assistance of mine management and miners, miners' representatives, and the Eureka County Sheriff's Department.

## DISCUSSION

### **Location of the Accident**

The accident occurred in the 4500-315 stope. The stope was located near the end of the 4500-315 drift. The slot of the stope had been developed and Campbell was working near the first two production rings that had been shot on the shift before. His duties as a stope driller included drilling, loading, blasting, and conducting post blast inspections.

During the process of preparing for a shot, Campbell fell approximately 90 feet from the drift he was working into the muck pile on the level below. During interviews, miners reported the top layer of material had remained in place after the previous shot. This infrequent post blast condition is referred to as 'being bridged over'. The bridged over material sometimes collapsed by its own weight. If that did not occur, remediation from additional blasting or other mechanical means was required. In this case, all but a narrow strip of bridged over material had fallen before the investigators arrived. A narrow band of strata remained in place at the approximate location of the leading edge of the previous stope hole shot.

### **Mining Method**

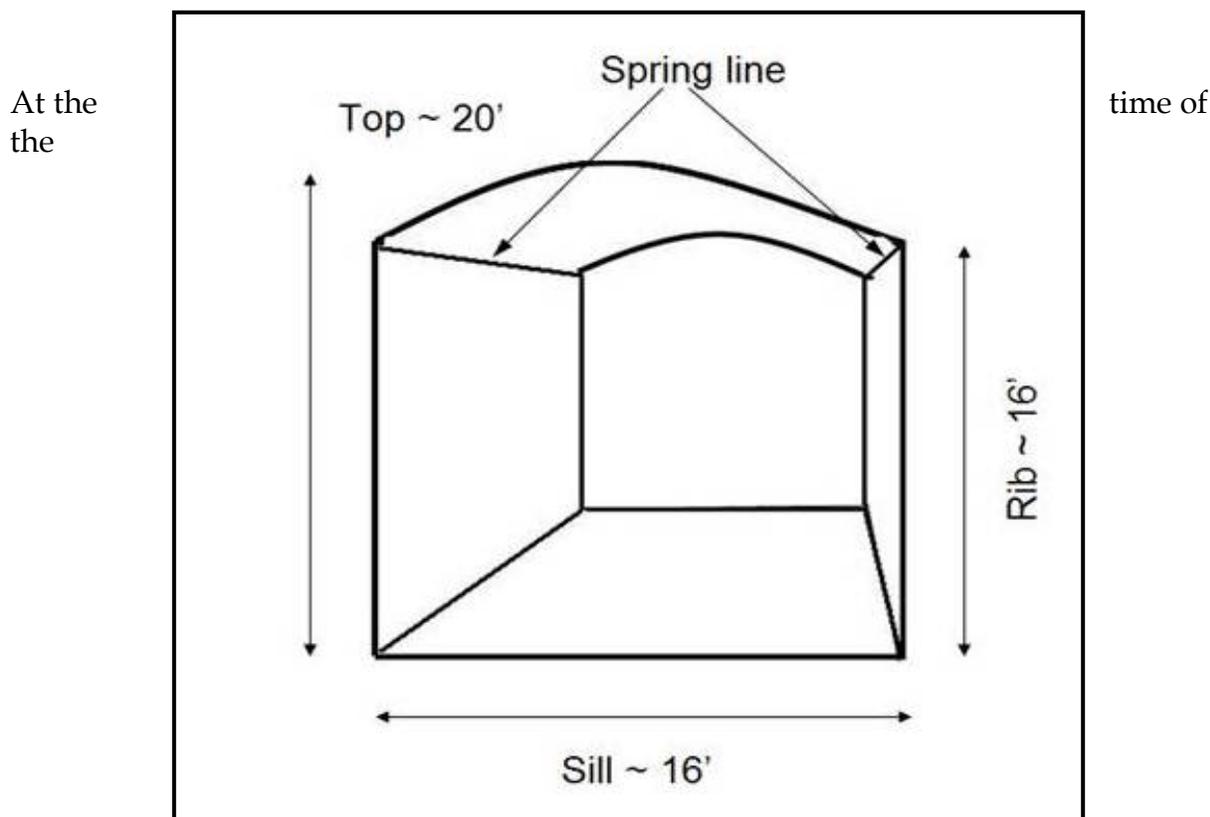
During the production process, a sill drift was driven horizontally and a second one was driven below the first (commonly referred to as the top cut and bottom cut, respectively). The 4500-315 stope consisted of the top cut on the 4500 level and the bottom cut on the 4410 level. The two levels were connected by drilling vertical blast holes from the end of the 4500-315 stope on the top cut to the bottom cut. Each row of holes from rib to rib was called a ring. Each shot consisted of several rings, beginning at the face, working outward toward the entry.

The initial rings of holes were shot to develop an opening referred to as a “slot” that allowed material to flow down to the bottom cut. The slot was developed to open the ground for subsequent production rings to be drilled and blasted. Once the blast was completed, the material was mucked on the bottom cut and transported to the surface for processing.

### **4500-315 Stope Description**

The specific location of the accident was the 315 drift on the 4500 level, the 4500-315 stope. Drift dimensions were 16 feet across the sill and 16 feet to the spring line as indicated in Figure 1. The back curved upward from the spring line to about 20 feet before curving down to the opposite side spring line. The overall length of the 4500-315 stope was approximately 300 feet.

Figure 1. Cross sectional diagram of an ideal drift at Exodus



investigation, the leading edge of the stope corresponded with Ring 9 as indicated in the diagram shown in Figure 2. This was consistent with the expected results of drilling and shooting Rings 7 and 8. The investigators noted marks on both the left and right ribs that corresponded with the location of Ring 9. An arrow was pointing to the face just inby those white lines.

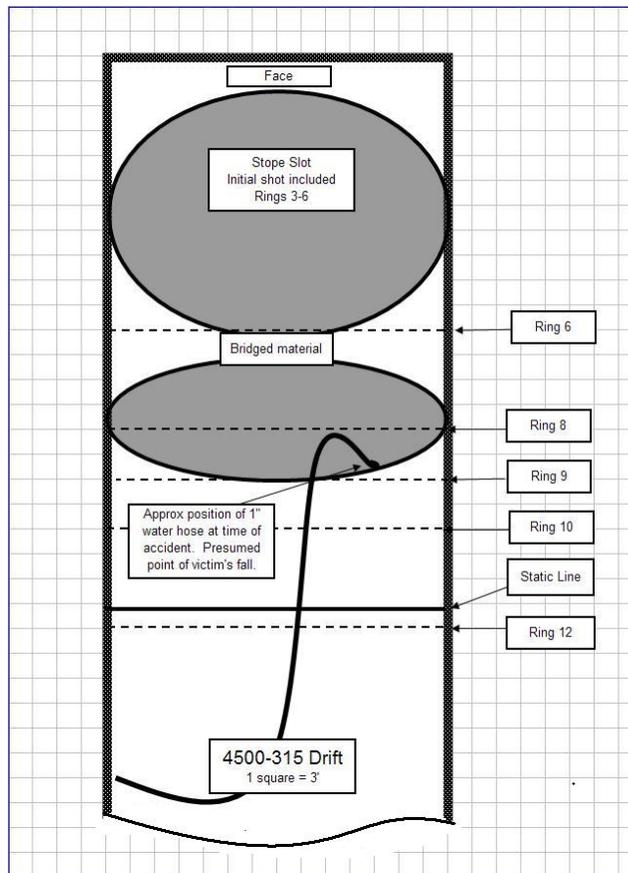
As stated during interviews, a line is normally painted on the rib 10 feet from the assumed edge of the stope to warn miners that fall protection was needed beyond that point. The location of the 10 foot warning line from the expected new leading edge should have been close to Ring 11 not at Ring 9. The distance from Ring 9 to Ring 6, at the time of the shot, was 18 feet. The crest of the bridged material was about 16 feet from Ring 9. This distance was nearly the distance expected to Ring 6 which should have been the approximate leading edge when the holes were drilled for Rings 7 and 8. After the investigation began, a static line was attached to each rib across the drift about 2 feet inby the Ring 12 position or about 16 feet from the mark indicating Ring 9. The static line was installed at the request of the investigators for attaching fall protection.

Figure 2. Sketch of drift 4500-315 at time of the investigation

## Fall Protection

The miners were protection and During the victim's fall was found in the retractable lifeline to a rock bolt in the The lifeline was case and the hook

Management had a requiring all protection when the edge of an open practice, the miners stope after a shot painted a "warning line" on the rib to use as a reference point for using fall protection.



issued fall trained in its use. investigation, the protection harness tractor he had work place. A was found attached rib near the stope. retracted into its was intact.

written policy miners to use fall within 10 feet of stope. As a that went into a

## Training and Experience

Allen Campbell (victim) had 23 years and 51 weeks of mining experience. He had over three years of experience at this task and had worked at this mine for about one year. A representative of MSHA's Educational Field Services staff conducted an in-depth review of the mine operator's training records and determined Campbell had been trained in accordance with 30 CFR, Part 48.

## **ROOT CAUSE ANALYSIS**

A root cause analysis was conducted and the following root cause was identified:

**Root Cause:** Management failed to ensure that the victim wore fall protection when working near an open stope where there was a danger of falling. The victim fell into the stope while working on or near the bridged material.

**Corrective Action:** Management reviewed the standard operating procedures for working near stopes and made revisions to include specific instructions regarding the use of fall protection. A second person will be present when a miner is working near a stope. All of the stope crews were trained in these new procedures.

## CONCLUSION

The accident occurred due to management's failure to ensure that the victim used fall protection when working near an open stope where there was a danger of falling.

## ENFORCEMENT ACTIONS

### **Issued to Newmont USA Limited**

**Order No. 8692159** – issued on August 31, 2012, under the provision of Section 103(j) of the Mine Act:

*An accident occurred at this operation on 08/31/2012 at approximately 13:45 hours. Rescue and recovery work is necessary; this order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all*

*activity at Exodus underground and area surrounding the portal until MSHA has determined that it is safe to resume normal mining operations in this area. This order applies to all persons except those engaged in the rescue and recovery operation. This order was initially issued orally to Doug Nelson-Sir HSLP at 15:06 and has now been reduced to writing.*

An Authorized Representative modified this order to section 103(k) of the Mine Act upon arrival at the mine site. This order was terminated on October 1, 2012, when the conditions that contributed to the accident no longer existed.

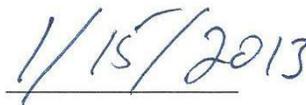
Citation No. 8693546 -- Issued on November 14, 2012, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.15005:

*A fatal accident occurred at this mine on September 31, 2012, when a driller fell through bridged material while working near an open stope. He was inadvertently loaded out with the material and transported by a haul truck to the surface where he was later discovered. The bridged material had been left from a recent stope shot on the 4500 foot level. The victim was attempting to clear the bridged material by washing it down with a water hose when the material gave way. He was not wearing a safety belt and line where there was a danger of falling.*

Approved: \_\_\_\_\_

  
Wyatt Andrews  
District Manager

Date: \_\_\_\_\_



## Appendix A

### Persons Participating in the Investigation

#### Newmont USA Limited

Timothy Webber	Chief Engineer
Matthew Haney	General Foreman/UG Operations
Pat Keough	Shifter/Foreman
Timmie Morgan	Shifter/Foreman
Randy Squires	Senior Manager for Safety Relations

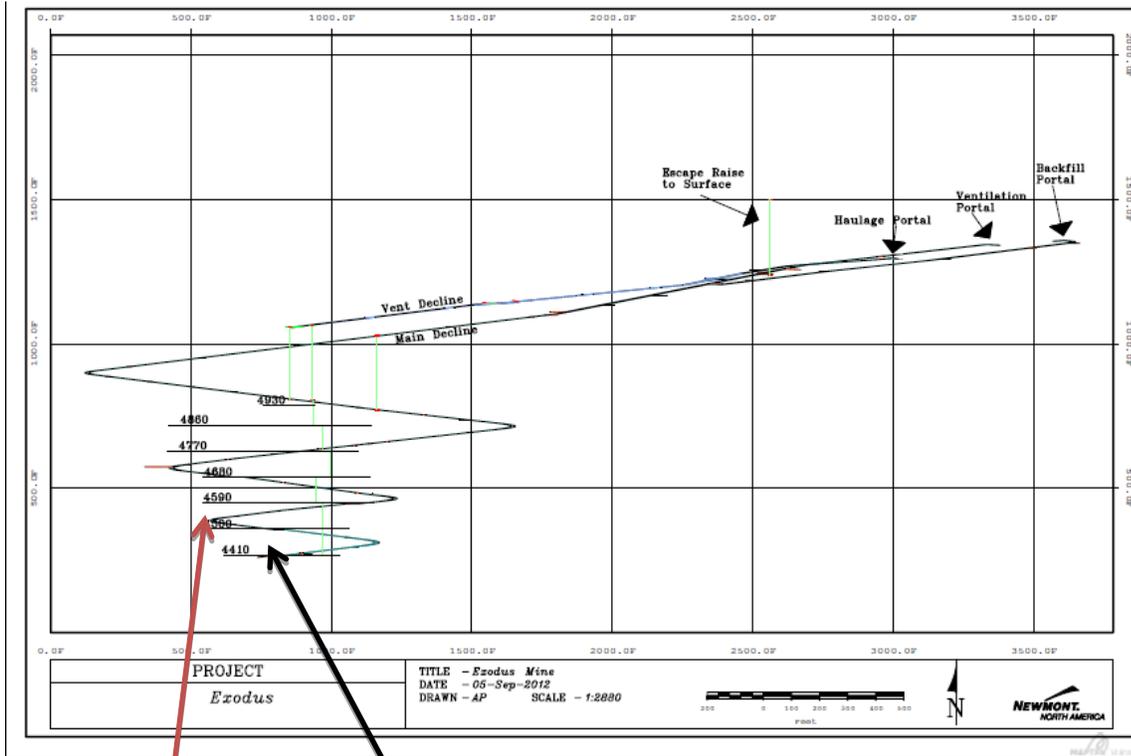
#### Eureka County Sheriff's Department

Kenneth Jones	Eureka County Sheriff
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#### Mine Safety and Health Administration

Steven Kidwell	Mine Safety and Health Inspector
Charles Snare	Mine Safety and Health Inspector
Gary Hebel	Supervisory Mine Safety and Health Inspector
Ronald Jacobsen	Supervisory Mine Safety and Health Inspector
John O'Brien	Mine Safety and Health Specialist
Dean Nichols	Physical Scientist

# Appendix B



4500 LEVEL

4410 LEVEL

## Appendix C

**Accident Investigation Data - Victim Information**

**U.S. Department of Labor**  
Mine Safety and Health Administration



Event Number:

<b>Victim Information:</b> <input type="text" value="1"/>														
1. Name of Injured/Ill Employee: <i>Allen R. Campbell</i>			2. Sex: <i>M</i>		3. Victim's Age: <i>49</i>			4. Degree of Injury: <i>01 Fatal</i>						
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 08/31/2012 b. Time: 14:45</i>								6. Date and Time Started: <i>a. Date: 08/31/2012 b. Time: 6:00</i>						
7. Regular Job Title: <i>027 Cubex Drill Operator</i>					8. Work Activity when Injured: <i>011 Cleaning/Preping area for drill setup</i>					9. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				
10. Experience														
a. This														
Work Activity: <input type="text" value="3"/> <input type="text" value="16"/> <input type="text" value="0"/> b. Regular <input type="text" value="3"/> <input type="text" value="16"/> <input type="text" value="0"/> c. This <input type="text" value="1"/> <input type="text" value="32"/> <input type="text" value="0"/> d. Total <input type="text" value="23"/> <input type="text" value="51"/> <input type="text" value="4"/>														
11. What Directly Inflicted Injury or Illness? <i>089 Broken rock</i>														
12. Nature of Injury or Illness: <i>110 Traumatic Asphyxia</i>														
13. Training Deficiencies: Hazard: <input type="text"/> New/Newly-Employed Experienced Miner: <input type="text"/> Annual: <input type="text"/> Task: <input type="text"/>														
14. Company of Employment: (if different from production operator) <i>Operator</i> Independent Contractor ID: (if applicable)														
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input checked="" type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>														
16. Part 50 Document Control Number: (form 7000-1) <i>220122510020</i> 17. Union Affiliation of Victim:														