UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

METAL AND NONMETAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Metal Mine
(Silver)

Fatal Slip or Fall of Person Accident
November 17, 2011

Cementation USA Inc.
Contractor ID No. M445

at

Lucky Friday
Hecla Limited
Mullan, Shoshone County, Idaho
ID No. 10-00088

Investigators

Rodney D. Gust
Mine Safety and Health Specialist

James J. DiSimone
Mine Safety and Health Inspector

John Kathmann
Mine Safety and Health Specialist

James M. Kelly, P.E.
Civil Engineer

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

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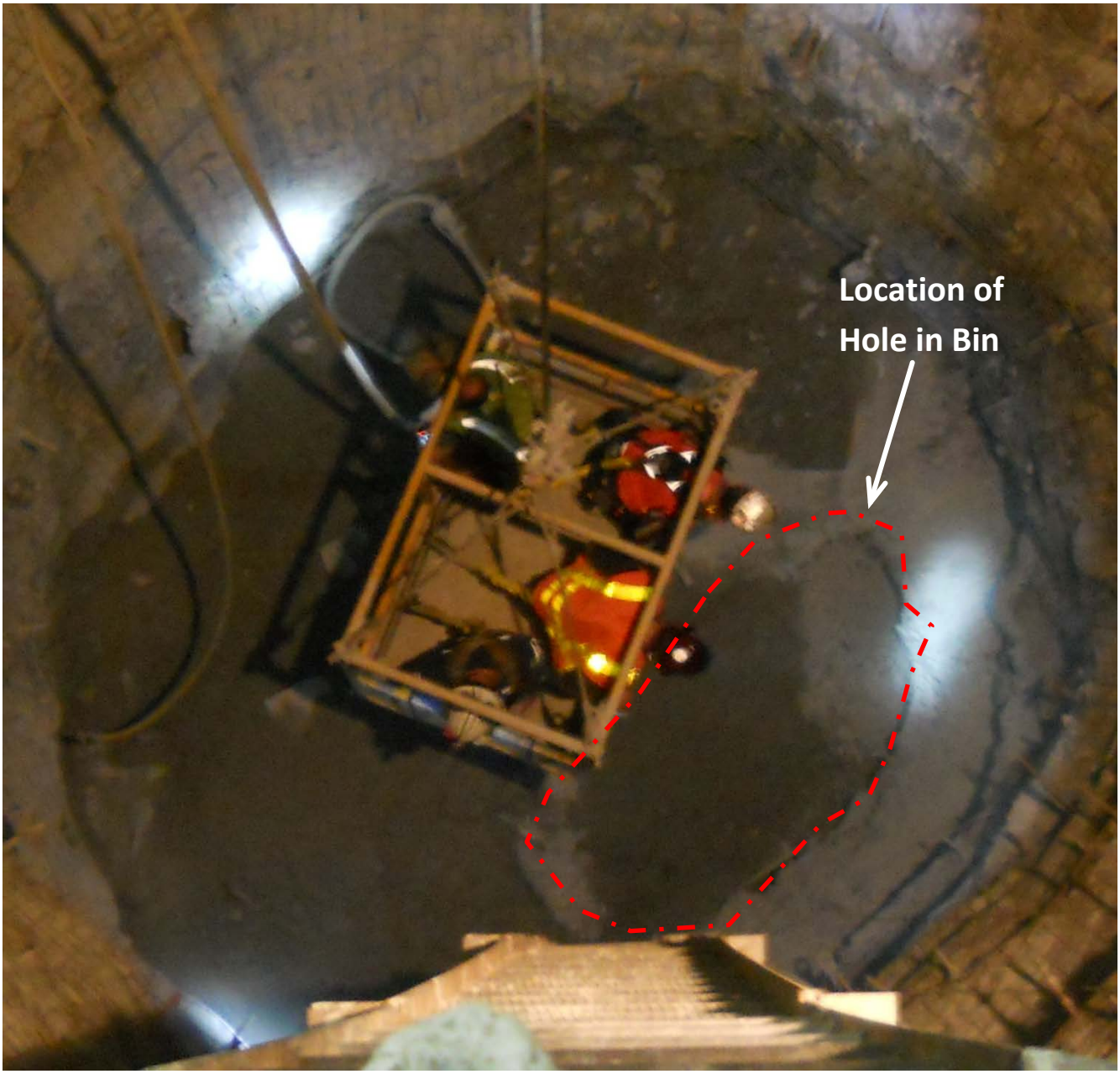

Location of
Hole in Bin

OVERVIEW

Brandon Gray, contractor miner, age 26, was injured on November 17, 2011, while attempting to free plugged material in a bin excavation. The victim and a coworker, Jason Figueroa, contractor miner, entered the bin from the top to remove blockage below them. The material gave way, engulfing them. Figueroa was partially buried but was freed from the material, treated at a hospital, and released the same day. Gray was completely engulfed in the material. Gray was freed from the material and hospitalized where, as a result of his injuries, he died on November 19, 2011.

The accident occurred due to management's failure to ensure miners were provided with the proper personal protective equipment when required to remove blocked material in the bin. The miners were standing on the plugged material wearing harnesses attached to self-retracting lifelines. However, the lifelines used were designed for an unobstructed fall path. When the material suddenly flowed and the victims fell, there was not sufficient speed to cause the self-retracting lifelines to lock before the victims were engulfed in the material. The slow rate of fall for the miners working on top of the material in the bin did not permit the devices to lock. Additionally, the miners did not receive the proper training to safely perform the task of removing the blocked material from the bin.

GENERAL INFORMATION

Lucky Friday is an underground silver mine owned and operated by Hecla Limited. The mine is located in the Coeur d'Alene mining district, approximately one mile east of Mullan, Shoshone County, Idaho. The principal operating officials are Phillips S. Baker Jr., President and Chief Executive Officer, John Jordan, Vice-President and General Manager, and Scott Hogamier, Safety Coordinator. The mine operates two 12-hour shifts per day, six days a week. Total employment is 273 persons.

Cementation USA, Inc. is located in Sandy, Salt Lake County, Utah. The principal operating official is Michael Nadon, President. Hecla Limited contracted with Cementation USA, Inc. to perform shaft sinking and mining construction projects at Lucky Friday. The #4 shaft construction crew works three 9-hour shifts per day, seven days per week. Cementation USA's total employment at this mine is 107 persons.

Silver, lead, and zinc bearing ore is drilled and blasted in multi-level open stopes. Broken material is transported from the stopes to ore chutes by diesel powered load-haul-dump (LHD) units and underground haulage trucks and hoisted to the surface for crushing and milling. Concentrates are sold to an off-site smelter for final processing.

The last regular inspection at this mine was completed on November 8, 2011.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, November 17, 2011, Brandon Gray (victim) reported for his normal 10:00 p.m. shift at 8:55 p.m. He met with Mark Auge, Shift Supervisor, and eight members of the night shift crew at the top station of the Silver Shaft.

At approximately 10:00 p.m., the crew was lowered to the 4900 level shaft station (depths designated in feet from the surface) , held their daily safety meeting, and discussed the previous day's work. The crew traveled to the 4850 level near the top of the south bin access, arriving at approximately 10:20 p.m. to conduct a meeting with the swing shift crew.

During the meeting, the night shift crew learned that the previous shift had drilled and blasted approximately a 4-foot-deep lift from the bin floor, with the bottom of the blast approximately 68 feet below the collar of the 4850 level. Following the blast, they removed three LHD buckets of muck (broken rock) below the raise (hole) between the bin's current floor level and the 4940 level. These loads were removed one at a time while observing the top surface of the muck in the bin during and after each load. The muck's surface did not move during or after the removal of the three loads. The crew recognized this condition of a material hang-up in the bin to be unusual, creating a dangerous condition. The swing shift crew left the area around 10:35 p.m.

At approximately 10:45 p.m., Gray and Figueroa were lowered, in a personnel hoisting basket, into the bin from the 4850 level to unplug the material. After both miners tied off with self-retracting lifelines (also referred to as self-retracting lanyards, or SRLs) secured to bolts on the rib, the basket was raised to get it out of the way. They stood on the material and began working on the blockage using a 2-inch air blowpipe and a 1-inch water hose for dust control purposes. Gray began working the blowpipe from the east side of the bin and created a hole in the muck near the center of the bin, pushing the blowpipe into the hole the air was creating.

Auge, observing from the 4850 level above, informed Gray that the muck had pulled from west of the center on the previous day due to the raise at this level being off-center to the bin walls. Moving to the southwest side of the bin to work, Gray attached his SRL to a bolt in the rib. Working from this new location could blow muck into a telephone that was attached just west of the ladder at the north side of the bin, so Gray walked over to the telephone and detached it from its cord, stretching his retractable line directly over the muck-covered hole in the process. Figueroa, whose SRL was attached to a bolt on the southeast side of the bin, was standing next to Gray and began coiling the phone's cord.

At approximately 11:00 p.m., the muck below suddenly broke free drawing both miners into the moving material. The material completely engulfed Gray prior to being stopped by his SRL, while Figueroa was partially buried. Investigators determined that this was due to the difference in anchoring points and relative distances of the miners from the hole. Gray's anchor point and standing position were closer to the hole than Figueroa's.

Rescue efforts began immediately. Auge was lowered into the bin and the crew on the 4940 level notified of the accident by radio. Figueroa was freed from the material from the top of the bin on the 4850 level, hoisted out of the mine, and transported to a local hospital.

Efforts to rescue Gray continued from the 4940 level. After freeing Gray from the muck pile, Cardiopulmonary Resuscitation (CPR) was administered and he was transported to the Silver Shaft. Gray was hoisted to the surface and transported by ambulance to Shoshone Medical Center. He was later transferred to Kootenai County Hospital in Coeur D'Alene, Idaho. On November 19, 2011, Gray was pronounced dead by the Kootenai County Coroner at 1:21 a.m. The cause of death was attributed to suffocation and mechanical compression.

INVESTIGATION OF THE ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified at 12:20 a.m. on November 18, 2011, by a telephone call to MSHA's emergency call center from Scott Hogamier, Safety Coordinator. Randy Cardwell, Supervisory Mine Safety and Health Inspector, was notified, and an investigation was started that day. An order was issued pursuant to §103(j) of the Federal Mine Safety and Health Act of 1977 to ensure the safety of persons. A citation was issued for late reporting.

MSHA's investigators traveled to the mine, made a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine and contract management and employees and miners' representatives.

DISCUSSION

Location of the Accident

The accident occurred in the south bin that is being excavated vertically between the 4850 level and the 4940 level and located adjacent to the Number 4 Shaft construction project. The location of the south bin in relation to the north bin on the 4850 and 4940 levels is shown in Appendix B, Figures 1 and 2, respectively, in which it is identified as the "waste bin." The shaft to the north-northwest of the bins is the Number 4 shaft. When the Number 4 Shaft project is completed and operational, ore and waste will be hoisted to the 4850 level where the materials will be transported via belt conveyor to either the south (waste) or north (ore) bin. Both materials will be taken from the bottom of the bins at the 4940 level and transported via truck to the Silver Shaft. The material will be dumped into skips and hoisted to the surface for final transportation to the processing plant (ore) or disposal (waste.)

Bin Construction Procedures

Both bins were constructed by driving a 7-foot x 7-foot raise from the 4940 level to the 4850 level, using a pneumatically powered rack-and-pinion platform lift system from which miners drilled and loaded holes in the back (roof). The platform was removed from the raise before each blast. Following the blast, the material (muck) fell to the lower level. After the ribs (walls) were supported, the process was repeated until the upper level was reached. This vertical excavation was referred to as the, "Alimak raise," named for the manufacturer of the lift system, Alimak Hek, Inc.

Following completion of the Alimak raise, construction of the bin proceeded from the 4850 level downward. Two rings of holes were drilled concentric with the Alimak raise, loaded with explosives, and blasted, resulting in the approximately 18-foot diameter bin. To protect equipment on the 4850 level from flyrock, plywood was placed over the collar during each blast and the hoisting basket was set down on it.
.
After each blast, some of the muck fell through the Alimak raise to the 4940 level, while the remaining muck formed a slope toward the walls of the raise at the material's angle of repose. Two miners "pushed" the remaining muck into the Alimak raise using a 2-inch diameter blowpipe. A water hose was also used as needed to control dust. After the muck was removed from the bin floor, ground supports were installed in the walls of the bin. The drilling, blasting, mucking, and bolting cycle was repeated until the bottom of the bin was reached.

Blasted Material (Muck)

As blasted muck fell to the 4940 level, the material below the Alimak raise formed a blockage and the raise filled. When the muck reached the working level of the bin, the miners at the 4850 level would contact miners at the 4940 level and request that the LHD operator remove a bucket of muck from the top of the pile, just below the bottom edge of the Alimak raise. Typically, the muck in the Alimak raise would then drop by a level approximately equivalent to the volume removed by the LHD. The miners above the bin would notify the LHD operator on the 4940 level by radio whether or not the muck level dropped. Failure of the level in the bin to drop after mucking from the pile would indicate a blockage preventing material from flowing. Techniques used to free blockages in the past included pushing the LHD bucket against the material to move it back and forth or mucking out another bucket.

Investigators learned that the muck began to hang up recently and was pulling mainly from one side. Figure 4 shows the hole in the bottom of the bin is toward its west-northwest side, corresponding to the side of the bin from where the raise was constructed and where the LHD would remove muck.

Cementation USA's written "Raise Mucking Procedure" acknowledges the danger of a situation resulting from a material hang-up in or below the Alimak raise, stating, "(i) if at any time the raise does not move while being mucked, stop the process until the raise settles". The procedure continues, "(employees) must be 100% tied off while in the raise if there is any concern that the muck pile did not move or is not settled after mucking. (Personnel) basket will be set on muck pile with hoist rope tight in case muck pile moves while (miners) are on the bench working to get muck moving". The final statement in this procedure is, "DO NOT ENTER RAISE IF MUCK HAS NOT DROPPED DOWN DURING MUCKING PROCESS WITHOUT YOUR SUPERVISOR'S ORDERS AND 100% TIE OFF".

Investigators could not determine the cause of the blockage of the muck below the bin. Several broken pieces of plywood, one as large as approximately 4 feet x 5 feet, were observed adjacent to the muck pile on the 4940 level. When the rescue attempts began, a half-sheet piece of plywood was between the top of the muck pile and the brow (intersection with the back of the 4940 level,) oriented vertically and between edge-on and face-on, as viewed in-line with the drift. Broken pieces of plywood had come out of the

muck pile previously. Bolts used to support the walls of the Alimak raise also dropped from the bin with the muck. The investigators observed one bolt still protruding from the north wall of the Alimak raise just above the brow.

The muck was determined visually to be predominately gravel-sized material, with some sand-sized particles and trace fines. A number of cobbles and one boulder (approximately 3.5 feet x 2.5 feet x 8 inches) were also observed in or adjacent to the muck pile. The muck was a granular, non-cohesive material. Wetting the material caused it to flow more freely.

Investigators discovered that at the time of the hang-up, the muck pile just below the roof brow at the 4940 level was standing more vertically than in the remainder of the muck pile. Considering the relatively narrow opening through which muck would typically flow, the investigators determined that one or more pieces of plywood, possibly together with the boulder that was observed near the muck pile and perhaps obstructed by the bolt protruding from the wall, could have caused the hang-up. The removal of the muck at the top of the pile may have left barely enough muck at the obstruction's edges to keep it in place. The blow piping performed in the bin, just preceding the material giving way, may have brought it to the edge of instability.

Fall Protection and Self-Retracting Lifelines (SRLs)

At the time of the accident, Gray and Figueroa were wearing full body harnesses attached to self-retracting lifeline (SRL) units featuring an automatic blocking function and a self-tightening and self-retracting system for the retractable lanyards. They were labeled as, "DBI SALA Ultra-Lok" 20-foot units. The manufacturer's User Instruction Manual for these SRLs contains a section entitled, "Locking Speed," which states, "Situations which do not allow for an unobstructed fall path should be avoided. Working in confined or cramped spaces may not allow sufficient speed to cause the SRL to lock in a fall. Working on slowly shifting materials, such as sand or grain, may not allow sufficient speed to cause the SRL to lock. A similar situation may occur on low pitched roofs, where a worker may slide instead of fall. A clear path is required to ensure positive locking of the SRL". The SRLs were not used as recommended by the manufacturer. The slow rate of fall for miners working on top of a blockage of material in the bin did not permit the SRLs to lock.

The situation was compounded because the miners were standing on slowly moving material and the devices were not attached at an elevation above their heads. The miners were positioned approximately 10 feet (horizontally) from the devices. Gray was on the opposite side of the hole from the device, requiring his horizontal movement to be toward the device as he fell into the raise.

Training and Experience

Brandon Gray, victim, had 3 years, 5 months of mining experience, and worked at this mine 9 months. Jason Figueroa had 1 year, 8 months of mining experience, and worked at this mine 5 months. Investigators reviewed the training records for these miners. Neither miner received Part 48.7(c) task training in the safety and health aspects and safe work procedures for unplugging bins or working in confined spaces.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root causes were identified.

Root Cause: Mine and contract management failed to establish procedures to safely unplug material in the bin, including the proper use of personal protective equipment.

Corrective Action: Mine and contract management established policies, procedures, and controls to finish the bin excavation. Management's new procedure does not allow miners to work on top of material that has the potential to move.

Root Cause: Contract management failed to ensure that miners had received training in the health and safety aspects and safe procedures regarding specific task training on how to safely unplug material blockage in the bins.

Corrective Action: Contract management provided training to all miners on the new procedures that were developed to finish the bin construction.

CONCLUSION

The accident occurred due to management's failure to provide the miners with the proper personal protective equipment when required to remove blocked material in the bin. They were standing on the material wearing harnesses attached to self-retracting lifelines. However, the lifelines used were designed for an unobstructed fall path. When the material suddenly flowed and the victims fell, there was insufficient speed for the self-retracting lifelines to lock before the material engulfed victims. The slow rate of falling for the miners, working on top of the material in the bin, did not allow the devices to lock. Additionally, the miners had not received the proper training to safely perform the task of removing the blocked material from the bin.

ENFORCEMENT ACTIONS

Issued to Cementation USA Inc.

Order No. 8556335 -- issued on November 18, 2011, under the provisions of § 103(k) of the Mine Act:

> The mine has experienced an accident in the Cementation Shaft Area Bin #4. This Order is issued under Section 103(k) of the Federal Mine Safety and Health Act of 1977. This 103(k) Order is intended to protect the safety of all persons in the effected area and to prevent the destruction of any evidence which would assist in the investigation of the cause or causes of the accident. The mine operator and contractor shall obtain prior approval from MSHA for all actions to recover and/or restore operations in the effected area.

Citation No. 8690065 -- issued on February 8, 2012, under the provisions of § 104(d)(1) of the Mine Act for a violation of 30 CFR 57.16002(c):

> A fatal accident occurred at this mine on November 17, 2011, when a miner was engulfed by blocked material in a bin. The victim and a coworker entered the bin to remove the blockage from below them when the material gave way, engulfing them in the material. Both miners entered the bin wearing safety harnesses and self-retracting lanyards, but they did not have lifelines suitably fastened. A second person per lifeline, similarly equipped, was not present. The shift supervisor had been working with the miners at this job site. This is an unwarrantable failure to comply with a mandatory safety standard. Management engaged in aggravated conduct constituting more than ordinary negligence in that they were aware that the bin had experienced blockage of material, yet failed to ensure that a safe means of clearing such blockages was provided.

Order No. 8690066 -- issued on February 8, 2012, under the provisions of § 104(d)(1) of the Mine Act for a violation of 30 CFR 48.7(c):

> A fatal accident occurred at this mine on November 17, 2011, when a miner was engulfed by blocked material in a bin. The victim and a coworker entered the bin to remove the blockage from below them when the material gave way, engulfing them in the material. The victim had received no specific task training on how to safely unplug the bin, nor could any training records be located on confined space entry training for this task. Management did not provide specific task training procedures on safely unplugging bins or confined spaces at this mine. This is an unwarrantable failure to comply with a mandatory safety standard. Management engaged in aggravated conduct constituting more than ordinary negligence in that they were aware of the requirements of the standard and of the task being performed, yet failed to ensure that training was given to miners.

Issued to Hecla Limited

Order No. 8556329 -- issued on November 18, 2011, under the provisions of § 103(j) of the Mine Act:

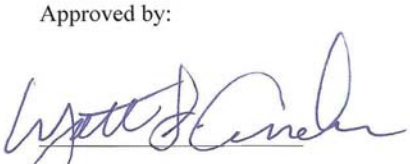
> An accident occurred on November 17, 2011 at approximately 11:00 p.m. This order is being issued under section 103 J of the Federal Mine Safety and Heath Act of 1977 to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. This order prohibits all activity in the entire mine until MSHA determines it is safe to resume normal mining operations. This order was initially issued verbally to the mine operator at 12:45 a.m. on November 18, 2011, and has now been reduced to writing.

This Order was terminated on November 18, 2011, and replaced with Order No. 8556335 (above.)

Order No. 8690067 -- issued on February 8, 2012, under the provisions of § 104(d)(2) of the Mine Act for a violation of 30 CFR 57.16002(c):

> A fatal accident occurred at this mine on November 17, 2011, when a miner was engulfed by blocked material in a bin. The victim and a coworker entered the bin to remove the blockage from below them when the material gave way, engulfing them in the material. The miners entered the bin wearing safety harnesses and self-retracting lanyards, but they did not have lifelines suitably fastened. A second person per lifeline, similarly equipped, was not present. Mine management personnel have been working underground with the contractor on a shift to shift basis since the beginning of the contract with Cementation, and have been in the bin when miners were working on potential falling/sliding material while only being tied off by self-retracting lanyards. Mine management engaged in aggravated conduct constituting more than ordinary negligence in that they were aware that the miners were working off material that had the potential (to) be blocked while only using a self-retracting lanyard.

Approved by:



Wyatt S. Andrews
District Manager

7/18/2012
Date

APPENDIX A

Persons Participating in the Investigation

Cementation USA Inc.

Michael Nadon	President
Jason Bucci	Project Manager
Carl Graham	Shaft Superintendent
Gregory Majeran	USA Safety Director
Brian Still	Manager of Health and Safety
Kenneth Bush	Safety Trainer

Hecla Limited

Bill Strickland	Project Engineer
Douglas C. Bayer	Mine Superintendent
Scott Hogamier	Safety Coordinator
Edward "Rick" Decker	Miners' Representative
Jerome Ploharz	Miners' Representative

Patton Boggs LLP

Donna Vetrano Pryor	Attorney

Mine Safety and Health Administration

Rodney Gust	Mine Safety and Health Specialist
James DiSimone	Mine Safety and Health Inspector
John Kathmann	Mine Safety and Health Specialist
James Kelly, P.E	Civil Engineer

APPENDIX B

Diagrams of the Location

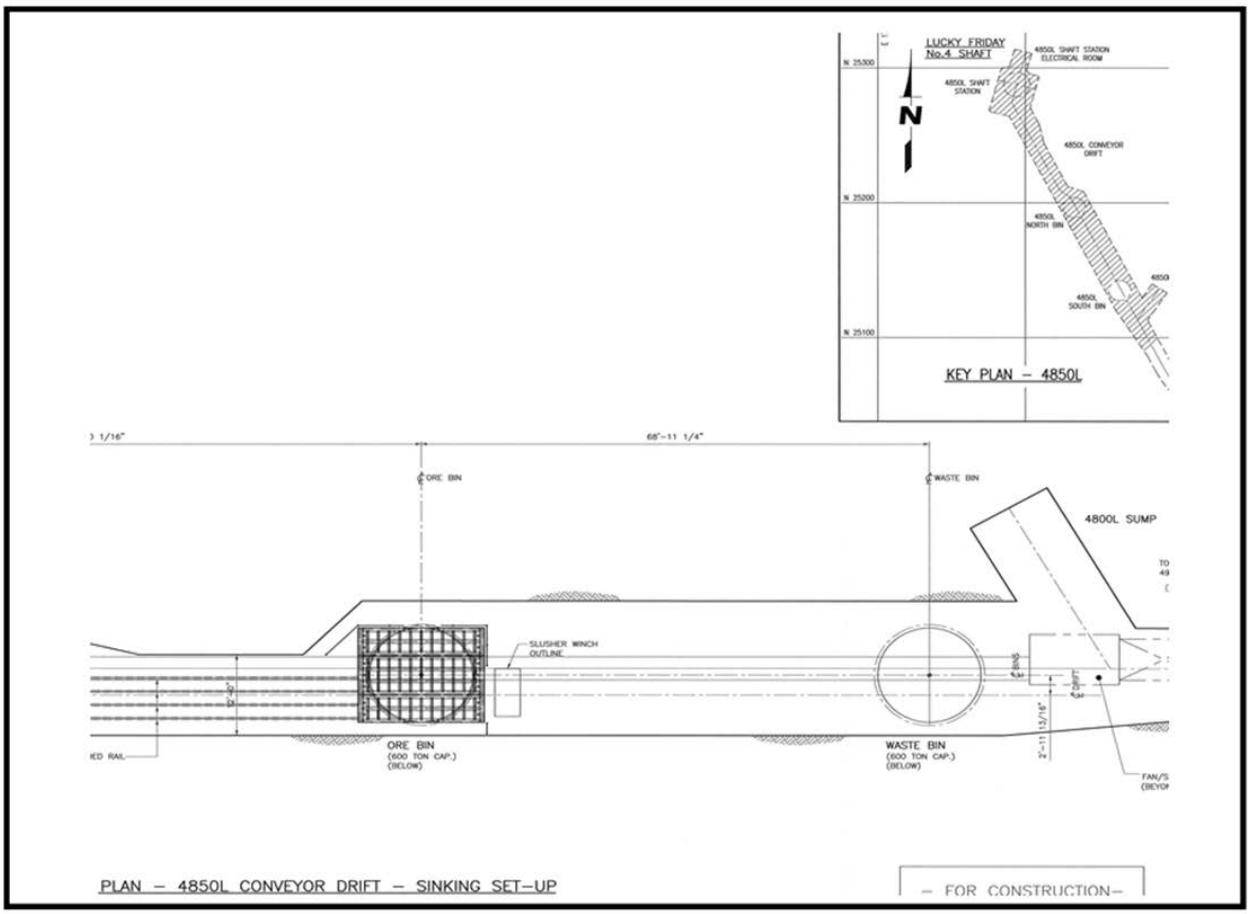


Figure 1 – Plan View of North (Ore) and South (Waste) Bins on 4850 Level

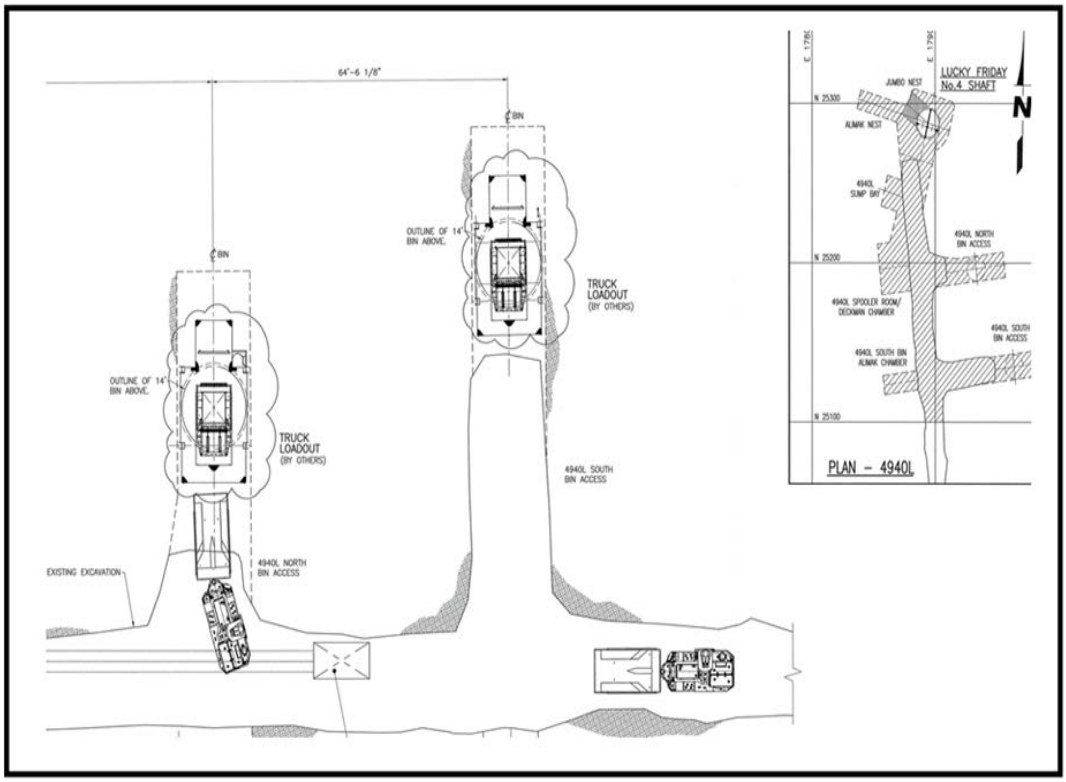


Figure 2 – Plan View of North (Ore) and South (Waste) Bins on 4940 Level

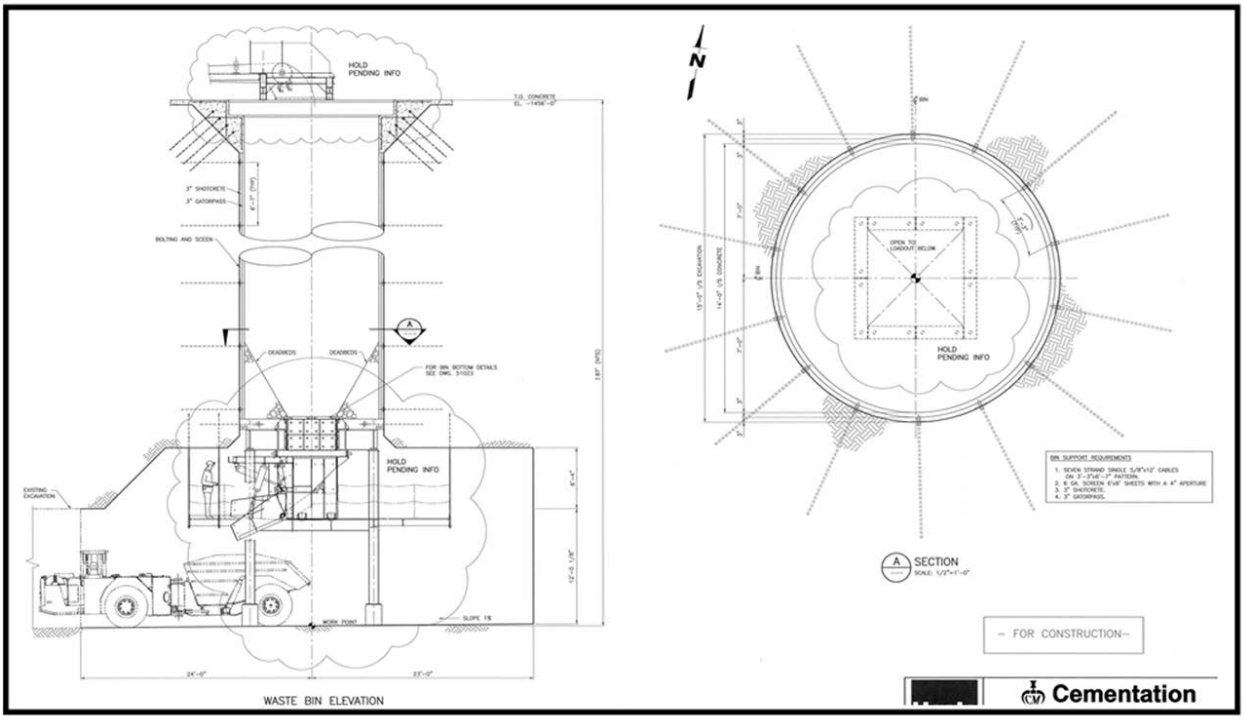


Figure 3 – Elevation and Section View of South (Waste) Bin Final Design Condition

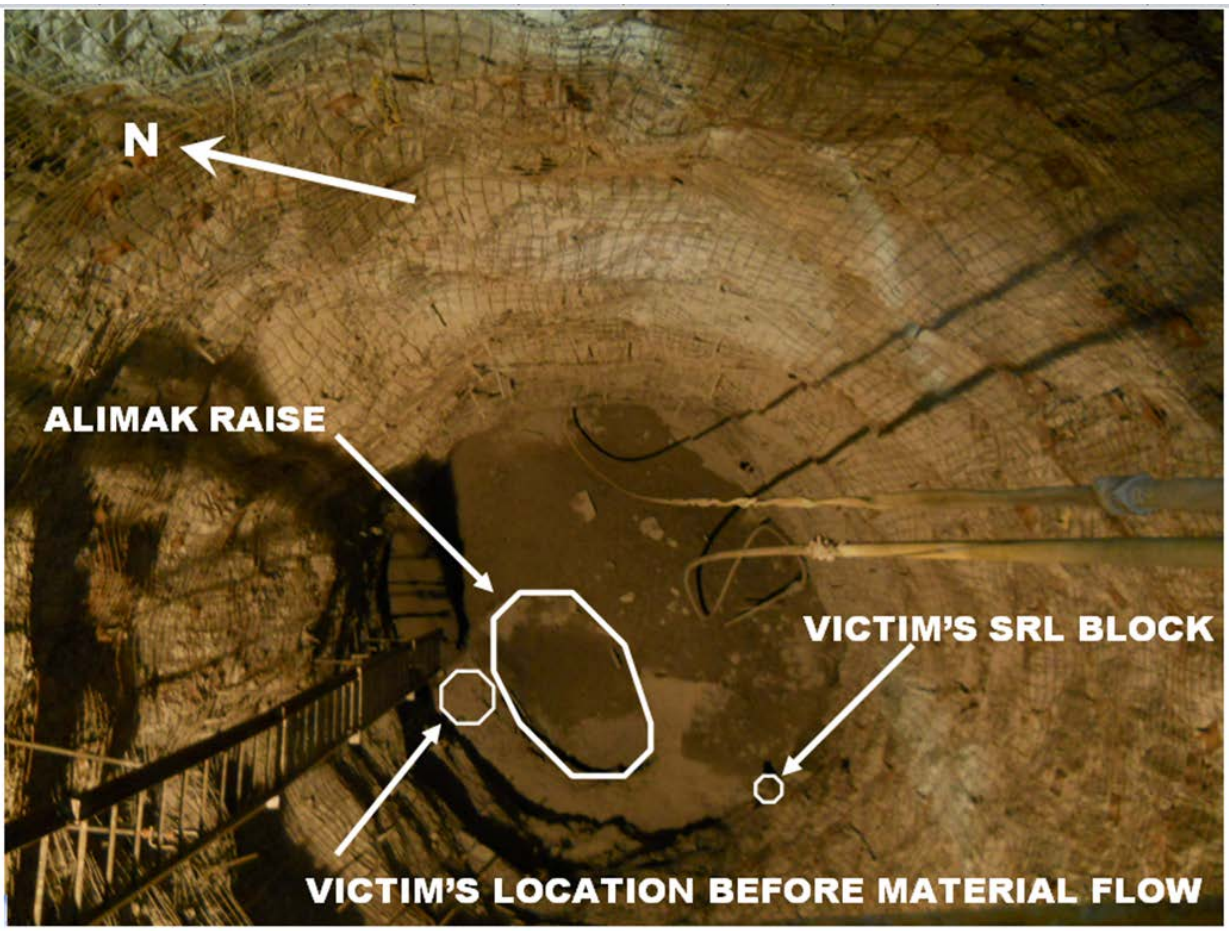


Figure 4 –View of South (Waste) Bin Looking Down from 4850 Level

APPENDIX C

Victim Data Sheet

Accident Investigation Data - Victim Information
Event Number: 1 1 5 8 0 7 7

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

Victim Information: 1

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:
Brandon L. Gray	*M*	*26*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 11/19/2011 b.Time: 1:21	*a. Date: 11/17/2011 b.Time: 22:00*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
080 Shaft material	*037 Working on hung material in bin const.*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*0*	*36*	*0*	b. Regular Job Title:	*0*	*36*	*0*	c: This Mine:	*0*	*36*	*0*	d. Total Mining:	*3*	*23*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
089 Broken rock	*110 Suffocation and Mechanical Compression*

13. Training Deficiencies
Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task: X

14. Company of Employment: (If different from production operator)
Cementation USA
Independent Contractor ID: (if applicable) *M445*

15. On-site Emergency Medical Treatment
Not Applicable: | First-Aid: | CPR: X | EMT: | Medical Professional: | None:

16. Part 50 Document Control Number: (form 7000-1) *220113320004*
17. Union Affiliation of Victim: *9999* *None (No Union Affiliation)*