# Report of Investigation Underground Metal Mine Fatal Fall of Materials Accident



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#### United States Department of Labor Mine Safety and Health Administration Metal and Nonmetal Mine Safety and Health

## ACCIDENT INVESTIGATION REPORT UNDERGROUND METAL MINE

## FATAL FALL OF MATERIALS ACCIDENT

## Mine ID 02-00152 Magma Mine Magma Copper Company Superior, Pinal County, Arizona

### August 10, 1993

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### SYNOPSIS

On August 10, 1993, at about 9:45 p.m., an ore pass raise collapsed at Magma Copper Company's Magma Mine while four persons were working inside. The fall of materials accident resulted in the deaths of four miners: Jeff S. Christiansen, Operations Tech I; John H. Dalton, Jr., Materials Handling Group Leader; Alfred D. Edwards, Materials Handling Team Leader; and Nicholas P. Truett, Support Tech III.

The accident occurred at the 865 Raise when the miners climbed into the manway compartment to free a hang-up of material in the ore pass side of the structure. Armored cribbing, dividing the manway and the adjoining ore pass compartments, dislodged and allowed ore, cribbing, and timber to fall into the manway striking and killing the four victims. The raise, which had been constructed by an independent contractor, Dynatec Mining Corporation, had been opened for production about six weeks before the accident. It was subsequently closed to repair damage from structural settlement and blasting, and then placed back in production the night before the accident.

The 865 Raise was designed as a timber-framed ground support structure comprised of two compartments, a manway and an ore pass. The raise was 364 feet high and framed with 10-inch by 10-inch timber. A single bearing set was hitched into the rock and encased in concrete at the bottom of the timber structure.

The 865 and two other raises had been designed to transfer ore, ventilate, and provide a secondary escapeway. During development of access drifts and a borehole for this project, loose and soft ground was encountered causing Magma to abandon plans for the three raises and to incorporate all three functions into a single raise, the 865.

The poor ground conditions causing the development problems were located near the site selected for the 865 Raise. Consequently, Magma said they designed the raise for adverse ground conditions. However, adverse ground was not encountered during development of the raise and the design was not modified to be appropriate for the ground in which the raise was developed.

About a month after the 865 Raise was first used for production and 12 days before the accident, 60 to 100 cubic yards of a water, sand, and cement mix, normally used for backfilling stopes in the mine, was dumped into the raise. Once the mix was in the raise, muck was not withdrawn from the raise for about 20 hours, allowing the cemented mix to set, forming a plug. As a result, hang-ups occurred in the ore pass compartment and Magma blasted the constriction in attempts to free the ore.

Six days after the mix was dumped, the 865 was closed to repair damage from the blasting and raise settlement. Inspections conducted by Magma and Dynatec revealed eight to ten inches of settlement from Set 8 through Set 20. There was joint separation, a broken divider plate, sheared blocking, loose and broken ladders, displaced landings, movement of the divider wall toward the manway, and divider cribbing and ore in the manway. Besides settlement, the cribbing in the manway was evidence that the divider posts were moving outward, away from one another. These conditions indicated that the raise was in a state of impending failure. The MSHA investigators determined that an imminent danger existed as defined in Section 3(j) of the Federal Mine Safety and Health Act of 1977.

The single bearing set at the bottom of the timbered structure bore the entire load of the raise, about a half million pounds, when the raise was empty. Although a number of repairs were effected, no effort was made to stop the settlement or correct the outward movement of the timber framework.

Magma decided that the raise be returned to service by midnight shift of August 8, 1993. The raise was placed back in production at some time during the evening shift of August 9. Magma began dumping in the raise as soon as it was available. Ore was pulled for the balance of this shift and through the succeeding shift without unusual incident. Dumping continued in the raise and ore was not pulled during day shift, August 10.

Ore was pulled during the evening shift and the raise was emptied to about Set 8 where it was reported to be hung-up. Two of the victims tried unsuccessfully to free the hang-up by blasting. They sought assistance from two supervisors who joined them later in the shift. When the four miners entered the raise, the ground support structure failed, fatally injuring them.

## **GENERAL INFORMATION**

The Magma Mine, an underground copper mine, owned and operated by Magma Copper Company, Superior Mining Division, was located approximately seven miles east of Superior, Pinal County, Arizona. Principal on-site operating officials were:

Douglas McGregor Steve Lautenschlaeger Richard Gresham General Manager Mine Manager Chief Engineer

The mine was operated three eight-hour shifts, seven days per week. At the time of the accident approximately 300 persons were employed, about 190 of whom worked underground.

The Magma Mine had a total of nine vertical shafts: One, Two, Seven, and Eight Shafts were inactive; Four and Six were ventilation exhaust shafts; and Three, Five, and Nine were used for production and transportation of personnel and supplies. Three and Nine Shafts were intake shafts. Nine Shaft was the primary entry and exit for the mine.

Ore was extracted from stopes on multiple levels using an underhand cut-and-fill mining method, called "drift and fill" by the company. Headings were driven with either jackleg or jumbo drills. After blasting, rounds were mucked out using load, haul and dump units (LHD).

The LHD's carried the ore by means of ramps from different levels of the mine and dumped it into transfer raises. A rail system collected the muck from the raises and transported it to the Nine Shaft transfer system. This system consisted of two parallel muck raises with multiple dump pockets for the LHD's on the 3000, 3400, 3500, 3600, 3700, and 3800 Levels. One dump pocket was located on the 4000 Level. A level was identified by the elevation difference in feet from the level to the One Shaft collar.

Pockets for loading the ore into production skips were located at the 3700 and 4100 Levels. The skips carried the ore to the 500 Level where it was transferred to underground rail cars, then transported about two miles to a surface milling facility.

The principal mineral produced from the Magma Mine was copper with byproducts of silver and gold.

# BACKGROUND

#### A. Recent Operating History of the Mine

Prior to ceasing production at the Magma Mine in 1982 because of low copper prices, Magma Copper Company was a subsidiary of Newmont Mining Corporation. From 1982 through 1985, a small maintenance crew pumped water and kept the mine available to reopen. The company decided to permanently abandon the operation in 1985 and removed pumps and electrical equipment. The mine was allowed to flood in 1986. Magma Copper Company separated itself from Newmont Mining Corporation about this time and became an independent entity.

During late 1988 and early 1989, Magma considered reopening the mine due to an increase in copper prices. For about two years, Magma hired a series of independent contractors to pump water from the mine and rehabilitate the shafts and underground workings.

The mine historically used relatively small stopes, short raises and a light rail system. While the mine was being restored, Magma developed plans to change the mine from a relatively localized mining system to an integrated operation that depended more on ramped access to stopes, centralized maintenance, and concentrated haulage. The new approach, referred to by Magma as the Ramp, Orepass, Rail, Shop (RORS) project would be composed of larger ore passes, heavier rail haulage, and a centralized shop.

Some mining activities were started on March 5, 1990, with activity gradually increasing. Ore was produced during the latter part of the year. On November 5, 1991, an underground fire interrupted mining for three to four weeks. Production resumed in December 1991 and continued until early January 1993.

During January and February 1993, heavy rains in the area caused excessive ground water to flow into the mine, reducing production as resources were diverted to cope with the water. Full production was resumed in March of 1993.

#### B. Mine Geology

Three partially replaced limestone beds, referred to by Magma as C, D and E ore bodies, were in production at the time of the accident. Replacement is a process of solution and deposition where a new mineral of differing chemical composition grows in the body of an old mineral. Limestone beds were the old mineral ore host rock in the Magma Mine. The C ore body represented about 90 per cent of the mine's reserves. Chalcopyrite was the dominant ore mineral of the replacement bodies and sometimes was accompanied by bornite. Hematite and pyrite were the most abundant gangue, or undesired, minerals. This series of limestone beds dipped approximately 30 degrees to the east. The primary C ore body was about 80 feet thick with a strike-line, or mineable length, of 200 to 300 feet varying at different horizons throughout the ore body.

The 865 Raise was driven adjacent to C bed through a sequence of horizontally layered or bedded dacite volcaniclastic rock. These rocks, originally volcanic, were very rapidly eroded and redeposited by sedimentary processes and are considered to be sedimentary beds.

The individual dacite layers were locally characterized:

- (a) by grain-size gradation from the bottom to the top of the bed;
- (b) by large size variations of volcanic rock fragments (clasts) occurring within a fine-grained to amorphous matrix of volcanic ash (a conglomerate); and
- (c) by the occurrence of hardened lens-like surfaces or partings occurring along bedding planes. Some of these hardened layers or surfaces may have been local layers of welded tuff. Samples were analyzed by x-ray diffraction and determined to be materials that should be found in a volcanic ash.

This cohesive rock mass was a well-indurated, structurally competent rock formation with no swelling, or squeezing, ground characteristics.

This rock formation occurred at the 865 Raise as a graben, a geological down-thrown block, between two nearly parallel major geologic structures - the North Boundary Fault and the South Boundary Fault. The North Boundary Fault struck east-northeast with a very steep south-southeast dip at current mining levels. This fault was located about 50 feet north of the 865 Raise on the 4000 Level and about 150 feet north on the 3763 Level.

The South Boundary Fault was located along the south side of this dacite graben.



Geologic Sketch of the 865 Raise Looking West

### C. Origins of the 865 Raise

The 865 Raise was a major element of the RORS project and was intended to complete development of the C bed ore body. Initial planning for RORS envisioned three separate borehole raises, the 895, 865, and 840, all terminating on the 4000 Level. The numbers identifying the raises are related to a mine grid used for surveying. Prior to developing the borehole raises, Magma needed access to the bottoms of the raises.



The 4000 Level

In early 1992, American Mine Services (AMS) contracted with Magma to drive drifts toward the raises to establish the necessary access. Magma planned one main haulage drift with a turnout creating two access drifts. Two sections of poor ground were encountered during this work: one was in the continuation of the main haulage; the other was the abandoned access drift. Ground conditions in parts of the new heading were characterized by Magma as "loose and soft" and required rockbolts, wire mesh, spiling, and shotcrete for support.

After the access drifts were driven in late spring, AMS was awarded another contract to drill the 895 borehole raise about 250 feet from the planned 865 borehole location. Matthew Kannegaard, Team Leader, was assigned by Magma to be the project coordinator. His responsibilities included coordinating project logistics and determining whether the contractor's work was acceptable.

AMS moved their drilling equipment to the mine site on April 20, 1992, set up on the 3700 Level at the 895 Station, and drilled a pilot hole to the 4000 Level. A pilot hole is a small hole drilled ahead of a full-sized, or larger, borehole. On May 27, an 8 foot reamer was installed on the drill and backreaming of the pilot hole began. On May 30, at 96 feet above the 4000 Level, the reamed hole began to cave. Drilling operations were terminated when the hole became choked with caved material.

On June 4, after unsuccessfully trying to free the reamer, Magma decided to abandon the 895 borehole because they believed the reamer was "...stuck in a mammoth cave." Over the next several months, AMS drove an inclined reamer recovery drift off the 865 access drift and reclaimed the reamer on September 28.

Between June and October of 1992, Magma abandoned the borehole raise concept because of the unanticipated adverse ground conditions at the 895 borehole and the 865 access drift. The company considered alternatives for

installing raises from the 4000 Level. A Magma memorandum, dated September 9, noted that "The [865] project team is currently preparing detailed engineering and project designs on the most cost effective ore pass [raise] development method." After the options were considered, the two-compartment, framed-timber raise design was adopted.

Members of Magma's 865 Raise project team were:

Steve Lautenschlaeger	Mine Manager
Richard Gresham	Chief Engineer
Thomas Fudge	Senior Mining Engineer
Dewayne Chambers	Development Group Leader
Johnie Brake	Construction Group Leader
John Tomerlin	Production Group Leader
John H. Dalton, Jr.	Materials Handling Group Leader
Matthew Kannegaard	Team Leader

According to Magma, all of the 865 Raise project team members had experience with smaller, timbered, multi-compartment vertical structures; however, with the exception of engineering classes attended by Fudge, Gresham and Lautenschlaeger, none of the members had any prior education or experience regarding the design, construction, installation or maintenance of a 364 foot, two compartment, armored crib raise structure such as the 865 Raise.

In the collective experience of MSHA's investigative team and other Agency professionals, the 865 Raise is unique in its scale and design. The vast majority of raises in American mines have single compartments and are smaller structures of less than 100 feet and supported by multiple bearing sets.

This design consolidated the planned boreholes for the 840, 865, and 895 Raises into one configuration. Magma believed this concept would give the mine, in addition to ore transfer capabilities, several benefits in one raise: ventilation, a second escapeway, and ground control. A November 4 Magma memorandum stated that "...a bid package is being prepared to complete this portion of the project [the 865 Raise] with conventional timber raise methods."

#### D. The 865 Raise

#### General

The MSHA accident investigation team could not physically enter the collapsed area of the 865 Raise because of the structure's unsafe condition and inaccessibility. Examinations of the failed area were by lowering a video camera into the raise.

The 865 Raise structure was composed of two-compartments, framed with heavy timber, and installed with the long axis at about 10 degrees from the vertical, angled toward the footwall. The excavation for the raise was designed to provide an opening approximately 10 feet by 20 feet. The raise structure was 364 feet high and connected the 4000 Level with the 3636 Level. An extension of the 865 had been started above the 3636 Level but had not broken through to the 3600 Level at the time of the accident.

The two compartments formed a rectangular structure comprised of an ore pass and manway. The ore pass compartment had inside dimensions of 6 feet by 8 feet. The manway compartment measured 6 feet by 6 feet inside and contained water and air lines, a vent pipe, a ladderway with landings, and a timber slide.

The compartments were formed by two interconnecting modified square sets using 10-inch by 10-inch square Douglas fir timber cut to Magma's specifications. The two side-by-side sets, comprising each unit of the raise structure, consisted of six vertical







Manway and Ore Pass Compartments with Divider Plates, Wall Plates and Posts

posts: a horizontal divider, two horizontal end plates, and two pairs of horizontal wall plates, one pair for the ore pass compartment and one pair for the manway compartment.

A set is a timber frame forming the sides of the raise structure and refers to each unit in the raise. A succession of sets, one on top of the other, form a complete ground support structure.

The manway was enclosed with 3 inch thick wooden lagging placed outside the timber framework. The armored cribbing formed the walls of the ore pass.



Typical 865 Corner and Center Friction Joints

Typically, the vertical spacing between each unit of manway and ore pass sets was 7 feet, 4 inches, center-to-center. The sets were interconnected at friction joints formed when the timbers met. These joints were comprised of daps, or sections of wood removed from the tops and bottoms of the ends of the 10 inch by 10 inch timbers. The remaining wood projection was referred to by Magma as a horn or tongue; another common term for the projection is a tenon.

Magma identified a location in the raise by counting sets upward from the bottom, or first set, of the structure. The ring of plates at the base of each set was used by Dynatec to identify a location in the raise. The bottom of Magma's Set 5 was referred to as Ring 5 by Dynatec.



Ore Pass and Manway Compartments

A Syntron vibratory feeder, supported by a steel beam structure, was located at the bottom of the raise. It was positioned above a haulage track and was used as an ore car loadout facility on the 4000 Level. The highest dump point into the 865 Raise was at the 3636 Level with intermediate dumps located at the 3700 and 3763 Levels. On August 10, Magma had only recently begun dumping into the raise on all three levels.

No mechanical fasteners such as lag bolts, plates, angle clips, tension rods, or drift pins were used in the 865 Raise framework to develop joint integrity and, therefore, the framework's structural integrity. Without fasteners, the joints were dependent on external blocking to hold them together and maintain their integrity.

Load calculations for the wooden structural members of the 865 Raise were not made by Magma when they designed the raise. Although some members of the 865 Project Team had work or design experience in smaller structures similar to the 865, none were experienced in the design of structures of this magnitude.

The post-accident MSHA investigation above the 3763 Level revealed that raise posts had moved outward and away from the ore pass compartment in portions of the raise that had been used for as little as 30 days.

#### **Bird Cages**

Magma referred to the 865 Raise as a "bird cage" design which they also characterized as an "experience-based design" used in other ore transfer raises at the mine. Within each set, a welded pair of vertical channel steel sections, or "bird cages," were nailed to the inside corners of the posts to act as receivers for the smaller, 6-inch by 8-inch crib timbers. The bird cages were 3-inch by 8-inch channel steel with a <sup>3</sup>/<sub>8</sub>-inch thick web and <sup>1</sup>/<sub>2</sub>-inch flanges. The crib timbers formed the walls or panels of each set. The timbers were not fastened in place, but were stacked one on top of another, typically lapping,



**Bird Cage and Divider Wall Detail** 

or extending, 2 inches inside each bird cage channel. The crib panels separated the ore pass from the manway compartment.

#### Blasting Windows/Dust Covers

Circular blasting windows were cut into the side skirts of the Syntron feeder trough. Blasting windows in the raise would have provided access to observe conditions, locate problems, and use explosives or other means to free ore pass compartment hangups. In Magma's 865

Raise design, crib timbers were placed inside the bird cages to form a panel. At the top of each panel, an opening or slot of about 2 inches was left between the top of the cribbing and the bottom of each divider plate. The raise design did not deliberately incorporate blast windows to observe, free or access ore pass hang-ups; however, these slots provided a convenient access to observe conditions and blast hang-ups. Access to the ore pass compartment was limited to approximately every seven vertical feet, the distance between sets.

As the raise was developed, project coordinator Kannegaard anticipated that dust and fragments of ore would migrate through the slots, at the top of each crib panel, into the manway compartment. To address this concern, Magma directed Dynatec to install a 1-inch by 10-inch by  $5\frac{1}{2}$ -foot board to the cribbing to cover each slot. Magma referred to the board as a dust cover. Kannegaard believed that the dust cover would be removed prior to blasting hang-ups or to observe ore pass conditions.

#### Blocking

Blocking was installed in the 865 Raise to prevent movement and maintain alignment of the structural timbers. Blocking, which included wood blocks, spacers, and pine wedges, was positioned between the ends of the plates and the surrounding rock. The amount of blocking used was determined by the amount of space between the plates and the rock.

Typically, a 12-inch wooden block was placed against a joint to form a 1-inch lap on the joint's posts. The block was placed with the grain vertical or parallel to the post. Pine wedging was used between the rock and the blocking to fill nonuniform spaces and tighten the blocking in position.

Blocking applies and absorbs load primarily in the plane of the wall plates. Any ability to resist vertical loads depends on the frictional forces between the blocking and the timber structure and the relative length versus depth of the blocking material. The orientation of the grain affects the ability of the wood to resist the load applied to the structure. Wood is several times stronger with a load applied parallel to the grain than when applied perpendicular to it.

Unless the ground is squeezing uniformly around the structure, the effects of timber drying, vibration, and impact can reduce the horizontal constraints imposed by the blocking and, therefore, loosen the blocking. Even in actively squeezing ground, the direction of forces is rarely uniform and can distort the structure, tightening joints in one direction, but loosening them in another. Consequently, care and attention is necessary during construction to ensure continued structural integrity.

The blocking behind the raise joints was photographed after the accident. These pictures are included in Appendix III, in Photographs 1 - 6, and provide examples of improperly installed blocking and crushed wedges. At some locations, blocks had split on one side, as depicted in Photograph 1. Photograph 2 shows overbreak, or blasting outside the intended line of excavation, and double blocking with numerous wedges and spacers installed to compensate for the additional space. Another example of stacked blocking and overbreak is shown in Photograph 3.

Photograph 4 shows two headers against the post at Ring 41 that are not wedged to keep the post from moving outward. The surface area of contact against the post is quite small. Any settling of the raise framework would dislodge the wedges and loosen the blocking unit. The two header boards positioned against the rock provide a flat bearing surface against the rock. If two wedges were opposed, the lower wedge would tighten with any downward movement.

Photograph 5 is a closeup of a wedged block where actual effective surface area was only through a single four-inch wedge.

Where large voids exist behind raise timbers, bridging may be used with blocking but the bridging timber should be braced against the rock where the force from the horizontal block is against the bridging. Photograph 6 depicts where a short block and wedges should have been used between the bridging and the rock wall. If force were exerted on the bridging it would bow out or crack the bridge timber.

#### Backfill

Backfill between the framework and the rock wall of the 865 Raise could have helped stabilize the timber structure and reduce outward movement of the structure as mined rock moved through the ore pass. The amount of structural stability that could be gained from backfill would depend on the particle size distribution of the material used and the method of placement.

The MSHA investigation and examination indicated that no attempts were made to backfill the structure except as an inadvertent result of raise development blasting. This backfill material was poorly sorted and contained chunks that could damage or dislodge blocking. It was randomly and non-uniformly placed, and contained many voids. Photographs 1 - 8, in Appendix III, depicts extensive voids where there was no backfill behind the framework. If the voids had been filled tightly with the sand-cement mixture used in the stopes, the horizontal loading would be distributed evenly from the timbered structure outward to the surrounding rock and the structure's stability would have been strengthened.

#### Armored Cribbing

The crib timber on all four walls of the ore pass compartment was armored, or faced, with 4-inch by 6-inch angle irons, <sup>3</sup>/<sub>6</sub>-inch thick, nailed to the tops of each crib timber. This armor provided greater strength and a wear surface for increased raise longevity. Some plates in the timber framework of the ore pass were also armored for wear protection.

During the February 1994 raise recovery, 22 pieces of armored cribbing were found, two of which were divider cribs having end chamfering and feathering. This indicated they had been forced out of the bird cage at the structure's hanging wall side. This would be a counter-clockwise rotation, looking down on the structure. With the posts in rotation, armored cribs came out of their position in the bird cage and fell into the manway allowing muck from the ore pass to enter the manway.

#### **Bearing Sets**

Bearing sets are periodic side wall anchorages created by using long plates as bearers "hitched" into the rock to transfer the weight of the framework above the bearing set to the rock. By choosing the location of bearing sets, the weight

of the structure is distributed in such a manner that allowable design stresses within the framework are never exceeded.

A single bearing set was provided in the 865 Raise and was located just above the Syntron feeder. The base of the first set, at Ring 1, was hitched into the rock with the entire set enclosed in concrete. MSHA's investigation and examination of the structure indicates that the lack of additional bearing sets allowed timber strengths to be exceeded. This overload caused cracking of the posts and wall plates and structural settlement which, in turn, caused distortion and separation of the timber framework as shown in Photographs 9-11 in Appendix III. Consequently, as a result of the separation, portions of the divider wall, between the manway and ore pass, fell into the manway allowing ore to enter the manway compartment.

### E. Significant Events Leading Up To The Accident

#### December, 1992

Bids for the 865 Raise were let in November 1992 and four independent contractors bid on the project. The four were: American Mine Services (AMS); J.S. Redpath Corporation (Redpath); CWM, Inc.; and Dynatec Mining Corporation (Dynatec).

On December 14, Magma Senior Mining Engineer Thomas Fudge, met with officials from Dynatec in Denver, Colorado. During this visit a number of items relating to the 865 Raise were reviewed including: (a) the geologic cross-section of the raise; (b) the area covered by Dynatec during their earlier site evaluation; (c) the summary of geologic mapping in the 3638 ramp; and (d) Dynatec's ground condition expectations and control plans. Fudge's notes from that meeting indicated that he informed Dynatec to "...expect some gouge, slips and blocky ground. Not prepared for totally unconsolidated conglomerate.[sic] Control plans include bolts, mats, and adjusting size of pilot excavation."

These notes also indicated that Matthew Kannegaard would be the project coordinator and would report to Fudge, the project facilitator. Kannegaard would be responsible for coordinating project logistics and accepting the contractor's work as he was with AMS during its earlier work at the mine. Finally, the notes stated that Fudge, Group Leader Dewayne Chambers and three unnamed team leaders would take an active role in project inspection and that "...all involved [in the project] will be educated on project scope and inspection requirements."

On December 29, the 865 Raise contract was awarded to Dynatec. The scope of the agreement included:

- a) The installation of 90-pound, 36-inch gauge rail [railroad track] on the 4000 Level;
- b) The installation of a Sanford Day car dump on the 4000 Level;
- c) The excavation and installation of an orepass loading station on the4000 Level; and
- d) The excavation and installation of an armored crib, timbered ore pass from the 4000 to the 3636 Levels.

The Magma/Dynatec contract also provided for the following services and supplies:

#### Magma:

- a) All construction materials;
- b) All consumables required for construction;
- c) Ventilation and dewatering systems;
- d) Compressed air, water, power and other utilities;
- e) Sanitary facilities;
- f) Necessary access and transport of personnel, equipment and materials between the surface and the 4000 Level station;
- g) Use of the mine dry and caplamps;
- h) Technical and surveying services;
- i) Office space and phone; and
- j) Use of certain locomotives and specialized haulage cars.

#### Dynatec:

- a) All labor and supervision to complete the project;
- b) All tools and equipment necessary to complete the project except those specified to be provided by Magma;
- c) General office supplies and equipment;
- d) Safety program for all contractor employees, including mandatory safety training; and
- e) Two week work plan updated weekly.

Some of the 865 Raise design prints provided to Dynatec have "MK" on them, indicating that Matthew Kannegaard initialed them. Other prints furnished to Dynatec have no initials or signature. These prints did not have a registered professional engineer stamp or signature on them.

#### January 1993

All four contractors who were given an opportunity to bid on the project submitted alternative raise excavation and installation plans that differed from Magma's design concept. Of significance are the two Dynatec alternative proposals. On January 4, Dynatec forwarded its first alternative plan to Magma. Their plan proposed developing the 865 Raise with a pilot raise excavated from the bottom up either by backreaming or conventional drilling and blasting. The pilot raise would then be opened out, or slashed, to a nominal twelve-foot diameter and an eleven-foot diameter steel liner installed. A partition would be installed slightly off center. Dynatec further proposed that a sand/cement backfill be placed as tightly as practicable behind the liner with concrete bearers poured at the bottom and midpoint breakthrough of the raise.

Magma rejected Dynatec's proposal, saying that "...development of the raise with a pilot hole was too risky given the failure of the 895 bore hole..." Further, Magma said they were concerned that "...use of such (liner) plate had been previously tried at Superior with unacceptable results..." and that the proposal did not satisfactorily address a raise manway design.

On January 19, Dynatec proposed a second alternative plan to Magma. This new plan proposed: (a) driving a smaller cribbed raise; (b) slashing into this pilot raise; (c) installing sets, as originally specified, and using hanging rods for support; (d) installing a bearing set just below the top of the raise; and (e) installing six additional bearing sets at various locations in the raise "...at no extra charge to Magma."

On January 21, Fudge and Kannegaard recommended approval of the new plan in a memorandum to Mine Manager Steve Lautenschlaeger. Their reasons for approving the Dynatec alternative plan for the 865 Raise installation included:

a) improved safety;

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- b) less potential for bad ground delay;
- c) better finished product;
- d) scheduled completion date of the raise would be moved forward at least three weeks; and
- e) material costs were about the same.

However, Magma ultimately rejected this plan citing Dynatec's inability to satisfy team members that the raise could be successfully driven and Dynatec's failure to "...adequately address concerns about the man-way bulkhead, ventilation and ground control in...areas similar to those that precipitated the collapse of the 895 borehole." Magma also noted that "...should the pilot raise suggested...hang-up during slashing, the success of the entire ore pass would be in jeopardy because there would be no safe manner in which to free the hang."

Meanwhile, Dynatec moved their equipment on-site and began work on the 4000 Level. When work began on the 4000, Kannegaard said he inspected the work site approximately two to three times each week between January and August 10. He estimated that he spent between fifteen to twenty hours each week conducting these inspections. Additionally, Fudge, who described himself as the lead agent or project facilitator for the 865 Raise project, estimated that he visited the work site one to three times each week during this same time period. Fudge spent an average of one to two hours each visit taking measurements, making observations, and adjusting or correcting plan specifications.

#### February - April 1993

On February 11, excavation for the 865 loading station and the Syntron feeder began with about half the excavation completed by the end of the month. On March 26, excavation of the station was completed. Meanwhile, between March 17 through 24, a pilot hole for the 865 Raise was drilled from the 3700 to the 4000 Level. About one week later, a second pilot hole for the raise was drilled from the 3636 to the 3700 Level. On March 31, Dynatec began driving the 865.

#### May 5, 1993

Because of blasting damage to a different armored crib timbered ore pass raise in the mine, Magma Group Leaders John Tomerlin, Dewayne Chambers, John H. Dalton, Jr., and Johnie Brake issued the following memorandum to team leaders and team members involved in underground blasting operations:

Effective immediately a Team Leader must be present when a crib raise hang-up is blasted. We are experiencing a lot of chute damage by improper blasting cribbed chutes.

#### <u>June 25 - 29, 1993</u>

On June 25, Mark Spaulding, Dynatec's Job Superintendent, trained Magma material handler Mary McConnel in operating the 865 Syntron feeder. On June 29, McConnel trained her partner, Christopher Allison, in the feeder's operating procedures. Magma did not produce documentation or evidence indicating that material handlers Jeff S. Christiansen or Nicholas P. Truett had received training in these operating procedures prior to being assigned work duties at the 865 Raise.

Additionally, the material handling crews (Allison, McConnel, Truett and Christiansen) were responsible for making safety inspections of the 865 Raise working places. During the period June 28 through August 10, their daily seven-point safety sheets did not detail whether raise ground conditions, blocking, backfill, or the raise's structural stability were evaluated or inspected. These crews were among the least experienced miners at the Magma Mine and had little, if any, raise inspection or construction experience. Magma team leaders' reports for this same period also did not note whether inspections were conducted of working places or ground conditions in the 865 Raise.

On June 25, the raise from the 3763 intermediate dumping site to the 4000 Level was turned over to Magma. However, ore was not pulled from the raise until June 28, "C" shift, when 23 ore cars were withdrawn. Thereafter, the 865 Raise was jointly used by Magma and Dynatec; while Magma dumped ore into the 3763 grizzly, Dynatec continued driving the raise above the 3763 to the 3636 Level.

Near the end of June, Magma Safety Supervisor Gene Halsey made an inspection of the 865 Raise and observed some loose ground which he asked Dynatec to scale down. Halsey said he never looked at raise blocking, cribbing or backfill during his inspection. Additionally, during the period April through August 10, Safety Manager Kelly Stolp made several attempts to inspect the raise. Stolp was unsuccessful in these tries due to, in his words, "...unsafe conditions as they [Dynatec] were cleaning down, I could not climb the raise at that time and would have had an hour and a half wait to climb the raise to inspect it..."

#### June 29 - July 28, 1993

Beginning on June 29 and continuing through July 28, ore was pulled from the 865 Raise, one shift each day, by a Magma material handling crew. For the period June 28 through July 11, timbers and boulders were sometimes hung-up in the 865 Syntron feeder chute and chute door. During this time, the crews used explosives on at least seven different occasions to blast the hung-up timbers and rocks blocking the feeder. McConnel and Allison said Group Leader John H. Dalton Jr., and Team Leader Craig Dahlstrand assisted them with hang-up blasts at the Syntron feeder during this period. Dynatec's Spaulding also assisted McConnel and Allison on at least one occasion, between July 1 and August 2, with blasting a hang-up at the Syntron feeder chute.

Approximately 706 cars of ore, at an estimated 5.1 yards each, was pulled from the raise between July 11 and July 28. There were no hang-ups blasted in the raise during this period and up to 112 cars were loaded during a single shift. During this 18 day period, ore was transferred through the raise without any significant problems.

On July 12, a memorandum from Kannegaard to Magma Chief Engineer Richard Gresham noted that a change order had been written and approved during June for the 865 Raise to be extended from the 3636 to the 3600 Level.

On July 28, "B" shift, 80 cars of ore were pulled from the 865 and two cars of water and muck were pulled from the raise by the materials handling crew.

#### July 29, 1993

On "A" shift, William Purcella, Magma LHD Operator, dumped thirty to fifty LHD buckets of sandfill, from the 16 panel 3733 extension stope, into the 865 Raise at the 3763 dump site as instructed by Group Leader Dalton. Sandfill is a hydraulic slurry consisting of cement and mill sand used in the stopes for backfilling. A material handling crew did not pull ore from the raise this shift.

On "B" shift, the material handling crew reported pulling 14 cars of ore and believed the raise was empty. They completed the shift hand mucking wet ore from around the Syntron feeder loadout station.

#### July 30, 1993

A material handling crew did not work at the 865 Raise on "A" shift. Beginning on "B" shift, blasting of ore pass hang-ups in the raise began on a continuing basis with between twelve and fourteen blasts occurring through August 3. Material handlers McConnel and Allison loaded 14 cars of ore before the raise hung-up. With assistance from Team Leader Dahlstrand, they blasted the hang-up in the raise three times. After the first blast, Allison said he saw a cracked divider deflected into the manway about 1<sup>1</sup>/<sub>2</sub> inches at Set 8, approximately 60 feet above the Syntron feeder. Blasting was done with emulsion and capped safety fuse with the exception of the first blast which also used detonating cord. Allison and McConnel's safety report noted that the raise was still hung-up at the end of the shift.

#### July 31 - August 1, 1993

On "A" shift, Team Leader Alfred D. Edwards assigned Operation Techs Joseph Elledge and Dusty Sanson to blast the hang-up remaining from "B" shift, July 30. The regular material handling crew of Jeff S. Christiansen and Nicholas P. Truett were scheduled to be off from work.

According to Elledge, he and Sanson placed the explosive charge of emulsion and capped safety fuse through the two inch slot at the top of the raise cribbing, at about Set 11 or 12, where they believed the hang-up was located. Elledge waited about 10 minutes while Sanson climbed the manway to guard the 3763 entrance before igniting the fuse. Elledge said he was unaware if the other dumping site at the 3700 Level was being used while hang-up blasting was occurring. The hang-up was blasted two to four times with about ten to twelve feet of material freed. At the end of the shift the raise still hung-up.

Work was not performed at the raise on "B" and "C" shifts, July 31, nor on any of the three shifts, August 1, because the material handling crews were scheduled to be off work.

#### August 2, 1993

On "A" shift, the Magma crew pulled 28 cars of ore and noted that the raise was either empty or hung-up. They went on to finish the shift on the 3000 Level performing other duties.

On "B" shift, Dahlstrand's crew said they were told by Edwards that the raise was "muck-bound" and hung-up at the 3700 or 3800 Level. Allison and McConnel pulled 11 ore cars from the raise during the shift and, with Dahlstrand's assistance, blasted the hang-up twice using emulsion explosive and capped safety fuse.

Immediately prior to each of these two hang-up blasts, Dahlstrand sent McConnel or Allison up the manway about six sets (45 feet) above the blast area to guard the manway. McConnel later said rocks and dirt flew around her when the blast went off. Allison also said the cracked divider, from July 30, that had deflected into the manway at Set 8, was still damaged. The raise was still hung-up at the end of the shift.

#### August 3, 1993

On "A" shift, Spaulding was told by Kannegaard that Magma miners had dumped cemented sandfill down the 865 Raise causing hang-ups which the Magma crews were blasting. This sandfill referred to Purcella's dumping material into the raise on July 29. Spaulding went to the raise to assist material handlers Christiansen and Troy Murphy, substituting for Truett, to blast the hang-up. He helped them blast twice at the Syntron feeder deck using emulsion explosive, capped safety fuse and detonating cord. Spaulding also confirmed that there was a sandbank at about Set 11 which he believed was causing the hang-up. Spaulding said he left the area after the second blast.

After Spaulding left, Murphy and Christiansen pulled about ten cars of ore before the raise hung-up again. According to Murphy, the two miners called Team Leader Edwards on the mine phone to ask for instructions regarding the hang-up. Murphy said Edwards told them to proceed with blasting the raise hang-up. The two miners then went to the 4000 Level auxiliary explosives magazine and obtained explosive materials.

Returning from the magazine, the two miners climbed 50 to 60 feet up the 865 manway. Murphy and Christiansen asked the two Dynatec miners working in the raise to go to the Syntron feeder deck so they could blast the hang-up. Murphy said he and Christiansen spent about 45 minutes blowing a hole into the packed ore with an air lance, a blow pipe attached to the mine's compressed air system, so they could place the explosives charge.

After the charge was placed, Christiansen ignited the fuse and climbed the raise to guard the blast area. Christiansen used fuse, detonating cord, and an emulsion

explosive for this blast. Murphy guarded the 4000 Level. Murphy could not confirm whether dumping of ore in the upper levels was taking place or had stopped while this hang-up blasting was occurring.

After the blast, Murphy waited a few minutes for the dust to clear and Christiansen came down the manway. He and Christiansen pulled several cars of ore from the raise before the ore flow stopped. At the end of the shift, they told the on-coming crew that the raise was still hung-up.

It is not known when Dahlstrand or his crew notified Group Leader Dalton about the cracked divider at Set 8, but by "B" shift August 3, Dynatec Lead Miner Douglas Massey had learned of the cracked divider from Dalton.

Early on "B" shift, August 3, Massey took William G. Wilson, a new Dynatec lead miner, on a familiarization tour of the 3800 Level. Massey related to Wilson that Dalton had told him ore was coming into the 865 Raise manway compartment. According to Wilson, Massey wanted to see the damage first-hand. Wilson waited outside the raise at the 3763 Level while Massey climbed down the raise. He came out about five minutes later and told Wilson the raise timber had moved eight to ten inches. Massey reported his observations to Dalton and later called Mark Spaulding at home to describe the problem to him.

Prior to this shift, Team Leaders Dahlstrand and Joseph Giarrizzo discussed closing the 865 dump points because Dahlstrand's materials handling crew might be blasting the raise if it was hung-up.

McConnel and Allison went to the 865 Raise and tried to pull ore but the raise would not flow and they concluded it was hung-up. According to Allison, they climbed the raise, looking through the slots until they found the hang-up at Set 8. After climbing back down the manway, Allison called Dahlstrand and told him they needed assistance with the hang-up.

Prior to Dahlstrand's arrival, McConnel and Allison went to the auxiliary explosives magazine on the 4000 Level and obtained one capped safety fuse and ½ stick of emulsion explosive. They carried the explosive materials back to the raise and waited for Dahlstrand. After Dahlstrand arrived, Giarrizzo was notified that the raise was hung-up and that dumping locations needed to be shut down before the raise was blasted. Giarrizzo directed Operations Tech Merryl Coleman to cover the grizzlies at the 3763 and 3700 dumps and to place barrier tape around each site. Giarrizzo hung signs saying "Danger - Do Not Dump In Ore Pass" at the two operating dump sites and assigned Operations Tech Cal Bryant to guard the 3763 Level dump and manway access.

The three Magma personnel, Dahlstrand, McConnel, and Allison, climbed the manway to about Set 9, which according to Allison "...was the only place we could...manage to get a stick...between the cribbing and the divider (plate)."

The crew blasted the hung-up 865 Raise at least six times during this shift. According to all three personnel, the raise was blasted four times from the raise manway compartment at about Sets 9 and 12. When freed material fell down the ore pass compartment, the crew moved to the bottom of the raise and blasted twice more at the Syntron feeder deck using  $\frac{1}{2}$  to 1 stick of emulsion explosive for each blast.

Dahlstrand, McConnel and Allison later acknowledged that a 10 inch divider plate was broken, at about Set 8, during their blasting activities. Allison also reported seeing rocks coming down the raise manway. McConnel and Allison's safety report for this shift described the 865 Raise manway as "BO" ("bad order" or not working). The Dynatec shift report filled out by Massey also indicated the raise had "BO" crib and dividers from blasting hang-ups. The raise was noted as still hung-up at the end of the shift.

#### <u>August 4, 1993</u>

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As a result of Massey's call the previous night, Spaulding and Dynatec miner Tony Contreras made an inspection of the 865 Raise, from the 3763 to the 4000 Levels, during the early part of "A" shift. During that inspection, Spaulding noted that raise sets had settled about eight to ten inches from the original installation. They also observed ore in the manway and two pieces of armored cribbing missing at Set 20. Spaulding said he and Contreras thought "...the raise was unsafe for travel."

Early the same day, Lautenschlaeger, Dalton, and Chambers told Kannegaard about the Magma crew damaging the raise the previous night. Kannegaard said Chambers told him there was a broken divider at Set 8 and asked him to look at it.

Kannegaard went to the raise and entered the manway at the 3763 Level. He climbed down the manway and inspected the raise as he descended. At Set 20, he observed two pieces of armored cribbing lying in the manway. Kannegaard said he thought the cribbing was there because the hanging wall plate had shifted toward the wall an inch or two, allowing the cribbing to come out. He also saw muck and material in the manway and became concerned about climbing below that point. Kannegaard climbed back out of the raise and proceeded to the 4000 Level where he met Spaulding. The two climbed up the raise to Set 8 where the divider plate had been reported as broken.

Here they found a number of burned safety fuses, a partial stick of emulsion explosive, emulsion explosive wrappers, and a broken divider plate. Kannegaard and Spaulding also saw a twelve inch by twelve inch block which Spaulding characterized as sheared. They climbed to Set 9, then stopped because of their concern that the material above could fall on them. They found more spent safety fuses draped across the manway ladder at this location. Both men, as a result of their inspection, believed that the 865 Raise had suffered blast damage.

Spaulding, Wilson, and Massey said, that between Sets 8 and 20, they observed the raise sloping 8 to 10 inches toward the ore pass indicating the ore pass side had moved, or settled, downward. Spaulding said Kannegaard told him that he and Magma believed settling of the structure for a full raise set, or  $7\frac{1}{2}$  feet, was acceptable. To Spaulding, Kannegaard's estimate "...sounded like a total disaster to me, at the time." Manway ladders in the raise were also broken, apparently as another result of the structural settling.

Dynatec Lead Miner Ronald Spry also made an inspection of the 865 Raise sometime on August 4 and saw "...over a hundred and some feet of sandfill..." in the ore pass compartment. He thought that Dahlstrand's crew had gotten part of the hang-up down during their blasting because the sandfill hang-up, or plug, had detached into two separate pieces. One plug remained at about Set 20 and the other obstruction had dropped 40 or 50 feet down the ore pass before it had hung-up again. Spry believed that the force of the lower hang-up falling, and then stopping, caused the center part of the raise to settle about eight to ten inches. In the lower raise sets Spry saw a number of crushed horns and believed these were the result of the hang-up falling and abruptly stopping.

Spry also said he saw evidence of blast damage at Set 20 because the two pieces of armored divider cribbing lying in the manway were blackened.

While these inspections were being conducted by Magma and Dynatec, Edward's materials handling crew pulled 40 cars of ore from the raise and then performed miscellaneous duties on the 4000 and 3600 Levels.

Based on the blasting damage and structural settling observed during these inspections, Magma decided to close the 865 Raise sometime during "A" shift, August 4. Kannegaard told Dynatec's Mark Spaulding to start repairing the raise. Dynatec promptly taped off all dumping points and boarded over the grizzlies prior to starting the repairs.

As repairs began, Dahlstrand's crew was at the 865 Raise and reported water coming down the manway. They did not pull ore but performed other duties on the 4000 Level for the remainder of the shift. The crew also moved the 4000 Level auxiliary explosives (detonator) magazine to the 3700 Level.

On "B" shift, Dynatec's Wilson was supervising the raise repair work from the 3763 to the 4000 Levels. He saw bowed timber, separation of the posts from the plates, landings misaligned, and manway ladders shifted sideways. Two pieces of cribbing had been removed from the bird cage and he looked up the raise from about Set 11. Wilson saw a large amount of cemented sandfill which created "...a big belly on the hanging wall..." of the ore pass compartment.

During the shift, Wilson's crew removed the dust covers from the crib slots, from Sets 8 through 11, and air lanced a hole into the hung-up mixture of cemented sandfill and packed ore. Wilson said they used <sup>1</sup>/<sub>2</sub> stick of emulsion explosive for each of the six blasts conducted to knock down the packed muck.

#### August 5, 1993

On "A" shift, Magma's Kannegaard and Thomas Fudge inspected the 865 Raise from the 3763 to the 4000 Levels. As a result of that inspection, Fudge concurred with the previous assessments that blasting had damaged the divider at Set 8. He also said he observed "...some settling of the timber...[and that the]...Set 21 and 20 area did show some signs of elongation or separation." Fudge went on to specify that by elongation or separation he meant "...there had been some settling of the ore pass where you could see the...post from the set below was starting to possibly separate itself from the wall plates and end plates up above. And our [Magma's] only concern there was...making sure that the cribbing was well keyed in to the bird cage...We didn't want any settling there to give that stuff [the crib] any chance to slide up and out."

According to Kannegaard, he and Fudge wrote a memorandum the same day officially closing the 865 Raise for repairs. The memorandum was posted on the mine bulletin board and stated, in part:

Due to some structural settling, 865 has been closed and should not be used. It will take several days to stabilize the raise and return it to operation.

Dynatec will be doing the following:

- 1) Removing sandfill banks in the muck compartment
- 2) Clean down manway
- 3) Install spreaders under all short manway wallplates
- 4) Finish closing all blow pipe windows
- 5) Stabilize broken divider #8
- 6) Repair broken ladders
- 7) Secure ladders to wallplates
- 8) Shotcrete at #20 and #21 hanging wall wallplates
- 9) Close windows at #8 and #21

Return to service on C-Shift Monday, August 8, 1993.

The shotcreting at Sets 20 and 21 was to, in Fudge's words, key in or hold the sets together. The structural settling of the 865 Raise was not addressed during the Magma assigned repairs of August 4 through 9.

#### August 6, 1993

A Magma memorandum noted that the raise had reached the 3636 Level at the end of July and that the top grizzly was installed at the dump site. The memorandum also noted that Dynatec had started to excavate the short extension raise from the 3636 to 3600 Levels and when this section was completed ore train usage on the 3600 Level would be reduced by 50%.

Also on this day, Spaulding and Ronald Spry attended a going away breakfast for Dynatec's Douglas Massey. Attending the meal were Spry, Spaulding, Massey, Kannegaard and Fudge. During the breakfast, Spry and Spaulding told Fudge and Kannegaard that further hang-up blasting in the 865 Raise, without the installation of load bearing sets in the raise, would cause the structure to fail. According to Spaulding and Spry, Kannegaard and Fudge agreed to limit blasting ore pass hang-ups except as a last resort. Both Fudge and Kannegaard deny they were told the raise would fail if further hang-up blasting was done. Spry and Spaulding also said that Kannegaard indicated he would inform Magma's group leaders that hang-up blasting was not to be done except as a last resort.

At about this same time, Kannegaard said he told Group Leader Dalton that the 865 Raise material handling crews should use air lances or sledge hammers as the preferred method of freeing hang-ups. According to Kannegaard, Dalton said he would see that his crews knew of the procedures.

Meanwhile, the Dynatec repairs continued in the 865 Raise on both "A" and "B" shifts, August 6. The packed muck, restricting passage in the ore pass compartment, was removed with explosives. The Magma material handlers did not work around the raise either of these shifts.

#### August 7-8, 1993

The Magma material handling crews did not work at the 865 Raise during this period. The Dynatec repair crew worked only day shift in the raise and blasting activities did not occur. Their work consisted of shotcreting at Sets 20 and 21 and repairing and cleaning raise landings.

#### August 9, 1993

No work was done at the 865 Raise by Magma crews on "A" shift. One Dynatec crew continued repairs on the raise during this shift and on "B" shift, the assigned repairs were nearly completed. While Wilson had concerns with the repairs, he had been instructed by Spaulding to release the raise to Magma once the repairs were finished. Wilson turned the raise over to Magma in the middle of the shift

and twelve cars of ore were pulled from the raise by Team Leader Edward's crew before the shift ended.

On "C" shift, 81 ore cars were pulled from the raise by McConnel and Allison. Allison said they left the raise empty at the end of the shift.

# DAY OF THE ACCIDENT

Dalton, Edwards, and material handlers Jeff S. Christiansen and Nicholas P. Truett, began "B" shift, August 10, by participating in a team meeting that lasted from 3:00 p.m., until approximately 5:00 p.m.

While the Magma crew was in this meeting, Dynatec Lead Miner Wilson made assignments to his crew of miners: Leo Ybarra and Abraham Donlin were to drill, blast and install timber sets for the 865 extension raise at the 3636 Level; Ernest Villaverde was to repair the Syntron feeder decking while Jose Castenada and Nathan Spry were to install spreaders and repair loose or broken ladders in the 865 Raise manway compartment.

After their meeting, Edwards and his crew went underground. Edwards left the mancage at the 3600 Level and walked down the ramp to the 3800 looking for a LHD. Truett and Christiansen proceeded to the 4000 Level to remove ore from the 865 Raise and transport it to the dump pocket.

Christiansen and Truett loaded ore into rail cars until about 6:00 p.m., when the raise hung-up. After Christiansen climbed the manway and unsuccessfully air lanced the hang-up, he descended back to the feeder deck and told Villaverde he was going to call for instructions.

Christiansen and Truett were next seen at Nine Shaft talking to Edwards and soon afterwards returned to the raise. Christiansen was seen carrying a capped safety fuse and one stick of emulsion explosive in his hands. Villaverde told Christiansen and Truett that Nathan Spry and Castaneda were working in the raise manway.

At about 6:30 p.m., Christiansen and Truett placed the explosive materials at about Set 11. Christiansen climbed up to Set 14 and told Spry and Castenada of the impending blast. As the Dynatec miners climbed down the manway, they encountered Truett. Spry asked Truett who gave them permission to blast the hang-up. Truett replied they had permission.

At about this time, while the Magma and Dynatec personnel were still in the raise, Wilson arrived at the 865 Raise. He learned from Villaverde that the two Magma miners were in the manway preparing to blast an ore pass hang-up. Wilson was upset and understood from Spaulding and Spry that there was to be no more hang-up blasting in the raise. Wilson climbed up the manway and met Spry and Castenada about two sets up. He told them to get out of the raise if Magma was going to blast a hang-up. Wilson then left for the 4000 Station.

Meanwhile, William Purcella and Jose Valdez, two Magma LHD Operators, were hauling ore from nearby stopes and dumping it into the raise at the 3763 grizzly. Material was also being dumped into the two upper level dump points of the raise.
When Wilson returned to the 4000 Station, he met Edwards getting off Nine Shaft mancage. Wilson asked Edwards if he was aware that Christiansen and Truett were blasting the 865 hang-up. According to Wilson, Edwards replied he knew of the blasting. Wilson said he told Edwards that he understood there was to be no more blasting in the raise. Wilson said that Edwards replied, "Well, there is."

Wilson boarded the mancage and returned to the 3600 Level to assist Ybarra and Donlin with their work at the top of the 865 Raise. It is unknown where Edwards went between this time, 6:30 p.m., and about 7:35 p.m.

Meanwhile, Truett left the raise and walked down the drift to guard the blast area, taking Villaverde, Spry and Castaneda with him. Christiansen, at about Set 11, ignited the safety fuse and climbed up the manway to guard against someone descending into the blast area.

After the hang-up blast, the four miners returned to the Syntron feeder deck and Christiansen climbed down from the manway compartment. Castenada and Spry assisted Villaverde with the Syntron feeder decking and did not go back into the manway.

Between 7:00 p.m. and 7:30 p.m., Dalton was seen on the 3000 Level by 81 Winze hoist operator James Mendoza. Dalton was taking carbon monoxide samples in the mine with a hand-held gas detector. Dalton told Mendoza he had to take the readings on the 3000 Level and then was going to Nine Shaft.

According to the Dynatec crew, Christiansen and Truett attempted to pull the raise again, but after approximately 2<sup>1</sup>/<sub>2</sub> ore cars, it hung-up once more. At about 7:10 p.m., Donald Graham, a Magma team leader, was overheard on the mine phone reporting that the 865 Raise was muck bound, or full of ore, three feet down from the 3763 Level grizzly. This indicated that ore was on top of the hang-up, at least to the 3763 Level. Approximately 180 yards of ore was dumped into the raise during the shift while hang-up blasting in the raise was occurring below.

Meanwhile, Wilson contacted his crew at the 865 Raise on the mine phone and told them to hurry because he wanted them at the 3600 Level to help Ybarra, Donlin and himself guard a blast planned for about 8:00 p.m., at the 865 extension raise.

Shortly after 7:15 p.m., Christiansen and Truett again walked to the explosive storage facility and returned with more emulsion explosive and capped safety fuse. The Dynatec miners observed Christiansen and Truett carrying the explosive materials in their hands.

Christiansen climbed up the manway to place the explosive charge in the hang-up while Truett stayed on the Syntron deck. While placing the explosive near Set 11,

Christiansen dropped the primed charge into the ore pass compartment. He climbed down the raise manway to the feeder deck and Truett turned on the Syntron feeder to vibrate the primed charge out of the ore pass compartment. The Dynatec crew stated they looked for a place to hide on the feeder deck, thinking an explosion would occur if the vibrating feeder caused an ignition. A few seconds later, Villaverde overheard Truett say "I've got the fuse." The emulsion explosive was not recovered from the Syntron feeder.

About 7:30 p.m., 81 Winze hoist operator Mendoza stated he was called by Dalton who told him he was at Nine Shaft, 3000 Level.

At about 7:35 p.m., Nine Shaft cager, Robert Courvoisier, overheard Edwards on the mine phone stating that the 865 Raise was hung-up. About five minutes later, Courvoisier said Edwards called and asked him to go to the 3500 Level and pick up four 1 inch diameter, 20 foot long PVC pipes and take them to the 4100 Station.

At approximately 7:45 p.m., Mendoza said he heard Christiansen paging Edwards on the mine phone. According to Mendoza, Edwards was needed at the 865 Raise because the crew was having trouble and the raise was hung-up.

A few minutes later, the Dynatec crew packed their gear and started to leave the Syntron feeder for the 4000 Station to catch Nine Shaft mancage.

At about the same time, Edwards took the Nine Shaft mancage from the 3500 to the 4000 Level. Edwards was getting off the mancage when the Dynatec crew arrived at the station. When they spoke to him, Edwards stated that he was aware of Christiansen and Truett's blasting activities at the 865 Raise and that he was going there to see what was going on. Villaverde, Spry and Castenada then took the mancage to the 3600 Level to assist the other Dynatec crew.

At approximately 8:20 p.m., Nine Shaft cager Charles Castaneda, took Dalton to the 3600 Level. At approximately 9:00 p.m., and after blasting the 865 extension raise, Wilson and his two crews went to the 3600 Station where they met Dalton. Wilson told Dalton they were out of materials and were leaving the mine in the next few minutes. Wilson also expressed concern about the hang-up blasting at the 865 Raise. According to Wilson, Dalton said he knew about the blasting and was going there to help with the hang-up.

A few minutes later, LHD Operator Purcella accidentally cut an electrical line with his LHD at the 3763 Level dump. While paging an electrician on the mine phone, Dalton got on and told Purcella he would contact an electrician. Edwards joined the phone conversation and Dalton told Edwards he would help the crew get the 865 Raise hang-up down. Dalton told Purcella to block off all three 865 dumping points. Dalton subsequently contacted Floyd George, an electrician, to repair the cut electrical line at the 3763 dump. At about 9:15 p.m., Dalton took the cage to the 4000 Level. Edwards paged Dalton on the mine phone and asked him to bring a 1-inch by 6-foot long blow pipe.

After closing the 3763 dump, Purcella arrived at the 3700 grizzly and saw a LHD getting ready to dump ore into the 865 Raise. He told the operator to dump the material because he was shutting the raise down. Purcella proceeded to the 3636 Level where he observed two more LHD's dumping into the raise. He told them that he was shutting down the dump site and taped the area off as he had the other two sites. Purcella then returned to the underground shop.

About 9:45 p.m., Electrician Floyd George began repairing the damaged electrical line about 30 feet from the 3763 dump. While repairing the line, George felt small rocks falling around him and heard the ore run in the 865 Raise. He ran from the area.

At shift changes, Magma's supervisors and miners routinely communicated from one shift to the next conditions that can be expected in the mine. Joseph Giarrizzo, an oncoming "C" shift team leader, tried unsuccessfully to contact Dalton and Edwards on the mine phone at about 10:50 p.m. At 11:00 p.m., Mary McConnel and Christopher Allison, materials handlers for the next shift, took the mancage to the 4000 Level to pull ore from the 865 Raise.

Arriving on the 4000 Station, McConnel and Allison saw Dalton's, Edwards', Truett's, and Christiansen's lunch buckets. The two walked to the raise and saw the ore train parked under the Syntron feeder chute. The first car behind the motor was empty, but a muck pile filled the drift and almost covered the second car.

The two climbed a ladder onto the Syntron feeder deck and observed the raise manway compartment full of ore, broken lagging, and armored timbers. They next saw a boot sticking out of the pile and Dalton's caplamp battery hanging from its cord on a steel beam.

McConnel used the mine phone to call her team leader, Craig Dahlstrand, on the surface. She told him there had been a serious accident at the 865 Raise. A few minutes later, Dahlstrand descended into the mine with Magma Team Leaders Michael Borseth, Ronald Hanson and Giarrizzo. Dahlstrand told them there had been a cave in at the raise and that he and Borseth were going to investigate the accident.

Giarrizzo and Hanson got off the cage at the 3700 Level and went to the 3763 dump to see if the missing crew might be there. They entered the 865 raise manway at this location and, proceeding cautiously, they climbed down. When they reached the first landing, located at Ring 29, Giarrizzo used the mine phone to page Dalton. Receiving no reply, they continued down the raise, expecting to see one or all of the missing crew. When they reached Ring 19, about 74 feet below the 3763 Level, they found a bird cage pulled slightly free from the raise timber.

On the next set down, at Ring 18, they found one piece of armored cribbing laying across the manway landing. Most of the crib panel between the manway and ore pass compartment was missing at this location. When Giarrizzo looked through the ladderway toward Ring 17, the entire panel was missing between the manway and ore pass compartment and there were no landings below him as far as he could see.

Giarrizzo started to yell and bang on the air and water pipes in case one of the missing miners was below him. He and Hanson saw and heard nothing in response. They climbed back up the manway, exiting the raise at the 3763 and then proceeded to the 4000 Level.

Meanwhile, Dahlstrand and Borseth arrived at the 4000 Station where McConnel met them. After talking with her, Dahlstrand called the hoistman and told him to notify the appropriate Magma officials because there was a serious situation at the 865 Raise. Dahlstrand, Borseth, and McConnel walked to the raise and saw water running out of the Syntron feeder chute and the muck pile. They climbed up the ladder to the feeder deck and Allison pointed out the boot and Dalton's cap lamp battery. They also saw blood on the muckpile.

Team Leader Borseth immediately sent out an alert over the mine phone for Magma Emergency Response Team members to report to the 4000 Level.

# A. Recovery Activities - August 11, 1993

Borseth briefed Emergency Response team members on the situation as they began reporting to the 4000 Level. As work began on finding the missing crew, MSHA Inspectors Clarence Ellis and James Eubanks arrived at the mine at about 2:55 a.m. Ellis immediately issued a Section 103(K) Order, Number 4124521, to insure the safety persons involved in the recovery operation.

Due to the unknown condition of the raise, Magma's recovery activities proceeded slowly during the night. Stulling and spiling of the loose material had to be completed before the victims could be located and extricated. After some material had been removed from the manway compartment, Dalton's body was recovered at approximately 3:15 a.m. The remaining three victims were recovered a short time later. During the recovery the following significant items were found:

One wristwatch, belonging to Nicholas P. Truett, which was stopped at 9:45 p.m.

One large empty powder (explosives) bag on a nail at the Syntron feeder deck.

One partial stick of unexploded cap-sensitive emulsion explosive on a Syntron feeder deck beam.

One detonating cord attached to a piece of armored cribbing.

The victims were pronounced dead at the scene by the Pinal County Sheriff's Department. They were removed from the mine at about 10:45 a.m., and transported to the Tucson Medical Center in Tucson, Arizona. Autopsies performed later by the Pinal County Medical Examiner's office indicated that all four victims died as the result of blunt force trauma.

#### B. Items Found - August 19, 1993

The following items were found at the 4000 Level auxiliary explosives storage area. The explosive materials stored at this magazine were used to blast hang-ups in the 865 Raise.

Thirty-six capped safety fuses stored in a foil barrier bag (trash-type) bag adjacent to the drift and 25 feet from the auxiliary explosives storage magazine;

Sixteen boxes of emulsion explosives were stored in the auxiliary magazine with the oldest products located at the bottom;

Sixteen boxes of emulsion explosives were stored in the auxiliary magazine which was more than a one-week supply; and

The cover was not on one box of emulsion explosive in the auxiliary magazine.

# HUMAN RESOURCES

### **Experience of the Victims**

John H. Dalton, Jr., age 48, Materials Handling Group Leader, had 21 years mining experience with four years four months at the Magma Mine. Alfred D. Edwards, age 56, Materials Handling Team Leader, had 30 years mining experience and three years five months at this mine. Jeff S. Christiansen, age 21, Operations Tech I, had one year four months mining experience, all at this mine. Nicholas P. Truett, age 19, Support Tech III, had one year two months mining experience, all at this mine.

### Training - Magma Copper Company

#### A. General

Magma's training plan was approved by the MSHA Rocky Mountain District Manager on May 17, 1991. Additionally, from May 11 through 27, 1993, the Ensign-Bickford Company was at the mine and reportedly instructed all Magma personnel in procedures and practices for the use of explosives.

#### **B.** Training Received by the Victims

Jeff S. Christiansen was hired at the mine on April 20, 1992, and had no previous mining experience. According to company training records, he received 40 hours of newly employed inexperienced miner training from April 20 through 24, 1992, and annual refresher training on March 26, 1993. Christiansen received seven MSHA Form 5000-23 Training Certificates for task training:

- 1) 05/04/92 9T Loco Diesel
- 2) 06/27/92 Cage; 1 and 2 yard LHD (form noted "in training")
- 3) 09/15/92 Fire extinguisher
- 4) 12/03/92 250
- 5) 04/18/93 Tractor
- 6) 04/25/93 500 Motor
- 7) 05/06/93 Oxy-Acetylene

The following deficiencies were noted for Christiansen in relation to the task training required for miners assigned to a task in which they have had no previous experience:

An MSHA Form 5000-23 or evidence of training was not produced for "blasting procedures" as required by mandatory standard 48.7. An MSHA Form 5000-23 or evidence of training was not produced indicating that "loading and dumping procedures," as mandated by Magma's approved training plan, was taught to Christiansen prior to his assumption of work duties at the 865 Raise. Magma did not produce documentation or evidence indicating that Christiansen had received training in the 865 Raise Syntron operating procedures prior to working at the raise.

John H. Dalton, Jr. had previously worked for various mining contractors and was hired by Magma on March 5, 1990. An MSHA Form 5000-23 was not produced indicating that he had received newly employed experience miner training before beginning his work duties. However, other information confirmed that Dalton had received the training. Dalton received annual refresher training on 05/05/90, 10/05/90, 09/30/91, and 10/28/92. He also received five MSHA Form 5000-23 Training Certificates for task training:

- 1) 05/08/89 Hoisting apparatus
- 2) 05/25/90 Task not indicated
- 3) 12/21/90 First aid (four hours)
- 4) 03/22/93 Tractor
- 5) Unknown 1 yard LHD

Alfred D. Edwards had previously worked for Magma and was rehired on March 5, 1990. According to company training records, Edwards received newly hired experienced miner training on February 13, 1990, about three weeks prior to starting work. While an MSHA Form 5000-23 was not produced for the training, other documentation confirmed Edwards received training. He received annual refresher training on 01/11/91, 01/11/92 and 11/23/92. He also received three MSHA Form 5000-23 Training Certificates for task training:

- 1) 05/31/90 Demonstration of Equipment
- 2) 11/11/92 250 LHD
- 3) 03/23/93 Tractor

Nicholas P. Truett was hired at the mine on June 15, 1992, and had no previous mining experience. According to company training records, he received 40 hours of newly employed inexperienced miner training from June 15 through 19, 1992, and annual refresher training on May 3, 1993. Truett received four MSHA Form 5000-23 Training Certificates for task training:

- 1) 09/15/92 Fire extinguisher
- 2) 12/02/92 250 LHD
- 3) 04/18/93 Tractor
- 4) 05/05/93 Oxy-Acetylene

The following deficiencies were noted for Truett in relation to the task training required for miners assigned to a task in which they have had no previous experience:

An MSHA Form 5000-23 or evidence of training was not produced for "blasting procedures" as required in mandatory standard 48.7. An MSHA Form 5000-23 or evidence of training was not produced indicating that "loading and dumping procedures," as mandated by Magma's approved training plan, was taught to Truett prior to his assumption of work duties at the 865 Raise. Magma did not produce documentation or evidence indicating that Truett had received training in the 865 Raise Syntron operating procedures prior to working at the raise.

#### C. Magma Training Documents and Blasting Practices

Magma's MSHA approved training plan for the task training required for miners assigned to a task in which they have had no previous experience, specifically "loading and dumping procedures," stated that one of the topics to be covered with personnel would be blasting orders and guarding. Magma documents indicated that the purpose of a blasting order was to ensure that all precautions were taken to protect other employees from being blasted, or dusted, and that qualified personnel were conducting blasting operations.

Further, these documents stated that a blasting order must be obtained from a supervisor when any blasting was to be done, except for those blasts which were electrically detonated at the end of the shift. A blasting order, according to Magma, must state:

- (1) The time and date of the blast
- (2) Name of the blaster and PR [payroll] number
- (3) Location of the blast
- (4) Amount of primers and powder used
- (5) For what purpose
- (6) Signed by the employee and supervisor

In response to MSHA questions concerning blasting orders, Magma noted that blasting orders were "...a pre-1982 shutdown policy that was not re-established when the mine re-opened." Magma did not produce documentation or evidence indicating that Truett or Christiansen received training in blasting orders as specified in their approved training plan.

Another Magma training document, dated January 27, 1993, indicated that waiting times before entering a blast area were thirty minutes after blasting activities occurred. Further, it established that personnel must "...be at least 100 feet from [the] blast and out of direct line of fire..." when blasting. Documentation or evidence was not produced indicating that Truett and Christiansen received training in this guarding information as specified in Magma's approved training plan.

#### D. Magma Pay For Skills and Team Concept

When the Magma Mine reopened in 1990 each employee was placed on salary, but the traditional system of paying weekly bonuses to contract miners who achieved higher production levels was retained. Documentation indicated that Magma introduced a "Team Concept" to encourage employee participation in decision making and to foster a closer sense of affiliation with the company.

Fundamental to Magma's "Team Concept" was that employees were involved in the decision-making process for a wide range of activities. Employee input, according to Magma, was sought for key safety, productivity, and cost decisions. Teams existed for mining processes including development, production, materials handling, maintenance and construction. Teams were also formed for special projects, among them the design of the 865 Raise.

Structurally, teams were normally composed of four to five miners and directed by a team leader. Depending on the mining process, two or more teams comprised a group, which was overseen by a group leader. Group leaders reported directly to the mine manager.

One element of the "Team Concept" was the Pay-For-Skills (PFS) assessment system. Under PFS, team members were paid based on their rated skills at a variety of mining tasks. Other team members, with the concurrence of the team leader, rated an individual who requested assignment to the next higher rated skill. This peer and team leader rating was based on their assessment of several behavioral skills: attendance, safety, and performance.

#### E. Pay for Skills and MSHA Training Requirements

Documents submitted by Magma to MSHA indicate that Christiansen and Truett received other instruction, in addition to what was required under their MSHA approved training plan, relative to their occupations. That instruction was provided under Magma's PFS assessment system.

An MSHA review of those PFS skill assessments instructions, when compared to Magma's approved training plan and mandatory standard 48.7, revealed the following deficiencies in the tasks "loading and dumping procedures" and "blasting operations":

Jeff S. Christiansen -

- a) Documentation or evidence was not produced indicating that Christiansen received training in "blasting orders and guarding" in the 865 Raise;
- b) Documentation or evidence was not produced indicating that Christiansen received training in "knocking down hang-ups" in the 865 Raise;

- c) Documentation or evidence was not produced indicating that Christiansen received training in "wet muck" in the 865 Raise;
- d) Documentation or evidence was not produced that Christiansen received training in "blasting operations" in the 865 Raise; and
- e) Christiansen began work at the raise on July 11, 1993 all evidence of MSHA training or PFS skill assessment instructions received preceded that date.

Nicholas P. Truett -

- a) Documentation or evidence was not produced indicating that Truett received training in "blasting orders and guarding" in the 865 Raise;
- b) Documentation or evidence was not produced indicating that Truett received training in "knocking down hang-ups" in the 865 Raise;
- c) Documentation or evidence was not produced indicating that Truett received training in "wet muck" in the 865 Raise;
- d) Documentation or evidence was not produced that Truett received training in "blasting operations" in the 865 Raise; and
- e) Truett began work at the raise on July 11, 1993 all evidence of MSHA training or PFS skill assessment instructions received preceded that date.

# **Training - Dynatec Mining Corporation**

All Dynatec miners received training in accordance with Dynatec's MSHA approved training plan which met the requirements of 30 CFR Part 48. The plan was approved by the MSHA Rocky Mountain District Manager on March 3, 1992.

All MSHA Form 5000-23's submitted by Dynatec met the requirements of 30 CFR Part 48. Dynatec's Job Superintendent Mark Spaulding, an approved MSHA instructor, received mine hazard training from Magma in January 1993. Spaulding provided each miner with the appropriate training as the remainder of the Dynatec mining employees were hired or came on site.

# CONCLUSIONS

Magma failed to use prudent engineering practices in the design of the 865 Raise. This ground support structure was inappropriate and inadequate for the ground in which it was built. Magma failed to make a structural analysis of the 865 Raise design. Magma failed to incorporate an adequate number of bearing sets in the raise to support the foreseeable structural loads to which it would be subjected. Magma failed to incorporate mechanical fasteners in the raise to prevent joint and structural separation. Magma also failed to modify the design of the structure as it was being developed for the ground conditions which were encountered. These fundamental design failures, which would have been prevented by the application of prudent engineering practices, contributed to the collapse of the 865 Raise.

Magma and Dynatec both failed to use prudent engineering practices in the installation of the 865 ground support structure. Magma and Dynatec failed to determine that external support, such as backfilling and blocking, was adequate to control the ground and stabilize the structure. These failures allowed the lateral movement of the structure and accelerated its collapse on August 10, 1993. The movement of the structural joints allowed cribbing, dividing the manway and ore pass compartments, to be dislodged causing ore to fall into the manway.

Magma and Dynatec both failed to use prudent engineering practices in maintaining the 865 ground support structure after progressive deterioration and damage was known to exist. Magma and Dynatec failed to adequately address the settlement of the structure during repairs ordered by Magma during August 4 through 9. Magma and Dynatec failed to ensure the safety of their miners who were assigned to work in the raise by inadequately inspecting, evaluating, and superficially correcting the known hazards that existed.

Magma demonstrated widespread disregard for the safe use of explosives. Magma failed to provide the required training for two inexperienced miners to ensure the safe storage, transportation, and use of explosives. The 865 Raise was damaged from improper hang-up blasting which accelerated the collapse of the already settling structure.

Magma routinely withdrew ore from the 865 Raise until it was empty and then refilled the raise with material. This repetitive loading and unloading loosened structural blocking to a point where some of the blocking fell from place, permitting the outward movement of the structural framework.

On August 3, 4, and 5, 1993, Magma and Dynatec inspected the 865 Raise and found structural settlement, joint separation, a broken divider plate, sheared blocking, loose and broken ladders, displaced landings, movement of the divider wall toward the manway, and divider cribbing and ore in the manway. Magma and Dynatec both failed to take the necessary remedial steps to correct the known

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settling damage to protect the miners who were assigned to and worked in the raise.

The MSHA investigators determined that an imminent danger as defined in Section 3(j) of the Federal Mine Safety and Health Act of 1977 existed from at least August 3 until the time of the accident. Because of the inadequate inspections, superficial repairs and the unsafe use of explosives, the 865 Raise was left in a condition of impending failure without regard to the safety of the miners who were exposed to the known hazards that existed.

# CAUSES OF THE ACCIDENT

Magma failed to utilize prudent engineering practices in the design of the 865 Raise which resulted in the failure of this ground support structure on August 10, 1993. The improper and inadequate installation and maintenance of the raise further reduced its structural integrity and compounded the design problems allowing ore to enter the manway compartment striking and killing the four miners.

Inadequate examinations of the raise, conducted by both Magma and Dynatec, failed to prevent miners from being exposed to its failure.

Magma failed to provide the required training to inexperienced miners who worked in the raise. This training would have ensured the safe and proper use of explosives. The improper use of explosives in the raise, including the unsafe blasting practices, damaged the settling structure and accelerated its collapse.

# RECOMMENDATIONS

The accident investigation committee believes that the following recommendations identify problems that were highlighted by this investigation and which go beyond current regulatory requirements. The investigators believe that these recommendations focus on issues which will enhance miner safety and health in the future.

MSHA should require mine operators to submit plans for major structures, such as raises with manways, for review and approval by an independent, registered professional engineer. These plans should then be required to be submitted to the appropriate MSHA district manager.

Mine operators should establish and implement quality control criteria for the design, installation, maintenance, and examination of major structures, such as raises with manways.

MSHA should require the certification of supervisors and miners who perform critical activities such as examinations and blasting.

**APPENDICES** 

Appendix I

**Investigation Participants** 

#### Magma Copper Company

Douglas R. McGregor Steve Lautenschlaeger Thomas Fudge Kelly Stolp Alison Shelton, Esq. Mark N. Savit, Esq. Dave West

Alex Paul John Hetrick **Dewayne Chambers** John Tomerlin Matthew Kannegaard Craig Dahlstrand Donald Graham Joseph Giarrizzo Michael Borseth Gene Halsev Charles Castenada Troy Murphy Mary McConnel Michael Stewart Douglas Eyler William Purcella Christopher Allison Joseph Elledge Kevin Chavez Cal Bryant James Mendoza **Flovd George** 

General Manager Mine Manager Senior Mine Engineer Manager of Safety Attorney Attorney, Jackson & Kelly Senior Engineer, Bharti Engineering Associates, Inc. Senior Mine Geologist Personnel Manager Group Leader Group Leader **Team Leader** Team Leader **Team Leader** Team Leader Team Leader Safety Supervisor Cager Support Tech Support Tech **Operation Tech** Chippy Hoist Operator **Operation Tech** Operation Tech **Operation Tech Operation Tech** Support Tech Hoist Operator Electrician

#### Office of the Arizona State Mine Inspector

Douglas Martin Phillip Howard Bill Hawes Gary Cothrun Arizona State Mine Inspector Assistant State Mine Inspector Assistant State Mine Inspector Deputy State Mine Inspector

#### **Dynatec Mining Corporation**

John Marrington	Vice President and General Manager
Brian J. Hagan	Safety Director
James Harrower	Former Area Manager
Mark Spaulding	Project Superintendent
John C. Folinsbee	Consulting Mining Engineer
Steven Weatherspoon, Esq.	Attorney, Chandler, Tullar, Udall and Redhair
Daniel Frost, Esq.	Attorney, Fairfield and Woods, P.C.
Douglas Massey	Lead Miner
Ronald Spry	Lead Miner
William G. Wilson	Lead Miner
Nathan Spry	Miner
Ernest Villaverde	Miner
Jose Castenada	Miner
Virgil Mason	Miner
Abraham Donlin	Miner
Leo Ybarra	Miner

#### **U.S. Department of Labor**

# Office of the Solicitor Division of Mine Safety and Health

Robert A. Cohen, Esq. Edward H. Fitch, Esq. Andre S. Love, Esq. Assistant Counsel, Trial Litigation Assistant Counsel, Trial Litigation Attorney

#### Mine Safety and Health Administration

Tyrone Goodspeed Jimmie L. Jones William W. Wilson Robert L. Ferriter James Warren Andrews Michael Music Jerry Davidson Sidney Hansen David M. Ropchan Dr. Kelvin Wu

Clarence Ellis James Eubanks Larry Nelson Larry Aubuchon Vernon R. Gomez

Supervisory Mine Inspector Supervisory Special Investigator Mine Safety and Health Specialist Chief, Ground Support Division, DS&HTC Mining Engineer, DS&HTC Supervisory Mine Inspector Geologist, DS&HTC Mining Engineer, DS&HTC Mining Engineer, DS&HTC Chief, Mine Waste and Geotechnical **Engineering Division, PS&HTC MSHA** Inspector **MSHA** Inspector Supervisory Mine Inspector **Supervisory Mine Inspector** Administrator for Metal and Nonmetal

# U.S. Bureau of Mines

Dr. R. Karl Zipf, Jr.

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Structural Engineer, Ground Control Division, DRC

Appendix II

Violations

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

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#### Mine Citation/Order Continuation

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

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MSHA Form 7000-3a, Mar 85 (Revised)

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

Section I Violation Data
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DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine ID 7. Mine ID 7. Mine ID
MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice 8a. Written Notice (103g)
BASED ON AN MSHA INVESTIGATION AND EXAMINATION, GROUND SUPPORT IN THE AREA OF THE 865 RAISE WAS NOT DESIGNED TO
EOR THE LOADS IMPOSED DURING MINING OPERATIONS. THIS VIOLATION CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93
WHICH RESULTED IN THE DEATH OF FOUR MINERS.
THE 865 RAISE STRUCTURE IS A 364 FOOT, TWO-COMPARTMENT, FRAMED-TIMBER RAISE CONSISTING OF A MANWAY/TIMBER SLIDE
AND ORE PASS COMPARTMENT. THE RAISE WAS DEVELOPED AT AN APPROXIMATE SLOPE OF 81 DEGREES BETWEEN THE 3636 AND
4000 LEVELS WITH ACTIVE DUMP POINTS AT THE 3763, 3700, AND 3636 LEVELS. MINER ENTRANCES TO THE RAISE WERE AT THE
4000, 3763 AND 3700 LEVELS.
THE MSHA INVESTIGATION AND EXAMINATION FOUND THE FOLLOWING DEFICIENCIES INCLUDING, BUT NOT LIMITED TO: (1)THE DESIGN
WAS NOT ADEQUATE FOR THE LOADS IMPOSED ON THE STRUCTURE; (2) THE LACK OF INTERMEDIATE BEARING SETS ALLOWED THE
See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health
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Other         of Act         -         Title 30 CFR         5         7         .         3         3         6         0         1         1
Section II Inspector's Evaluation
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred X
B Injuny or Illness could rea
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse). Tes X No D. Number of Persons Affected 10 0 4
A. None B. Low C. Moderate D. High E. Reckless Disregard X
12. Type of Action 13. Type of Issuance (check one)
1 0 4 - D - 1 ,
14. Initial Action       D. Written       E. Citation/       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       0       5       1       0       9       4
15. Area or Equipment
865 RAISE
16 Termination Due Mo Da Yr
A. Date     B. Time (24
Casting III Transienting Acting
Section III Termination Action 17. Action to Terminate
18. Terminated Mo Da Yr A. Date B. Time (24 Hr Clock) B. Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6 1 8
22. Signature 23 AR Number
I) here book and
MSHA FORM/000-JMar 85 (Revised)
and the contraction of the second

# Mine Citation/Order Continuation

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

Section I - Subsequent Action/Continuation [	Data										
1. Subsequent Action 1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 5 1 0	Yr 9 4		3.	Citation/O Number	rder	4 4	1 0 4 2	2 - 1
4. Served To		1 1.	5. Op	erator	I	I			I	1 I	
DOUGLAS MCGREGOR, GENERAL MA	NAGER		M	AGMA	СОРР	ER CC	MPANY. S	UPERIOF		DIVISION	
6. Mine			7. Mir	ne ID						Bitliolott	
MAGMA MINE					02	- 0	0 1 5	2 -		ontractor)	
Section II Justification for Action			- <u>1</u>		1012			2			
ENTIRE WEIGHT OF THE STRUCTURE	TO BE TRANSFERRED	то т	THE LO	WER S	SETS;	(3)THE	DEAD LO	AD WEIG	HT OF TI	HE STRUCTU	RE
CAUSED CRUSHING OF STRUCTURAL	MEMBERS IN THE BO	ттом	SETS	; (4)CR	USHIN	IG (DE	FLECTION	) CONTR	IBUTED	TO SEPARAT	ION OF
WALLIEND PLATES AND POSTS; (5)TH	E LACK OF MECHANIC	AL FA	STENE	ERS (E	.G., LA	G BOL	TS, TENS	ON ROD	S, HANG	ER RODS) CA	USED
FRAMEWORK INTEGRITY TO BE DEPE	NDENT ENTIRELY UPO	DN IN	STALLE	ED BLC	CKIN	3; <b>(6)</b> P	OOR BLO	CKING PF	RACTICE	S ALLOWED I	ATERAL
MOVEMENT OF STRUCTURAL MEMBE	RS; (7)THE MOVEMEN	TOFS	STRUC	TURA	MEM	BERS	AND MININ	IAL LAP I	NTO THE	E CHANNEL	
BIRDCAGE ALLOWED ARMORED CRIB	S TO BE DISLODGED;	(8)NO	N-UNIF	ORM	PLACE	MENT	OF BACK	FILLING A	ROUND	TIMBER FRA	MEWORK
CONTRIBUTED TO THE FRAMEWORK	SEPARATION; AND (9)	THE R	AISE D	ESIG	N REQ	UIRED	THAT EX	ERNAL C	OMPRE	SSIVE FORCE	ES BE
SWELLING NATURE AND THEREEORE	STRUCTURAL INTE	GRIT	Y; HOW	EVER	, GRO		ONDITION	S WERE	NOT OF	A SQUEEZIN	G OR
SWEELING NATORE AND THEREFORE	WOULD NOT HOLD II	HESI	RUCH	URE I	JGEN	IER.					
THE BAISE DESIGN ALSO DID NOT FO	RESEE OR PLAN FOR	THE		CTION							DINO
BUT NOT LIMITED TO: (A)BLAST WIND	OWS OR REINFORCED	STRI	ICTUR				ASTING M			SAGES INCLU	DING,
BLASTING; (B)CLEAR ACCESS WAS NO	DT PROVIDED, AT ALL	TIMES	5. TO A	N FXI	FOR		S WHEN F	ASTING	HANGU	IPS LISING SA	
FUSE; AND (C)EFFECTIVE PASSABILIT	Y FOR THIS DESIGNAT	TED S	ECON	DESC	APEW	AY WA	S NOT PR		N THAT	IN ILIBED MIN	FRS
IN THE EVENT OF AN EMERGENCY, CO	DULD NOT SAFELY TR	AVEL	THIS R	RAISE	MANW	AY AS	THEIR EX	TOUTO	F THF M	INF	
Section III Subsequent Action Taken									Se	e Continuation	Form
B. Extended To A. Date Mo Da	Yr B. Time (24 Hr. (	Clock)				C. Vac	ated	D. Termi	nated	E. Modifie	ed
9. Type of Inspection 0 3 0	vent Number 0 5	1 1	6 1	8							
11. signature	ARM 00	Sumbe	er 12.	. Date	м 0	o D 51	a Yr 094	13. Time (1	24 Hr. Cio	ock)	0 7 0 1

MSHA Form 7000-3a, Mar 85 (Revised)

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

Section 1 Violation Data			
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	0702	3. Citation	/Order
4. Served To		Numbe	r  4 4 1 0 4 2 3
DOUGLAS MCGREGOR GENERAL MANAGER	J. Operator		
6 Mine		COPPER COMPANY, SUPER	IOR MINING DIVISION
8. Condition or Practice		02-00152-	(contractor)
			3a. Written Notice (103g)
NECESSARY GROUND SUPPORT IN THE AREA OF T	BEE DAISE WAS NOT I		
WHERE MINERS WORK OR TRAVEL DURING THE P	LOD 2/02 9/02 MANAO	NSTALLED TO CONTROL TH	E GROUND IN PLACES
AS BACKFILLING AND BLOCKING WAS ADEQUATE T	CONTROL THE OBOUN	MENT FAILED TO DETERM	NE THAT SUPPORT, SUCH
CONTRIBUTED TO THE LATERAL MOVEMENT OF ST	ICTURAL MEMBERS	ID AND GROUND SUPPOR	STRUCTURE WHICH
ARMORED CRIBBING TO BE DISLODGED BETWEEN	E MANWAY AND OPE	ASS COMPARTMENT ALLO	CTURAL MEMBERS CAUSED
CRIBBING PIECES TO FALL INTO THE MANWAY COM		ASS COMPARTMENT ALLO	WING ORE AND ARMORED
THIS VIOLATION CONTRIBUTED TO THE FAILURE OF	HE RAISE ON 8/10/93 W	HICH RESULTED IN THE DE	
MANAGEMENT ENGAGED IN AGGRAVATED CONDUC	CONSTITUTING MORE	THAN ORDINARY NEGLIGEN	
UNWARRANTABLE FAILURE.			TOL: THIS VISCATION IS AN
	·····	······································	
		See Continuation Form (	MSHA Form 7000-3a)
9. Violation A. Health			
Safety B. Section	C. P	art/Section of	
Other of Act -	Ti	te 30 CFR 5	7 . 3 3 6 0
Section II Inspector's Evaluation			
A Injury or Illnoop (here) (is) the Libertheout			
	kely Reasonabl	y Likely 🔄 Highly Lik	ely Occurred X
B. Injury or Illness could rea-			
construction of the heat the set West set West structure			
sonably be expected to be. No Lost workdays	Lost Workdays or i	Restricted Duty	nanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes	Lost Workdays or i	Restricted Duty Perm	nanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes 11. Negligence (check one)	Lost Workdays or i	Restricted Duty Perm D. Number of	nanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None B. Low	Lost Workdays or F No Moderate	Restricted Duty Perm D. Number of D. High	nanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action	Lost Workdays or F No Moderate	Restricted Duty Perm D. Number of D. High	nanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X
C. Significant and Substantial (See Reverse):     Yes       11. Negligence (check one)     A. None       A. None     B. Low       12. Type of Action     1       0     4       -     1	Lost Workdays or F No No Moderate 13. Type of Issue Citation	Restricted Duty D. Number of D. High D. High Ince (check one) Order	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard
C. Significant and Substantial (See Reverse):     Yes       11. Negligence (check one)     A. None       A. None     B. Low       12. Type of Action     1       14. Initial Action	Lost Workdays or F No Moderate 13. Type of Issue Citation D. Written	Restricted Duty Perm D. Number of D. High C. High C. Check one) C. Tration (	hanently Disabling     Fatal     X       of Persons Affected     0     0     4       E. Reckless Disregard     X       X     Safeguard
C. Significant and Substantial (See Reverse):     Yes       11. Negligence (check one)     A. None     B. Low       12. Type of Action     1     0     4     -     D     -     1     ,       14. Initial Action     A. Citation     X     B. Order     C. Safeguard     C. Safeguard	Lost Workdays or F No Moderate 13. Type of Issua Citation D. Written E. Notice	Restricted Duty Perm D. Number of D. High Citation/ Order	Manently Disabling     Fatal     X       of Persons Affected     0     0     4       E. Reckless Disregard     X       X     Safeguard       F. Dated     Mo     Da     Yr       0     5     1     0     9     4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment	Lost Workdays or F No No Moderate 13. Type of Issua Citation D. Written Notice E.	Restricted Duty     Perm       D. Number of       D. High       Ince (check one)       Order       Citation/ Order       4       1     0       4	Manently Disabling     Fatal     X       of Persons Affected     0     0     4       E. Reckless Disregard     X       X     Safeguard       F. Dated     Mo     Da       0     5     1     0     9
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard	Lost Workdays or F No No Moderate 13. Type of Issua Citation D. Written Notice E.	Restricted Duty Perm D. Number of D. High Citation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE	Lost Workdays or F No No Moderate 13. Type of Issua Citation D. Written Notice E.	Restricted Duty Perm D. Number of D. High Citation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
Solidary be expected to be.     No Lost Workdays       C. Significant and Substantial (See Reverse):     Yes       11. Negligence (check one)     A. None       A. None     B. Low       12. Type of Action     1 0 4 - D - 1 ,       14. Initial Action     A. Citation       A. Citation     B. Order       C. Safeguard       15. Area or Equipment       865 RAISE	Lost Workdays or F No No Moderate 13. Type of Issue Citation D. Written Notice E.	Restricted Duty Perm D. Number of D. High Citation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE     16. Termination Due	Lost Workdays or F No No Noderate 13. Type of Issua Citation D. Written Notice E.	Restricted Duty Perm D. Number of D. High Creation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE     16. Termination Due     A. Date     Mo     Da     B. Tim	Lost Workdays or F Lost Written D. Written Notice	Restricted Duty Perm D. Number of D. High Creation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes  11. Negligence (check one)  A. None B. Low  12. Type of Action 1 0 4 - D - 1 ,  -   14. Initial Action A. Citation X B. Order C. Safeguard  15. Area or Equipment  865 RAISE  16. Termination Due A. Date Mo Da B. Tin Hr Section III - Termination Action	Lost Workdays or F No Lost Workdays or F Lost Workdays or F Lost Workdays or F Lost Workdays or F Lost Written D. Written D. Written Notice Class	Restricted Duty Perm D. Number of D. High Created Duty Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE     16. Termination Due     A. Date     Mo     Da     B. Tin     Section III - Termination Action     17. Action to Terminate	Lost Workdays or F	Restricted Duty Perm D. Number of D. High Created Duty Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes  11. Negligence (check one)  A. None B. Low  12. Type of Action 1 0 4 - D - 1 , -  14. Initial Action A. Citation X B. Order C. Safeguard  15. Area or Equipment  865 RAISE  16. Termination Due A. Date Mo Da B. Tin Hr Section III - Termination Action  17. Action to Terminate	Lost Workdays or F	Restricted Duty Perm D. Number of D. High Created Duty Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE     16. Termination Due     A. Date     Mo     Da     B. Tin     Section III Termination Action     17. Action to Terminate	Lost Workdays or F	Restricted Duty Perm D. Number of D. High Created Duty Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4
Solidably be explected to be.       No Lost Workdays       C. Significant and Substantial (See Reverse):     Yes       11. Negligence (check one)     A. None     B. Low       12. Type of Action     1     0     4     -       12. Type of Action     1     0     4     -     0     -       14. Initial Action     X     B. Order     C. Safeguard     -       15. Area or Equipment	Lost Workdays or F No Lost Workdays or F I Lost Workdays or F I Lost Workdays or F I Lost Written D. Written Notice I Lost Vitten I Lost Vitte	Restricted Duty Perm D. Number of D. High Created Duty Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes     11. Negligence (check one)     A. None     B. Low     12. Type of Action     1 0 4 - D - 1 ,     -     14. Initial Action     A. Citation     X B. Order     C. Safeguard     15. Area or Equipment     865 RAISE     16. Termination Due     A. Date     Mo     Da     B. Tin     Section III Termination Action     17. Action to Terminate     18. Terminated     A. Date     Mo     Da     Yr     B. Time (24     Section IV Automated System Data	Lost Workdays or F  No Lost Workdays or F  Noderate  13. Type of Issua Citation  D. Written Notice  (24 Cick)  Ir Clock	Restricted Duty D. Number of D. High D. High Order	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4 0 5 1 0 9 4
C. Significant and Substantial (See Reverse): Yes  11. Negligence (check one)  A. None B. Low  12. Type of Action 1 0 4 - D - 1 , -  14. Initial Action A. Citation X B. Order C. Safeguard  15. Area or Equipment  865 RAISE  16. Termination Due A. Date Mo Da B. Tin Hr Section III Termination Action  17. Action to Terminate  18. Terminated A. Date Mo Da Yr B. Time (24 Section IV Automated System Data  19. Type of Inspection 20. Event Number	Lost Workdays or F  Lost Workdays or F  Moderate  13. Type of Issue Citation  D. Written Notice  (24 Cick)  Ir Clock	Restricted Duty Perm D. Number of D. High Citation/ Order Citation/ Order 4 4 1 0 4 2 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4 0 5 1 0 9 4
Sonably be expected to be.       No Lost Workdays         C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       X       B. Order       C. Safeguard	Lost Workdays or F	Restricted Duty D. Number of D. High D. High Order Check one) Order Citation/ Order 4 4 1 0 4 2 1 Number 4 4 1 0 4 2 1 Number 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4 0 5 1 0 9 4
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment       865 RAISE       -       -       -       -       -         16. Termination Due       A. Date       Mo       Da       B. Tin       -         17. Action to Terminate       -       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24         Section III Terminated       A. Date       Mo       Da       Yr       B. Time (24         Section IV Automated System Data       19. Type of Inspection       20. Event Number       0         20. Section IV Automated System Data       -       0       3       0       0	Lost Workdays or I         Image: Moderate         Image: Moderate         Image:	Restricted Duty       Perm         D. Number of         D. High         Ince (check one)         Order         Citation/         Order         Number         4         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         1         0         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	hanently Disabling Fatal X of Persons Affected 0 0 4 E. Reckless Disregard X X Safeguard F. Dated Mo Da Yr 0 5 1 0 9 4 0 5 1 0 9 4
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,         14. Initial Action       A. Citation       X       B. Order       C. Safeguard	Lost Workdays or I         Image: Moderate         Image: Moderate         Image:	Restricted Duty       Perm         D. Number of         D. High         ince (check one)         Order         Citation/         Order         Order         Number         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         1         0         1         0         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	hanently Disabling       Fatal       X         of Persons Affected       0       0       4         E. Reckless Disregard       X       X         X       Safeguard       X         Y       F. Dated       Mo       Da       Yr         I       F. Dated       Mo       Da       Yr         X       Safeguard       X       Yr         I       F. Dated       Mo       Da       Yr         X       Safeguard       X       Yr       Yr         X       Safeguard       X       Yr       Yr         Y       Yr       Yr       Yr       Yr         Y       Yr       Yr       Yr       Yr         Y       Yr       Yr       Yr       Yr         Yr       Yr       Yr       Yr       Yr         Yr
Sonably be expected to be.       No Lost Workdays         C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	Lost Workdays or I         K       No         Moderate       Image: Citation         Image: Citation       Image: Citation         D. Written       E.         Notice       Image: Citation         Image: Citation       Image: Citation <t< td=""><td>Restricted Duty       Perm         D. Number of         D. High         ince (check one)         Order         Citation/         Order         Order         Citation/         Order         Order         Number         4         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         1         0         1</td><td>namently Disabling       Fatal       X         of Persons Affected       0       0       4         E. Reckless Disregard       X         X       Safeguard      </td></t<>	Restricted Duty       Perm         D. Number of         D. High         ince (check one)         Order         Citation/         Order         Order         Citation/         Order         Order         Number         4         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         4         1         0         1         0         1	namently Disabling       Fatal       X         of Persons Affected       0       0       4         E. Reckless Disregard       X         X       Safeguard

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

1. Date Mo Da Yr 2. Time (24 Hr. Clock) 0 7 0 3	3. Citation/Order
4. Served To	5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - 0  (contractor)
8. Condition or Practice	8a. Written Notice (103a)
A SAFE MEANS OF ACCESS WAS NOT PROVIDED AND MAINTAIN	ED TO WORKING PLACES BETWEEN THE 3700 AND THE 4000 LEVELS IN
THE 865 RAISE DURING THE PERIOD 8/3-10/93. THIS VIOLATION C	CONTRIBUTED TO THE SEVERITY OF THE ACCIDENT INVOLVING THE
FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DE/	ATH OF FOUR MINERS.
CONDITIONS IN THE DAIOS WEDE WARDEN ON THE DAIOS	TING MORE THAN ORDINARY NEGLIGENCE IN THAT: (1)STRUCTURAL
SHIETED: (4)ARMORED CRIPPING WAS DISLODGED AND DAVID	NOT BEEN SECURED; (3)TIMBER, BLOCKING, AND CRIBBING HAD
COMPARTMENT: AND (5) ORE AND ARMORED CRIBBING WAS DISLODGED AND DAMAGE	D IN AT LEAST TWO AREAS BETWEEN THE ORE PASS AND MANWAY
COMPARTMENT, AND (3) ORE AND ARMORED CRIBBING PIECES F	IAD FALLEN INTO THE MANWAY COMPARTMENT.
MINERS WERE REGULARLY REQUIRED TO TRAVEL THE MANIMAN	
ACCESS TO OTHER LEVELS. MANAGEMENT ALLOWED THESE SA	AFE ACCESS HAZARDS TO EXIST AND REPAILTED THE CONTINUED HAS
OF THIS MANWAY DURING THIS PERIOD. THIS VIOLATION IS AN I	JNWARRANTABLE FAILURE
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act -	Title 30 CFR 5 7 1 1 0 0 1
Section II Inspector's Evaluation	
A. Injury of liness (has) (is): No Likelihood Unlikely	Reasonably Likely Occurred X
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays	Norkdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes X No	D. Number of Persons Affected 0.0.4
11. Negligence (check one)	
A. None B. Low C. Moderate	D. High E. Reckless Disregard X
12. Type of Action 13.	Time of laws o
	I VDE OT ISSUANCE (CRECK ONE)
104-D-1,     -   -	Citation Order X Safenuard
1 0 4 - D - 1 ,   -   -	Citation Order X Safeguard
1         0         4         -         D         -         -         -         -           14. Initial Action         D. Writter         D. Writter         D. Writter	Citation     Order     X     Safeguard       E. Citation/     F. Dated     Mo     Da
1         0         4         -         D         -         1         ,         -         -         -         .           14. Initial Action         A. Citation         X         B. Order         C. Safeguard         D. Writter	Citation       Order       X       Safeguard         •       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         •       Order       Virginger       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
1         0         4         -         D         -         1         ,         -         -         -         .           14. Initial Action         A. Citation         X         B. Order         C. Safeguard         D. Writter           15. Area or Equipment         D. Area         D. Vritter         D. Vritter	Citation     Order     X     Safeguard       •     E. Citation/ Order     4     4     1     0     4     2     1     F. Dated     Mo 0     Da 5     Yr 0       •     Order Number     4     4     1     0     4     2     1     •     0     5     1     0     9     4
1       0       4       -       D       -       1       ,       -       -       -         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Writter Notice         15. Area or Equipment       -       -       -       -       -       -       -	Citation       Order       X       Safeguard         •       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo 0       Da 5       Yr 0       9       4
1       0       4       -       D       -       1       ,       -       -       -         14. Initial Action       D. Writter       D. Writter       D. Writter       Notice         15. Area or Equipment       -       -       -       -       Notice         865 RAISE       -       -       -       -       -       -       -	Citation       Order       X       Safeguard         0       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo 0       Da 5       Yr 0       9       4
1       0       4       -       D       -       1       ,       -	Citation       Order       X       Safeguard         0       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D.       D.       Writter       D.       Notice         15. Area or Equipment       0       C. Safeguard       Notice         865 RAISE       16. Termination Due       Mo       Da       Yr       B. Time (24)	Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       O       5       1       0       9       4
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D. Writter       D. Writter       D. Writter       Notice         15. Area or Equipment       -       -       -       Notice         865 RAISE       -	Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       Image: Constraint of the second
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D. Writter       D. Writter       D. Safeguard       D. Writter       Notice         15. Area or Equipment       -       -       -       -       -       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Section III Termination Action       -       -       -       -       -	Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       O       5       1       0       9       4
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D. Writter       D. Writter       D. Writter       Notice       Notice         15. Area or Equipment       -       -       -       -       Notice         865 RAISE       -       -       -       -       -       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         Section III Termination Action       17. Action to Terminate       -       -       -       -	Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       Image: Constraint of the second
1       0       4       -       D       -       1       ,       -       -       -       -       -       -       1       ,       Image: Constraint of the state of the st	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       Image: Check one
1       0       4       -       D       -       1       ,       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       0       5       1       0       9       4
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D. Order       D. C. Safeguard       D. Writter       Notice         15. Area or Equipment       -       -       -       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         16. Termination Action       17. Action to Terminate       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Y       Y       Y       Yr       Yr       Yr       Yr       Yr       Yr       Yr       Yr       Yr
1       0       4       -       D       -       1       ,       -       -       -       -       1         14. Initial Action       D. Order       D. C. Safeguard       D. Writter       Notice         15. Area or Equipment       -       -       -       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       -       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       -       -       -       -       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       V       V       V       V       V       V       V       V       V       V       V       V
1       0       4       -       D       -       1       ,       -       -       -       -       -       -       1       ,       -       1       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         V       Number       4       4       1       0       4       2       1       Image: Second Secon
1       0       4       -       D       -       1       ,       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       A       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Image: State of the st
1       0       4       -       D       -       1       ,       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1 <td< td=""></td<>
1       0       4       -       D       -       1       ,       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         U       Number       4       4       1       0       4       2       1       Image: 2       1       1       1       1       1       1       1       1       1
1       0       4       -       D       -       1       ,       -	Type of issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Number       0       5       1       0       9       4 <t< td=""></t<>

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

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
	Number   4   4   1   0   4   2   5
4. Served To 5. Operator	
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER C	OMPANY, SUPERIOR MINING DIVISION
MAGMA MINE     O 2 - C     S Condition or Practice	8a Written Notice (103a)
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT. 8/3/93 EVEN THOU	GH MANAGEMENT FAILED TO ADEQUATELY
EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING, AFTER I	HANGUP BLASTING AND AS OTHER GROUND
CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO	CONDUCT ADEQUATE EXAMINATIONS THAT
CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DE	EATH OF FOUR MINERS.
AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE RAISE SUPPORT	STRUCTURE WOULD HAVE DETERMINED
THAT: (1)RAISE TIMBERS WERE SHIFTING AND PROGRESSIVELY DETERIORATING; (2)R	
POSTS, DIVIDERS, WALL PLATES, AND CRIBBING, (3)SUPPORT BLOCKING WAS SHEARI	ED AND NO LONGER FUNCTIONAL;
THE MANWAY COMPARTMENT: (5) THE RAISE SUPPORT STRUCTURE HAD BEEN SUBJE	CTED TO WATER INFIL TRATION AND
FREQUENT DEVELOPMENT AND HANGUP BLASTING: (6)NON-UNIFORM PLACEMENT OF	BACKFILLING AROUND TIMBER FRAMEWORK
WAS CONTRIBUTING TO FRAMEWORK SEPARATION; AND (7)SWELLING OR SQUEEZING	GROUND CONDITIONS WERE NOT
See	Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section C. Part/Section	of IIIIIIIIIIIIIII
Other of Act   -   Title 30 CFR	5 7 . 3 4 0 1
Section II Inspector's Evaluation	
A Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely	Highly Likely Occurred X
B. Injury of liness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Restricted I	
C. Significant and Substantial (See Reverse): Yes X No	D. Number of Persons Affected 0 0 4
11. Negligence (check one)         A. None       B. Low         C. Moderate       D. Hig	h E. Reckless Disregard X
12. Type of Action 13. Type of Issuance (check	< one)
1 0 4 - D - 1 ,   -   - Citation	Order X Safeguard
14. Initial Action D. Written E. Citation/	F. Dated Mo Da Yr
A. Citation X B. Order C. Safeguard Notice Order	4 4 1 0 4 2 1 0 5 1 0 9 4
15 Area or Equipment	
	··
DAHLSTRAND/MCCONNEL/ALLISON - GROUND EXAMINATIONS	
16. Termination Due Mo Da Yr A Date A Date B Time (24	
Section III Termination Action	
17. Action to Terminate	
18 Terminated Mo Da Yr	n na ann an a
A. Date   B. Time (24 Hr Clock)	
Section IV – Automated System Data	
19 Type of Inspection 20 Event Number 21 Primary or N	
	23. Art Number
L'Unoverblooksores	00341
MSHA Form 7000-3)Mar 85 (Revised)	

Mine Citation/Order Continuation

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

Continuenton					e 38	nety ar	io nealth Administ	ration
Section I Subsequent	Action/Continuation	Data					· · · · · · · · · · · · · · · · · · ·	
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Mo 0 5	Da 1 0	Yr 9	1	3. Citation/Order Number	4 4 1 0 4 2 5 - 1
4. Served To				5.00				
DOUGLAS MCGRE	GOR, GENERAL MA	NAGER		м	AGMA	COPPE	R COMPANY SUPERIOR	
6. Mine				7. Min	ne ID			
MAGMA MINE						02	- 0 0 1 5 2 -	(contractor)
Section II Justification	for Action							
	IPING PAISE CONS							
PROPER STRUCTU	RAL INTEGRITY.	TRUCTION AND USE				RAISES	UPPORT STRUCTURE F	ROM DEVELOPING THE
ADEQUATE GROUM	D CONDITION EXA	MINATIONS OF THE R		VERE	WARF		O PROTECT MINERS R	
WORK IN THE ARE	A. THE ABOVE NOT	ED CONDITIONS WEF	RE VISI	BLY O	BVIO	JS AND E	STABLISHED THAT THE	GROUND SUPPORT
STRUCTURE WAS I	FAILING TO MAINTA	IN ITS STRUCTURAL	NTEG	RITY A	ND C	APABILIT	Y. MANAGEMENT ENGA	GED IN AGGRAVATED
CONDUCT CONST	TUTING MORE THA	N ORDINARY NEGLIG	ENCE.	THIS	VIOLA	TION IS	AN UNWARRANTABLE F	AILURE.
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			•			······		
	A							See Continuation Form
Section III Subsequent . 8. Extended To	Action Taken	Vr	•			· · · · · ·		
A. Da		B. Time (24 Hr.	Clock)			c	Vacated D. Termin	ated E. Modified
Section IV Inspection D	ata	·····		 				
9. Type of Inspection	0 3 0 10. Ev	ent Number 0 5	1 1	6 1	8			
	<u>لي المار المار</u>		Numbe	r 12	 Date	Mo	Da Vr 13 Time /2	4 Hr. Clock)
Jynon	-Dode	799 00	3 4	1	2010	_ 0 5	1 0 9 4	0 7 0
MSHA Form 7000-3a, Ma	ar 85 (Revised)	V						

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

Section I Violation Data
1. Date         Mo         Da         Yr         2. Time (24 Hr. Clock)         3. Citation/Order         4.4         4.4         1.0         4.2         6
4. Served To 5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine D 7. Mine ID
MAGMA MINE 0 2 - 0 0 1 5 2 - 0 (contractor)
8. Condition or Practice 8a. Written Notice (103g)
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "A" SHIFT, 8/4/93, EVEN THOUGH MANAGEMENT FAILED TO ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING, AND AS OTHER GROUND CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS. AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE RAISE SUPPORT STRUCTURE WOULD HAVE DETERMINED THAT: (1)RAISE TIMBERS WERE SHIFTING AND PROGRESSIVELY DETERIORATING; (2)RAISE TIMBERS WERE SEPARATING FROM POSTS, DIVIDERS, WALL PLATES, AND CRIBBING; (3)SUPPORT BLOCKING WAS SHEARED AND NO LONGER FUNCTIONAL; (4)SECTIONS OF ARMORED CRIBBING WERE DISLODGED WHICH ALLOWED ORE AND ARMORED CRIBBING PIECES TO FALL INTO THE MANWAY COMPARTMENT; (5)THE RAISE SUPPORT STRUCTURE HAD BEEN SUBJECTED TO WATER INFILTRATION AND FREQUENT DEVELOPMENT AND HANGUP BLASTING; (6)NON-UNIFORM PLACEMENT OF BACKFILLING AROUND TIMBER FRAMEWORK WAS CONTRIBUTING TO FRAMEWORK SEPARATION; AND (7) SWELLING OR SQUEEZING GROUND CONDITIONS WERE NOT See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other         of Act         -         Title 30 CFR         5 / / . 3 / 4 / 0 / 1
Section II - Inspector's Evaluation
A Injury or Illness (has) (is) No Likelihood Unlikely Reasonably Likely Highly Likely Occurred X
B. Injury or Illness could rea-
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0 4
11. Negligence (check one)
A. None B. Low C. Moderate D. High E. Reckless Disregard X
12. Type of Action       1     0     4     -     D     -     1     ,     -     -     13. Type of Issuance (check one)       Citation     Order     X     Safeguard
14 Initial Action D. Written E. Citation/ F. Dated Mo Da Yr
A. Citation X B. Order C. Safeguard Notice Order A 4 4 1 0 4 2 1 0 5 1 0 9 4
15. Area or Equipment
KANNEGAARD\EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS
16. Termination Due Mo Da Yr A. Date B. Time (24 Hr. Clock)
Section III Termination Action 17. Action to Terminate
18. Terminated   Mo Da Yr     A. Date     B. Time (24 Hr Clock)
Socilion IV Automatod System Data
Soction IV Automatod System Data       19. Type of Inspection       20. Event Number
Soction IV Automatod System Data         19. Type of Inspection       20. Event Number         (activity.code)       0         3. Q       0
Soction IV Automatod System Data           19. Type of Inspection         20. Event Number         21. Primary or Mill           (activity.code)         0         0         5         1         1         6         1         8         P           22. Signature         23. AR Number         21. Primary or Mill         P         23. AR Number         1         1
Soction IV Automatod System Data         19. Type of Inspection         (activity.code)         0       0         5       1         19. Type of Inspection         (activity.code)       0         0       0         5       1         19. Type of Inspection       0         (activity.code)       0         0       0         5       1         19. Type of Inspection       0         (activity.code)       0         22. Signature       23. AR Number         0       0         0       3         4       1         MSHA Form 7000-9 Mar 85 (Rovised)

# Mine Citation/Order Continuation

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

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Subsequent Action	Ta. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 10	94		3. Citation/Order Number	4 4 1 0 4 2 6 - 1
Served To			4 <u></u> [	5. Op	erator	I	<u> </u>	
DOUGLAS MCGRE	<b>3OR, GENERAL MA</b>	NAGER		M	AGMA	COPPER	COMPANY, SUPERIOR	R MINING DIVISION
Mine			· · · · · · · · · · · · · · · · · · ·	7. Mir	ne ID			
MAGMA MINE				1		02-	00152-	(contractor)
ection II - Justification	for Action							
PROPER STRUCTU	RAI INTEGRITY	TRUCTION AND USE F	REVE	NTING	S THE I	RAISE SU	IPPORT STRUCTURE F	ROM DEVELOPING THE
		<ul> <li>The second se</li></ul>				··· · · ·		e e e e e e e e e
ADEQUATE GROUN	ID CONDITION EXA	MINATIONS OF THE R	AISE W	ERE	WARR	ANTED T	O PROTECT MINERS R	EGULARLY REQUIRED TO
WORK IN THE AREA	A. THE ABOVE NOT	ED CONDITIONS WER	E VISI	BLY O	BVIOU	S AND ES	STABLISHED THAT THI	E GROUND SUPPORT
STRUCTURE WAS F	AILING TO MAINTA	IN ITS STRUCTURAL I	NTEGF	RITY A	ND CA	PABILITY	. MANAGEMENT ENG	AGED IN AGGRAVATED
CONDUCT CONST	UTING MORE THAT	N ORDINARY NEGLIGE	NCE.	THIS	VIOLA.	TION IS A	N UNWARRANTABLE	AILURE.
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ection III Subsequent /	Action Taken	Yr						·····
ection III Subsequent / Extended To A. Da	Action Taken Mo Da	Yr B. Time (24 Hr. (	Clock)			C. 1	Vacated D. Termi	nated E. Modified
ection III Subsequent / Extended To A. Da ection IV Inspection D	Action Taken Mo Da Ite	Yr B. Time (24 Hr. (	Clock)			C. Y	Vacated D. Termin	nated E. Modified
ection III Subsequent / Extended To A. Da ection IV Inspection D Type of Inspection	Action Taken Ite Mo Da ata 0 3 0 10. Ev	Yr B. Time (24 Hr. 0	Clock)	6 1	8	C. 1	Vacated D. Termit	nated E. Modified

MSHA Form 70003a, Mar 85 (Revised)

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

Section I Violation Data							
1. Date Mo Da	Yr 2. Time (24 H	r. Clock)				3. Citation/Order	
0 5 1 0	9 4		0 7 0	6		Number	4410427
4. Served To				5. Operat	or		
DOUGLAS MCGREGO	DR, GENERAL MANA	GER		MAGN	A COPPER COM	PANY, SUPERIOR MI	NING DIVISION
6. Mine				7. Mine IC			
MAGMA MINE			•	•	02-00	152-	(contractor)
8. Condition or Practice		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	an al contra de colo de la Co	8a. Writt	en Notice (103a)
MINERS WERE ALLO	WED TO WORK IN T	HE 865 RAISE	ON "B" S	HIFT, 8/4/93	EVEN THOUGH N	MANAGEMENT FAILE	D TO ADEQUATELY
EXAMINE GROUND C	ONDITIONS IN THE	AREA PRIOR T	O WORK	COMMENC	CING, AND AS OTH	ER GROUND COND	TIONS WARRANTED.
THIS VIOLATION IS P	ART OF A PRACTIC	OF A FAILUR	E TO CO	NDUCT AD	QUATE EXAMINA	TIONS THAT CONTR	BUTED TO THE
FAILURE OF THE RAI	SE ON 8/10/93 WHIC	HRESULTED	IN THE D	EATH OF F	OUR MINERS.		
			TIONO				
THAT: (1) RAISE TIMB	EDS WEDE SUIETIN		HONS A	ND THE RA	ISE SUPPORT STI	RUCTURE WOULD H	AVE DETERMINED
POSTS, DIVIDERS, W		BIBBING: (3)SI	IDDODT	PLOCKING	RATING; (2)RAISE	E TIMBERS WERE SE	PARATING FROM
(4)SECTIONS OF ARM	ORED CRIBBING W	FRE DISLODG		BLOCKING	WAS SHEARED A	ND NO LONGER FUN	ICTIONAL;
THE MANWAY COMP	ARTMENT: (5)THE R	AISE SUPPOR	T STRUC	TURE HAD	DORE AND ARM	D TO WATED INCUT	ES TO FALL INTO
FREQUENT DEVELO	MENT AND HANGU	P BLASTING (			ACEMENT OF DA		
WAS CONTRIBUTING	TO FRAMEWORK S	EPARATION: A	ND (7) SI		R SOLIEEZING CR	OUND CONDITIONS	
				TELENIO O	See Cont	inuation Form (MSHA	Form 7000 2a)
9. Violation A. Health							
Safety	B. Section			C	Part/Section of		
Other	of Act			, i i i i i i i i i i i i i i i i i i i	Title 30 CFR	573	4 0 1
Section II - Inspector's Eva	luation						
10. Gravity:							
A. Injury or lilness (has)	is): No Likelihood	Unlik	ely	Reason	ably Likely	Highly Likely	Occurred X
B. Injury or Illness could be a series of the series of	d rea-		•			1990 - A.	
sonably be expecte	d to be: No Lost	Workdays	Los	t Workdays	or Restricted Duty	Permanently	Disabling Fatal X
C. Significant and Sub	stantial (See Reverse)	· Yes X	No	· · · · · · · · · · · · · · · · · · ·		D Number of D	
11. Negligence (check one		· · · · · · · · · · · · · · · · · · ·			·	D. Number of Perso	ns Affected 004
A. None	B. Low	<b>c</b> .	Moderate	• 🗌	D. High	E. Re	ckless Disregard X
12. Type of Action			1	3. Type of Is	suance (check one)		
1	0 4 - D - 1,	-	-	Citation	·····,	Order X	Safequard 🗌 🐥
					·····		
14. Initial Action		—	D. Writt	ten	E. Citation/	F. (	Dated Mo Da Yr
	Order C. Sa	teguard	Notic	» []	Order 4 4	1 0 4 2 1	0 5 1 0 9 4
15. Area or Equipment					Number		<u>_</u>
DAHLSTRAND\MCCO	NELVALLISON - GR	OUND EXAMIN	ATIONS				
16 Termination Due							
A D	ate i i	r     B.Time/	24				
		Hr C	(2-4 lock)				
Section III Termination Ac				╺┹╌╌┖═┛╶╻			
Content in Termination Ac	tion						
17. Action to Terminate							
17. Action to Terminate							
17. Action to Terminate							
17. Action to Terminate 18. Terminated	Mo Da Yr	B. Time (24 Hi					
17. Action to Terminate 18. Terminated A. Date	Mo Da Yr	B. Time (24 Hr	r Clock)				
17. Action to Terminate 18. Terminated A. Date Section IV Automated System	Mo Da Yr	B. Time (24 H	r Clock)				
17. Action to Terminate       18. Terminated       A. Date       Section IV Automated System       19. Type of Inspection	Mo Da Yr	B. Time (24 Hr	r Clock)		Primary or Mill		
17. Action to Terminate       18. Terminated       A. Date       Section IV Automated System       19. Type of Inspection (activity spde)	tion Mo Da Yr item Data 20. Event N	B. Time (24 Hr lumber 0 5	Clock)		Primary or Mill	P	
17. Action to Terminate       18. Terminated       A. Date       Section IV Automated System       19. Type of Inspection       (activity spde)       22. Signature	tion Mo Da Yr item Data 20. Event N	B. Time (24 Hr lumber 0 5	Clock)	21. 1 8	Primary or Mill	P 23. AR 1	łumber
17. Action to Terminate       18. Terminated       A. Date       Section IV Automated System       19. Type of Inspection       (activity code)       22. Signature	tion Mo Da Yr item Data 20. Event N	B. Time (24 Hr lumber 0 5	Clock)	21. 1 8	Primary or Mill	P 23. AR M	łumber
17. Action to Terminate       18. Terminated       A. Date       Section IV Automated System       19. Type of Inspection (activity code)       22. Signature       MSHA Form 7000-3Mar 85	Mo Da Yr tem Data 20. Event N 20. Event N (Revised)	B. Time (24 Hr umber 0 5	7 Clock)		Primary or Mill	P 23. AR M	lumber 0 0 3 4 1

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Mine Citation/Order Continuation

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

Section I Subsequent Action/Continuation Data							
1. Subsequent Action	1a. Continuation	2. Dated	Мо	Da	Yr	3. Citation/Order	
	X	(Original Issue)	05	10	94	Number	4 4 1 0 4 2 7 - 1
				+			
4. Served to 5. Operator							
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION							
6. Mine				7. Mi	ne ID		
MAGMA MINE						02-00152-	(contractor)
Section II Justification for Action							
ENCOLINTEDED DUDING DAISE CONSTRUCTION AND USE DESIGNATING THE DAIGE OURDOD'S DEDUCTION FROM DELETION OF THE							
PROPER STRUCTURAL INTEGRITY							
ADEQUATE GROU	ND CONDITION EXA	MINATIONS OF THE RA	AISE V	VERE	WARR	ANTED TO PROTECT MINERS REC	GULARLY REQUIRED TO
WORK IN THE ARE	A. THE ABOVE NOT	ED CONDITIONS WER	E VISI	BLY C	BVIOU	S AND ESTABLISHED THAT THE C	BROUND SUPPORT
STRUCTURE WAS FAILING TO MAINTAIN ITS STRUCTURAL INTEGRITY AND CAPABILITY. MANAGEMENT ENGAGED IN AGGRAVATED							
CONDUCT CONSTI	TUTING MORE THAT	NORDINARY NEGLIGE	NCE.	THIS	VIOLA	TION IS AN UNWARRANTABLE FAI	LURE.
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							See Continuation Form
Section III - Subsequent	Action Taken	1- · · · · · · · · · · · · · · · · · · ·					· · · · · · · · · · · · · · · · · · ·
8. Extended To A. D	ate Mo Da	Yr B. Time (24 Hr. )	Clock)			C. Vacated D. Termina	ted E. Modified
Section IV Inspection Data							
9. Type of Inspection 10. Event Number							
	030	05	11	6 1	8		
41 Signature	$K^{-1}$		L_L_ Numbe	1  17	L Date	Mo Da Vr 13 Time /24	Hr. Clock)
	11 0			<u>"</u>  '	Date		
V JMOME	HUENGOR	20 00	34	1		0 5 1 0 9 4	0706

MSHA Form 7000-3a, Mar 85 (Revised)
Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
0_5_1_0_5_40_7_0_7	
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine	
	0 2  -  0 0 1 5 2  -   (contractor)
8. Condition or Practice	
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON B" SH	
THE VIOLATION IS DADE OF A PRACTICE OF A FAILURE TO CON	COMMENCING, AND AS OTHER GROUND CONDITIONS WARRANTED.
EALLURE OF THE BAISE ON 8/10/02 WHICH BESH TED IN THE DE	
FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DE	ATH OF FOUR MINERS.
AN ADECULATE EXAMINATION OF THE OPOLIND CONDITIONS AN	
THAT: (1) PAISE TIMBERS WERE SHIETING AND PROGRESSIVEL	V DETERIORATING: (2) PAISE TIMBERS WERE SEPARATING FROM
POSTS DIVIDERS WALL PLATES AND CRIBBING: (3)SUPPORT	BLOCKING WAS SHEARED AND NO LONGER FUNCTIONAL
(4)SECTIONS OF ARMORED CRIBBING WERE DISLODGED WHICH	H ALLOWED ORE AND ARMORED CRIBBING PIECES TO FALL INTO
THE MANWAY COMPARTMENT: (5)THE BAISE SUPPORT STRUC	TURE HAD BEEN SUBJECTED TO WATER INFILTRATION AND
FREQUENT DEVELOPMENT AND HANGUP BLASTING: (6)NON-UN	NIFORM PLACEMENT OF BACKFILLING AROUND TIMBER FRAMEWORK
WAS CONTRIBUTING TO FRAMEWORK SEPARATION: AND (7) SV	VELLING OR SQUEEZING GROUND CONDITIONS WERE NOT
	See Continuation Form (MSHA Form 7000-3a) X
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act -	Title 30 CFR 5 7 . 3 4 0 1
Section II Inspector's Evaluation	
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely Occurred X
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays Los	t Workdays or Restricted Duty Permanently Disabling Fatal X
C Significant and Substantial (See Reverse): Ves X No	D. Number of Persons Affected $0.04$
11 Nerligence (check one)	
A. None B. Low C. Moderate	e D. High E. Reckless Disregard X
12. Type of Action	3. Type of Issuance (check one)
1 0 4 - D - 1 ,   -   -	Citation Order X Safeguard
14. Initial Action D. Writt	ten E. Citation/ F. Dated Mo Da Yr
A. Citation 🛛 B. Order 🗌 C. Safeguard 🔲 Notic	ce Crder 4 4 1 0 4 2 1 0 5 1 0 9 4
15 Area or Equipment	Number
DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS	
16 Termination Due	
A. Date B. Time (24	
Section III Termination Action	
17. Action to Terminate	
	· .
18. Terminated Mo Da Yr A. Date Da Yr B. Time (24 Hr Clock)	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number	21. Primary or Mill
(activity barde) 0 3 0-	6 1 8 P
22 Signature	23 AR Number
Lynone Drop and	0 0 3 4 1
MSHA Form 7000-3 Mar 85 (Revised)	

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

Section I Subsequent Action/Continuation D	ata				
1. Subsequent Action 1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 1 0	Yr 9 4	3. Citation/Order Number 4 4 1 0 4 2 8 -
. Served To	▲		5. Ope	erator	
DOUGLAS MCGREGOR, GENERAL MAN	AGER		MA	GMA	COPPER COMPANY, SUPERIOR MINING DIVISION
. Mine			7. Min	e ID	
MAGMA MINE					0 2 - 0 0 1 5 2 - (contractor)
ection II Justification for Action					
ENCOUNTERED DURING RAISE CONST	RUCTION AND LISE	PREVE	NTING		
PROPER STRUCTURAL INTEGRITY.				11161	AISE SOFFORT STRUCTURE FROM DEVELOPING THE
ADEQUATE GROUND CONDITION EXAM	MINATIONS OF THE R	AISE W	ERE V	VARRA	NTED TO PROTECT MINERS REGULARLY REQUIRED TO
STRUCTURE WAS FAILING TO MAINTAI	ED CONDITIONS WER				S AND ESTABLISHED THAT THE GROUND SUPPORT
CONDUCT CONSTITUTING MORE THAN	ORDINARY NEGLIG	ENCE			ABILITY. MANAGEMENT ENGAGED IN AGGRAVATED
			11110		ION IO AN ONWARRANTABLE FAILURE,
		······ ·			
		·			
					-
	· · · · · · · · · · · · · · · · · · ·				
					See Continuation Form
Sction III Subsequent Action Taken	Vr			_ <u>r</u> _r	
A. Date	B. Time (24 Hr.	Clock)			C. Vacated D. Terminated E. Modified
ection IV Inspection Data					
iype of Inspection 0 3 0	ent Number 0 5	1 1	6 1	8	
1. Signature	AR	Number	12.	Date	Mo Da Yr 13. Time (24 Hr. Clock)
Umonebook	7-50 00	34	1		0 5 1 0 9 4 0 7 0
SHA Form 7000 3a, Mar 85 (Revised)					· · · · · · · · · · · · · · · · · · ·

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock) 0 7 0 8	3. Citation/Order         4         4         1         0         4         2         9
4 Served To 5. Operator	
DOUGLAS MCGREGOR GENERAL MANAGER MAGMA COPPER COM	PANY, SUPERIOR MINING DIVISION
6 Mine 7. Mine ID	
	1 5 2 - (contractor)
8 Condition or Practice	8a. Written Notice (103g)
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH	MANAGEMENT FAILED TO ADEQUATELY
EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING, AND AS OT	HER GROUND CONDITIONS WARRANTED.
THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMIN	ATIONS THAT CONTRIBUTED TO THE
FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	
AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE RAISE SUPPORT ST	TRUCTURE WOULD HAVE DETERMINED
THAT: (1)RAISE TIMBERS WERE SHIFTING AND PROGRESSIVELY DETERIORATING; (2)RAIS	SE TIMBERS WERE SEPARATING FROM
POSTS, DIVIDERS, WALL PLATES, AND CRIBBING; (3)SUPPORT BLOCKING WAS SHEARED	AND NO LONGER FUNCTIONAL;
(4) SECTIONS OF ARMORED CRIBBING WERE DISLODGED WHICH ALLOWED ORE AND ARM	ORED CRIBBING PIECES TO FALL INTO
THE MANWAY COMPARTMENT; (5) THE RAISE SUPPORT STRUCTURE HAD BEEN SUBJECT	ED TO WATER INFILTRATION AND
FREQUENT DEVELOPMENT AND HANGUP BLASTING; (6)NON-UNIFORM PLACEMENT OF BA	ACKFILLING AROUND TIMBER FRAMEWORK
WAS CONTRIBUTING TO FRAMEWORK SEPARATION; AND (7) SWELLING OR SQUEEZING G	ROUND CONDITIONS WERE NOT
See Col	ntinuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section C. Part/Section of	
Other of Act   - Title 30 CFR	57.3401
10. Gravity:	
A Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely	Highly Likely Occurred X
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty	y Permanently Disabling Fatal X
C Significant and Substantial (See Reverse): Ves X No	D Number of Persons Affected 0 0 4
11 Negligence (check one)	
A. None B. Low C. Moderate D. High	E. Reckless Disregard X
12. Type of Action         1         0         4         -         D         -         1         .         13. Type of Issuance (check or Citation	ne) Order X Safeguard
14. Initial Action       D. Written       E. Citation/         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4         Number       Vinter       Vinter       Number       Number       Number	4 1 0 4 2 1 P. Dated 0 5 1 0 9 4
15. Area or Equipment	· · · · · · · · · · · · · · · · · · ·
EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS	
16. Termination Due Mo Da Yr	
A. Date     B. Time (24	
Hr. Clock)	
Section III Termination Action	
THE THREE MINERS ARE DECEASED	
18. Terminated         Mo         Da         Yr           A. Date         0         5         1         0         4         B. Time (24 Hr Clock)         0         7         0         9	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number 21. Primary or Mill	
(activity-code) 0 8 (7) 0 5 1 1 6 1 8	P
22. Signature	23. AR Number
Junone Doolges	0 0 3 4 1
MSHA Form 7000-§ Mar 85 (Revised)	

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

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Subsequent Action	1a. Continuation	2. Dated (Originat Issue)	Мо 0 5	Da 10	Yr 9 4		5	3. Ci N	itatic umb	n/Oro er	der		4	4 1 0 4 2 9 -
I. Served To			_ I I	5. Ope	erator	1	·						I	
DOUGLAS MCGREC	GOR, GENERAL MA	NAGER		MA	GMA	COPF	ER C	OMF	PAN	Y, SL	JPERI	OR M	INI	NG DIVISION
6. Mine				7. Min	e ID	Ī	TT			<u> </u>	ΤŤ			
MAGMA MINE						02	-	0 0	1	5	2 -			(contractor)
Section II - Justification	for Action						·	- 1			- 11			
ENCOUNTEDED														
PROPER STRUCTU	RING RAISE CONS	TRUCTION AND USE I	PREVE	NTING	THE F	RAISE	SUP	POR	TS	TRUC	TUR	E FRC	M	DEVELOPING THE
			• • • • •					<u> </u>						
ADEQUATE GROUN WORK IN THE AREA STRUCTURE WAS F CONDUCT CONSTIT	A. THE ABOVE NOT ALLING TO MAINTA FUTING MORE THA	MINATIONS OF THE R ED CONDITIONS WEF IN ITS STRUCTURAL I N ORDINARY NEGLIGI	AISE W RE VISII INTEGF ENCE.	/ERE V BLY OE RITY AN THIS \	VARRA BVIOU: ND CAI /IOLAT	ANTE S ANI PABIL FION I	D TO D EST .ITY. S AN	ABL MAN UNV	ISH IAG NAR	ED T EMEI RAN	NERS HAT T NT EN TABLI	REG HE G GAGI E FAIL	UL RO ED _UF	ARLY REQUIRED TO UND SUPPORT IN AGGRAVATED RE.
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												· · · · · ·		
														See Continuation Form
ection III – Subsequent A	Action Taken													See Continuation Form
ection III – Subsequent / Extended To A. Da	Action Taken te	Yr B. Time (24 Hr. (	Clock)				C. Va	cate			D. Ter	minate	ęd	See Continuation Form
ection III – Subsequent / Extended To A. Da ection IV – Inspection D	Action Taken Mo Da te	Yr B. Time (24 Hr. (	Clock)				C. Va	cate			D. Ter	minate	ed	See Continuation Form
ection III – Subsequent / Extended To A. Da action IV – Inspection Da Type of Inspection	Action Taken te Mo Da ta ata 0 3 0	Yr B. Time (24 Hr. ( rent Number 0 5	Clock)	6 1	8		C. Va	cate			D. Ten	minate		See Continuation Form

MSHA Form 7000-3a, Mar 85 (Revised)

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Section 1 Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock) 3. Citation/Order 3. Citation/Order	
	3 0
4 Seniel Te	<u></u> _
A SERVEL TO COMPANY SUPERIOR MINING DIVISION	
6. Mine	
MAGMA MINE 0 2 - 0 0 1 3 2 - 1 (contractor)	
8. Condition of Practice	
NUMERO WERE ALLOWED TO WORK IN THE OCCONICE SHIET 90/02, EVEN THOUGH MANAGEMENT FAILED TO AREOLATELY	
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON C SHIFT, 69955, EVEN THOOGH WARRAGENET FAILED TO ADDATED.	
EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING, AND AS OTHER GROUND CONTRIBUTED TO THE	
THIS VIOLATION IS PART OF A PRACTICE OF A PAILORE TO CONSIDER AD COATE AND	
FAILURE OF THE RAISE ON & 10/95 WHICH RESULTED IN THE DEATH OF TOOR MINERS.	
AN ADSOLVATE EXAMINATION OF THE OPOLIND CONDITIONS AND THE RAISE SUPPORT STRUCTURE WOULD HAVE DETERMINED	
AN ADECOME EXAMINATION OF THE GROOD COMBINES AND THE INCE ON ON ONO ON THE INCE OF THE INCE AND PROCEEDS WERE SEPARATING FROM	
THAT, (I) PAISE TWIDERS WERE SHITTED AND COURSENCE (3) SUPPORT BLOCKING WAS SHEARED AND NO LONGER FUNCTIONAL:	
AND A REAL PLATES, AND ORDERING, WERE DISING, WHICH ALLOWED ORE AND ARMORED CRIBBING PIECES TO FALL INTO	
(4)SEC THANKING COMPARTMENT (5)THE BAISE SUPPORT STRUCTURE HAD BEEN SUBJECTED TO WATER INFILTRATION AND	
FREQUENT DEVELOPMENT AND HANGUP BLASTING (6NON-UNIFORM PLACEMENT OF BACKFILLING AROUND TIMBER FRAMEWORK	
WAS CONTRIBUTING TO FRAMEWORK SEPARATION: AND (7) SWELLING OR SQUEEZING GROUND CONDITIONS WERE NOT	
See Continuation Form (MSHA Form 7000-3a)	X
Q Violation A Hagith	
9. Violation – Fleatin – B. Section – C. Part/Section of	
Other of Act   -   Title 30 CFR   5 7 . 3 4 0 1	
Section    Inspector's Evaluation	
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely Greasonably Likely Highly Likely Occurred X	
B. Injury or liness could rea-	
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal	X
	01
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Arrected U	0 4
11. Negligence (check one)	
A. None B. Low C. Moderate D. High E. Reckless Disregard A	
12. Type of Action 13. Type of Issuance (check one)	
12. Type of Action	
12. Type of Action       1       0       4       -       D       -       1       13. Type of Issuance (check one)         Citation       Order       X       Safeguard	
12. Type of Action       1       0       4       -       D       -       13. Type of Issuance (check one)         Citation       Order       X       Safeguard         14. Initial Action       D. Written       E. Citation/       F. Dated       Mo       Da	Yr
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         14. Initial Action       Order       X       Safeguard       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         0       5       1       0       0       5       1       0       0       5       1       0	Yr 9 4
12. Type of Action       1       0       4       -       0       -       1       3. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       D.       D. Written       Notice       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da	Yr 9 4
12. Type of Action       1       0       4       -       0       -       1       .       13. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       D <t< td=""><td>Yr 9 4</td></t<>	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHI STRANDMCCONNEL VALUSON - GROUND EXAMINATIONS       D       Context       <	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       D. Written       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       D       D       D       D       D	Yr 9 4
12. Type of Action       1       0       4       -       0       -       1        13. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       A. Citation       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRAND/MCCONNEL/ALLISON - GROUND EXAMINATIONS       A	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       A. Date       Mo       Da       Yr       B. Time (24       DA       Da       Yr       B. Time (24       DA       Da </td <td>Yr 9 4</td>	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       -	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       DAHLSTRAND\MCCONNEL\ALLISON - GROUND EXAMINATIONS       -	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - GROUND EXAMINATIONS       -	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard	Yr 9 4
12. Type of Action       1       0       4       -       0       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       B. Order       C. Safeguard       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       -       -       -       B. Time (24       Hr. Clock)       -	Yr 9 4
12. Type of Action       1       0       4       -       0       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       -       -       -       8. Time (24 Hr. Clock)       -	Yr 9   4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       -       -       -       Notice       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       0       5       1       0         15. Area or Equipment       -       -       -       B. Time (24       -       <	Yr 9   4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       -       -       Notice       Notice       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       -<	Yr 9   4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment	Yr 9 4
12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard	Yr 9 4
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       Order       K       Safeguard       -         15. Area or Equipment       -       -       -       Notice       P.       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       -       -       -       Notice       P.       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       -	Yr 9 4 

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

Section I Subsequent Action/Continuation I	Data				
. Subsequent Action 1a. Continuation	2. Dated	Mo	Da	Yr	3. Citation/Order
	(Original Issue)	0 5	10	94	Number 4 4 1 0 4 3 0 - 1
. Served To			5. Op	erator	
DOUGLAS MCGREGOR, GENERAL MA	NAGER		м/	AGMA	COPPER COMPANY, SUPERIOR MINING DIVISION
. Mine			7. Min	ne ID	
MAGMA MINE	·				0 2 - 0 0 1 5 2 - (contractor)
ection II - Justification for Action					
ENCOUNTERED DURING RAISE CONS PROPER STRUCTURAL INTEGRITY.	STRUCTION AND USE	PREVE	NTING	S THE I	RAISE SUPPORT STRUCTURE FROM DEVELOPING THE
ADEQUATE GROUND CONDITION EXA			VERE		
WORK IN THE AREA. THE ABOVE NOT	TED CONDITIONS WE	RE VISI	BLY O	BVIOU	S AND ESTABLISHED THAT THE GROUND SUPPORT
STRUCTURE WAS FAILING TO MAINTA	AIN ITS STRUCTURAL	INTEGR		ND CA	PABILITY. MANAGEMENT ENGAGED IN AGGRAVATED
CONDUCT CONSTITUTING MORE THA	N ORDINARY NEGLIG	ENCE.	THIS	VIOLA	TION IS AN UNWARRANTABLE FAILURE.
		<u></u>			
· · · · · · · · · · · · · · · · · · ·			· · · ·		
		, <u> </u>			
					· · · · · · · · · · · · · · · · · · ·
		_			
ection III Subsequent Action Taken				1.1	
. Extended To Mo Da	Pr B. Time (24 Hr	. Clock)			C. Vacated D. Terminated E. Modified
ection IV Inspection Data		- <u>1</u> - <del>1</del>	T T "	1 1	
Type of Inspection 0 3 0 10. E	vent Number	5 1 1	6 1	8	
1. Sjørrature		Numbe	er 12	2. Date	Mo Da Yr 13. Time (24 Hr. Clock)
Ugnons Wood	apred 10	0 3 4	1		0 5 1 0 9 4 0 7 0 9
ISHA Form 7000-3a, Mar 85 (Revised)					

1 27 -

1. Date Mo Da Yr 2. Time (24 Hr. Clock) 3. Citation/Order 3.	
0 5 1 0 9 4 0 7 1 0 Number 4 4 1 0 4	3 1
4. Served To 5. Operator	
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION	
6. Mine 7. Mine ID	
MAGMA MINE 0 2 - 0 0 1 5 2 - 0 (contractor)	
8. Condition or Practice 8a. Written Notice (103g)	
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/10/93, EVEN THOUGH MANAGEMENT FAILED TO ADEQUATELY	
EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING, AFTER HANGUP BLASTING AND AS OTHER GROUND	
CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT	
CONTRIBUTED TO THE FAILORE OF THE RAISE ON 0/10/33 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	
AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE RAISE SUPPORT STRUCTURE WOULD HAVE DETERMINED	
THAT: (1)RAISE TIMBERS WERE SHIFTING AND PROGRESSIVELY DETERIORATING; (2)RAISE TIMBERS WERE SEPARATING FROM	
POSTS, DIVIDERS, WALL PLATES, AND CRIBBING; (3)SUPPORT BLOCKING WAS SHEARED AND NO LONGER FUNCTIONAL;	
(4)SECTIONS OF ARMORED CRIBBING WERE DISLODGED WHICH ALLOWED ORE AND ARMORED CRIBBING PIECES TO FALL INTO	
THE MANWAY COMPARTMENT; (5)THE RAISE SUPPORT STRUCTURE HAD BEEN SUBJECTED TO WATER INFILTRATION AND	
FREQUENT DEVELOPMENT AND HANGUP BLASTING; (6)NON-UNIFORM PLACEMENT OF BACKFILLING AROUND TIMBER FRAMEWOF	<u>K</u>
WAS CONTRIBUTING TO FRAMEWORK SEPARATION; AND (7) SWELLING OR SQUEEZING GROUND CONDITIONS WERE NOT	
See Continuation Form (MSHA Form 7000-3a)	-
9. Violation A. Health	
Other of Act Title 30 CEP 5 7 3 4 0 1	
Section II - Inspector's Evaluation	
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood 🔄 Unlikely 🔄 Reasonably Likely 🔄 Highly Likely 🔤 Occurred 义	
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fate	
	I X I
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected (	
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected ( 11. Negligence (check one)	04
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       ()         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       >	
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       >         12. Type of Action       1.0       1.1       Type of Issuance (check one)       Type of Issuance (check one)	
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       ()         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         Citation       Order       X       Safeguard       -	
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       2         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       2         14. Initial Action       D. Written       E. Citation/       F. Dated       Mo       Da	1 X 04
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (C         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       Z         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)       Citation       Order       X       Safeguard       Z         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da	1 X 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (C         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       (Z         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       (D         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       F. Dated       Mo       Da         15. Area or Equipment       Iso of Equipment       Iso	1 X 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (C         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       (Z         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       (D         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       I       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       2         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       2         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       Mo       Da       Yr       Image: Comparison of the state o	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       2         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       2         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       E. Time (24       I	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       2         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       2         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       E       E       Image: Citation is a citation is citation is citation is citation is a citation	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       >         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       >         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS/TRUETT/CHRISTIANSEN - GROUND EXAMINATIONS       E. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock)       Hr. Clock       Hr.	1 X 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       2         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       1       0       4       -       D       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       Notice       D. Written       E. Citation/       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETTICHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETTICHRISTIANSEN - GROUND EXAMINATIONS       Time (24       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock)       Hr. Clock       Hr. Clock       Hr. Clock)       Hr. Clock	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       (>)         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       -       Citation       Order       X       Safeguard       >         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       I	1 X 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       -       Citation       Order       X       Safeguard       ()         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       E	1 X 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       (         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       (         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       0       5       1       (         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - GROUND EXAMINATIONS       Image: Citation	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       ()       ()         12. Type of Action       1       0       4       -       -       -       -       C. Moderate       D. High       E. Reckless Disregard       ()         14. Initial Action       1       0       4       -       0       -       -       -       C. tation       Order       X       Safeguard       D         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       D       D       10       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       ()       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       -       D       -       13. Type of Issuance (check one)       () <td< td=""><td>1 X 0 4 9 4</td></td<>	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (1)         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       [2]         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       C. Moderate       Order       X       Safeguard       [3]         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       [3]         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       [3]       [4]       4       1       0       4       2       1       F. Dated       Mo       Da       [6]       <	1 X 0 4 9 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       (         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       ()         12. Type of Action       1       0       4       D       -1       13. Type of Issuance (check one)       ()       ()         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       ()	1 X 0 4 9 4

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

Section Subsequent P	cuon/continuation D					
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 1 0	Yr 9 4	3. Citation/Order Number 4 4 1 0 4 3 1 - 1
A Convert To						
4. Served To				5. Ope	erator	
DOUGLAS MCGREG	OR, GENERAL MAI	NAGER		MA	GMA	COPPER COMPANY, SUPERIOR MINING DIVISION
MAGMA MINE				7. Min	eID	0 2 - 0 0 1 5 2 - (contractor)
Section II Justification for	or Action		-			
ENCOUNTERED DU					-	
PROPER STRUCTUR	RAL INTEGRITY.	TRUCTION AND USE	PREVE	NTING	THEF	CAISE SUPPORT STRUCTURE FROM DEVELOPING THE
WORK IN THE AREA	THE ABOVE NOT		AISE V			ANTED TO PROTECT MINERS REGULARLY REQUIRED TO
STRUCTURE WAS F	AILING TO MAINTA	IN ITS STRUCTURAL				PABILITY MANAGEMENT ENGAGED IN AGGRAVATED
CONDUCT CONSTIT	UTING MORE THAI	NORDINARY NEGLIG	ENCE.	THIS \	/IOLAT	TION IS AN UNWARRANTABLE FAILURE.
					·····	
			·····			
	· · · · · · · · · · · · · · · · · · ·					
	· · · · · · · · · · · · · · · · · · ·					
•						
			•			•
						See Continuation Form
Section III - Subsequent	Action Taken					
8. Extended To A. Da	ite Mo Da	Yr B. Time (24 Hr.	Clock)			C. Vacated D. Terminated E. Modified
Section IV Inspection D	ata					
9. Type of Inspection	0 3 0 10. E	vent Number 0 5	5 1 1	6 1	8	
11-Signature	Der	AR AR	Numbe	12.	Date	Mo Da Yr 13. Time (24 Hr. Clock)

MSHA Form 7000-3a, Mar 85 (Revised)

,

Section I – Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
	Number $4410432$
4. Served To 5. Operator	
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COM	PANY, SUPERIOR MINING DIVISION
6. Mine 7. Mine ID	
MAGMA MINE 0 2 - 0 0	0 1 5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
DURING THE FIRST OF TWO BLASTS ALL PERSONS WERE NOT CLEARED AND REMOVED	FROM THE BLAST AREA WHEN BLASTING
PRESENT IN THE 865 RAISE ON B SHIFT, 8/2/93. TWO MINERS AND A TEAM LEADER, AN	AGENT OF THE OPERATOR, WERE
WITHIN SEVERAL SETS OF THE BLAST AREA WHEN THE BLAST WAS INITIATED. THE TEAM	
RAISE.	
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES US/	AGE REQUIREMENTS AND CONTRIBUTED
TO THE SEVERITY OF THE ACCIDENT INVOLVING THE FAILURE OF THE RAISE ON 8/10/93	WHICH RESULTED IN THE DEATH OF
FOUR MINERS.	
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDIN	ARY NEGLIGENCE IN FAILING TO ENSURE
THAT ALL PERSONS WERE CLEARED AND REMOVED FROM THE BLAST AREA. THIS VIOL	ATION IS AN UNWARRANTABLE FAILURE.
See Co	ntinuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section C. Part/Section of	
Section II - Inspector's Evaluation	57.6375
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely	Highly Likely Occurred X
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty	Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No	D Number of Persons Affected 0 0 4
11. Negligence (check one)	
A. None B. Low C. Moderate D. High	E. Reckless Disregard X
12. Type of Action 13. Type of Issuance (check or	e)
1 0 4 - D - 1 , Citation	Order X Safeguard
14. Initial Action D. Written E. Citation/	F. Dated Mo Da Yr
A. Citation X B. Order C. Safeguard Notice Order 4 4	1 0 4 2 1 0 5 1 0 9 4
15. Area or Equipment	
DARLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES	
16. Termination Due Mo Da Yr A. Date B. Time (24	
Section III Termination Action	· · · · · · · · · · · · · · · · · · ·
17 . Action to Terminate	
18. Terminated Mo. Da Vr.	
A. Date A. Date B. Time (24 Hr Clock)	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number 21. Primary or Mill	
(activity code) 0 3 0 0 5 1 1 6 1 8	P
22. Signature	23. AR Number
Eliminal Flores	
MSHA Form 7000-2 Mar 85 (Revised)	

Section I Violation Data			
1. Date Mo Da Yr 2. Time (24 Hr	r. Clock)		3. Citation/Order
4. Served To		5. Operator	
DOUGLAS MCGREGOR, GENERAL MANA	GER	MAGMA COPPER COMPAN	IY, SUPERIOR MINING DIVISION
6. Mine		7. Mine ID	
MAGMA MINE		0 2 - 0 0 1	5 2 - (contractor)
8. Condition or Practice			8a. Written Notice (103g)
DURING THE SECOND OF TWO BLASTS	ALL PERSONS WERE NOT	T CLEARED AND REMOVED FR	ROM THE BLAST AREA WHEN
BLASTING HANGUPS IN THE 865 RAISE C	DN "B" SHIFT, 8/2/93. TWC	MINERS AND A TEAM LEADE	R, AN AGENT OF THE OPERATOR,
WERE PRESENT IN THE MANWAY COMP	ARTMENT. THE TEAM LE	ADER DIRECTED ONE MINER	TO STAY IN THE MANWAY
MINED EVITED THE DAISE	OF THE BLAST AREA WH	IEN THE BLAST WAS INITIATED	D. THE TEAM LEADER AND OTHER
MINER EXITED THE RAISE.			
THIS VIOLATION IS PART OF A GENERAL	FAILURE TO FOLLOW FE	DERAL EXPLOSIVES USAGE	REQUIREMENTS AND CONTRIBUTED
TO THE SEVERITY OF THE ACCIDENT IN	VOLVING THE FAILURE O	F THE RAISE ON 8/10/93 WHIC	CH RESULTED IN THE DEATH OF
FOUR MINERS.			
MANAGEMENT ENGAGED IN AGGRAVAT	ED CONDUCT CONSTITU	TING MORE THAN ORDINARY	NEGLIGENCE IN FAILING TO ENSURE
THAT ALL PERSONS WERE CLEARED AN	ID REMOVED FROM THE	BLAST AREA. THIS VIOLATION	N IS AN UNWARRANTABLE FAILURE.
		See Continua	ation Form (MSHA Form 7000-3a)
9. Violation A. Health			
Safety B. Section		C. Part/Section of	
Other of Act		Title 30 CFR	5 7 . 6 3 7 5
10. Gravity:			
A. Injury or Illness (has) (is): No Likelihood	Unlikely	Reasonably Likely	Highly Likely Occurred X
B Injuny or Illness could rea-			
sonably be expected to be: No Lost	Workdays Lost	Workdays or Restricted Duty	Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse)	): Yes X No		D. Number of Persons Affected 0 0 4
11. Negligence (check one)			
A. None B. Low		D. High	E. Reckless Disregard X
12. Type of Action	13.	Type of Issuance (check one)	
1 0 4 - D - 1 ,		Citation	Order X Safeguard
14 Initial Action	D 10/		E Dated Star Da V
A Citation X B Order C Sa	aferward Notice		
		Number	
15. Area or Equipment	<u></u>		
DATES TRANSMICCONTREE VEESON - 03	E OF EXFLOSIVES		
16. Termination Due Mo Da Mo	/r		
A. Date	B. Time (24		
Section III - Termination Action	Hr. Clock)		
17. Action to Terminate	· · · · · · · · · · · · · · · · ·	· ·	
		· · · · · · · · · · · · · · · · · · ·	·····
18. Terminated Mo Da Yr	B. Time (24 Hr Cleak)		
A. Date	D. Time (24 mi Clock)		
Section IV Automated System Data			
19. Type of Inspection 20. Event	Number	21. Primary or Mill	
(activity code) 030	0 5 1 1 6	1 8	Р
22 Signature			23. AR Number
	PP		
H Cmme	Jones		00597
MSHA Form 7000-3 Mar 85 (Revised)	X		
- 0 (	/ .		
			-

Mine Safety	/ and	Health	Adminis	tration
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Date       Mo       Da       Yr       2. Time (24 Hr. Clock)       0       7       1       3       Citation/Order       4       4       1       0       4       3       4         A Served To       DOUGLAS MCGREGOR, GENERAL MANAGER       MAGMA ACOPPER COMPANY, SUPERIOR MINING DIVISION       Mine       7       Mine ID       0       2       0       1       5       0       9       2       0       0       1       5       0       2       0       0       1       5       0       2       0       0       1       5       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       1       1
10       10       10       17       15
DUGLAS MCGREGOR, GENERAL MANAGER       MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION         Mine       7. Mine ID       0       2       -       0       0       1       5       2       -       (contractor)         8. Mine       0       2       -       0       0       1       5       2       -       (contractor)         8. Condition or Practice       Ba. Written Natice (103g)       -
Mine         Time         The intervention         The intervention         The intervention           3. Condition or Practice         8a. Written Notice (103g)
MAGMA MINE       0 2 - 0 0 1 5 2 - 1 (contractor)         3. Condition or Practice       8a. Written Notice (103g)         TWO INEXPERIENCED AND UNTRAINED MINERS BLASTED AN ORE PASS HANGUP FROM THE MANWAY IN THE 865 RAISE ON "A"         SHIET, 8/393, WITHOUT DIRECTION FROM TRAINED AND EXPERIENCED PERSONS. THIS PRATTOR A GENERAL         FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         Section I       -         Other       of Act         Section II - Inspector's Evaluation         IO. Gravity:       A. Injury or Illness (has) (is): No Likelihood         A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred         B. Injury or Illness (check one)       A. No. 1       -       13. Type of Issuance (check one)       0 0 4         11. Negligence (check one)       1       0       -       -       13. Type of Issuance (check one)       0       14. Initial Action       D. Written       Notice       Dref       4 4 1 0 4 2 1
TWO INEXPERIENCED AND UNTRAINED MINERS BLASTED AN ORE PASS HANGUP FROM THE MANWAY IN THE 865 RAISE ON 'A'         SHIFT, \$/3/33, WITHOUT DIRECTION FROM TRAINED AND EXPERIENCED PERSONS. THIS PRACTICE WAS PART OF A GENERAL         FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED TO THE FAILURE OF THE RAISE ON         8/10/33 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Safety       B. Section         of ther       of act         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Safety       B. Section         of ther       of act         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Safety       B. Section         of ther       of act         B. Injury or Illness could rea-       Somably Likely         Highly Likely       Occurred         Z. Significant and Substantial (See Reverse): Yes       Yes         A.
TWO INEXPERIENCED AND UNTRAINED MINERS BLASTED AN ORE PASS HANGUP FROM THE MANWAY IN THE 865 RAISE ON 'A'         SHIFT, 8/3/93, WITHOUT DIRECTION FROM TRAINED AND EXPERIENCED PERSONS. THIS PRACTICE WAS PART OF A GENERAL         FAILURE OF FOLLOW FEDERAL EXPERIENCED AND CONTRIBUTED TO THE FAILURE OF THE RAISE ON         8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Safety       of Act         Other       of Act         Section II       Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         8. Injury or Illness could rea-sonably Likely       Lost Workdays or Restricted Duty       Permanently Disabiling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4       4       1       0       4       1       0       5       1       0       5       1       0
SHIFT, 8/3/83, WITHOUT DIRECTION FROM TRAINED AND EXPERIENCED PERSONS. THIS PRACTICE WAS PART OF A GENERAL         FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED TO THE FAILURE OF THE RAISE ON         8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Safety       B. Section         Other       of Act         -       Title 30 CFR         5       7       6       3       0         3. Violation       A. Health       -       See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health       -       -       -         9. Toilury or Illness (has) (is):       No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred         8. Injury or Illness could rea-       sonably be expected to be:       No Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       No       No
FALLURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         9. Violation       A. Heaith Safety Other of Act of Act B. Section Other of Act C. Part/Section of Title 30 CFR 5 7 . 6 3 0 0         9. Violation III Inspector's Evaluation       Unlikely         10. Gravity:       Reasonably Likely         A. Injury or Illness (nas) (s): No Likelihood       Unlikely         B. Injury or Illness cluab (si): No Likelihood       Unlikely         R. Injury or Illness cluab (si): No Lost Workdays       Lost Workdays or Restricted Duty         Permanently Disabiling       Fatal         C. Significant and Substantial (See Reverse): Yes X       No         D. Number of Persons Affected       0 0 4         1. Negligence (check one) A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard         12. Type of Action       1 0 4 - D - 1 1 ,       -       -       C. Idation       Order       X Safeguard         13. Type of Issuance (check one) C. Kiation       D. Order       C. Saf
Briting and colspan="2">Brite Death of Four Miners.         MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Heaith       B. Section       C. Part/Section of       T ////. 6 ///. 6 ///. 6 ///. 6 ///. 6 ///. 7 ///. 6 ///. 6 ///. 6 ///. 7 //. 6 ///. 6 ///. 7 //. 6 ///. 6 ///. 7 //. 6 ///. 6 ///. 7 //. 6 ///. 6 ///. 7 //. 6 //. 7 //. 6 ///. 7 //. 6 //. 7 //. 6 //. 7 //. 6 ///. 7 //. 6 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 6 //. 7 //. 7 //. 7 //. 6 //. 7 //. 7 //. 7 //. 7 //. 7 //. 7 //. 7 //. 6 //. 7 //. 7 //. 7 //. 7 //. 7 //.
MANAGEMENT AUTHORIZED THESE TWO MINERS TO PERFORM THIS BLASTING TASK WITHOUT THE IMMEDIATE PRESENCE OF         PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN AGGRAVATED         CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         A. Heatth       B. Section         Other       of Act         -       C. Part/Section of         Title 30 CFR       5 7 . 6 3 0 0         A. Injury or Illness (has) (is): No Likelihood       Unlikely         Reasonably Likely       Highly Likely       Occurred         A. Injury or Illness could rea- sonably be expected to be:       No Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0 0 4         11. Veglegence (check one)       A. low       C. Moderate       D. High       E. Reckless Disregard       11         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Crear       Safeguard       14. Initial Action       D. Written       Notice       D. Reckless Disregard       14. J       0       4       1       0       5       1       0
MinAdde MinAdd Director of
CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health       B. Section       C. Part/Section of       J       J       J       J       J       J       Get on II       C. Part/Section of       J <t< td=""></t<>
See Continuation Form (MSHA Form 7000-3a)         2. Violation       A. Health       B. Section       C. Part/Section of       Image: C.
See Continuation Form (MSHA Form 7000-3a)         9. Violation       A. Health       B. Section       -       C. Part/Section of Title 30 CFR       5       7       . 6       3       0       0       1         9. Violation       A. Health       Safety       B. Section       -       Title 30 CFR       5       7       . 6       3       0       0       1       1         9. Violation       of Act       -       Title 30 CFR       5       7       . 6       3       0       0       1       1         10. Gravity:       A. Injury or Illness (nas) (is):       No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could rea-sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       1       0
See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health       B. Section       -       C. Part/Section of       5       7       . 6       3       0       0         3. Violation       A. Health       Safety       of Act       -       C. Part/Section of       5       7       . 6       3       0       0         3. Old Gravity:       A. Injury or Illness (has) (is):       No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       0       5       1       0       9       4         14. Initial Action       R       D. Order       C. Safeguard       D. Viritten       E. Citation       0       5       1
See Continuation Form (MSHA Form 7000-3a)         2. Violation       A. Heatth       Safety       B. Section       C. Part/Section of       5       7       . 6       3       0       0         3. Violation       M. Heatth       Safety       D. Section       C. Part/Section of       5       7       . 6       3       0<
See Contributation Form (NSFA Form 7000-3a)         B. Violation         A. Health         Safety         Other         of Act         -         Title 30 CFR         5         7       6         Section II – Inspector's Evaluation         10. Gravity:         A. Injury or Illness (has) (is):         No Likelihood       Unlikely         Reasonably Likely       Highly Likely         Occurred       X         B. Injury or Illness (has) (is):       No Lost Workdays         Lost Workdays or Restricted Duty       Permanently Disabling         Fatal       X         C. Significant and Substantial (See Reverse):       Yes X         A. None       B. Low         C. Moderate       D. High         X       Safeguard         12. Type of Action       1         1       4         A. Citation       C. Safeguard         D. Written       E. Citation/ Order         A. Citation       B. Order         C. Safeguard       D. Written         D. Written       C. Citation/ Order         A. Initial Action       B. Order         C. Safeguard <t< td=""></t<>
9. Volation       A. Heatin       B. Section       of Act       -       Title 30 CFR       5       7       .       6       3       0       0         Section II - Inspector's Evaluation       0       Occurred       X       Title 30 CFR       5       7       .       6       3       0       0       0         10. Gravity:       A. Injury or Illness (has) (is):       No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could rea- sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence       (check one)       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       0       5       1       0       9       4         14. Initial Action       X       B. Order       C. Safeguard       Notice       Order       Y       Safeguard       0       5       1       0       9       4
Other       of Act       -       Title 30 CFR       5 7 . 6 3 0 0         Section II - Inspector's Evaluation       10. Gravity:       A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       I         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       I         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       0       4       2       1       0       5       1       0       9       4         15. Area or Equipment       -       -       -       -       -       -       -       -       -       -       0       5       1       0
Section II Inspector's Evaluation         10. Gravity:         A. Injury or Illness (has) (is): No Likelihood       Unlikely         B. Injury or Illness could rea- sonably be expected to be:       No Lost Workdays         Lost Workdays or Restricted Duty       Permanently Disabling         Fatal       X         C. Significant and Substantial (See Reverse):       Yes         Yes       X         None       B. Low         C. Moderate       D. High         X       E. Reckless Disregard         12. Type of Action       1         14. Initial Action       X         A. Citation       X         B. Order       C. Safeguard         D. Written       E. Citation/ Notice         Order       X         Safeguard       0         J. A. Citation       X         B. Order       C. Safeguard         D. Written       E. Citation/ Number         4       4         4       1         4       1         4       1         4       1         9       4
10. Gravity:       A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could rea- sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Conder to the conderate in the condera
A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       X         B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Construction of the second
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Construction of Persons Affected       0       0       4         12. Type of Action       Image: Construction of Person of Person of Persons Affected       Image: Construction of Person of P
sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0       4         12. Type of Action       Image: Comparison of Persons Affected       Im
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       -       Citation       Order       X       Safeguard
11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       0       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       - <td< td=""></td<>
A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       0       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       OUDIDITIANIDENTY       UPDIDITY
12. Type of Action       1       0       4       -       D       -       13. Type of Issuance (check one)         14. Initial Action       .
1       0       4       -       D       -       1       .
14. Initial Action       D. Written       E. Citation/       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       OUDEDITIANISTRIMUNDENT       UPDITIANISTRIMUNDENT       UPDITIANISTRIMUNDENT       UPDITIANISTRIMUNDENT       UPDITIANISTRIMUNDENT       UPDITIANISTRIMUNDENT       UPDITIANISTRIPHY       UPDITIANISTRIMUNDENT       UPDITIANISTRIPHY
14. Initial Action       D. Written       E. Citation/ Order       H. Totation/ A. Citation       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATION       OUDIOTIONICATIONICATION       OUDIOTIONICATIONICATION       OUDIOTIONICATIONICATION       OUDIOTIONICATIONICATION       OUDIOTIONICATIONICATIONICATION       OUDIOTIONICATION
A. Citation X B. Order C. Safeguard Notice Order A 4 4 1 0 4 2 1 0 5 1 0 9 4
CHRISTIANSENMURPHY - USE OF EXPLOSIVES
16. Termination Due Mo Da Yr
A. Date B. Time (24
Protion III Termination Action
17. Action to Terminate
18. Terminated A. Date Mo Da Yr B. Time (24 Hr Clock)
18. Terminated         Mo         Da         Yr           A. Date         I         I         B. Time (24 Hr Clock)         I           Section IV Automated System Data         Section IV Automated System Data         I         I
18. Terminated       A. Date       Mo       Da       Yr         B. Time (24 Hr Clock)       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       21. Primary or Mill
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       20. Event Number       21. Primary or Mill         (activity code)       0       3       0       0       5       1       1       6       1       8       P
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P         22. Signature, OA       23. AR Number
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P         22. Signature       0       0       0       5       1       1       6       1       8       P

# U.S. Department of Labor

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	11-
4. Served To 5. Operator	3 5
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION	
6. Mine 7. Mine ID 7.	
MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)	
8. Written Notice (103g)	
TWO INEXPERIENCED AND UNTRAINED MINERS BLASTED AN OPE BASS HANGUD FROM THE MANUAL THE COLOR	
SHIFT, 8/10/93, WITHOUT DIRECTION FROM TRAINED AND EXPERIENCED PERSONS. THIS PRACTICE WAS PART OF A CENERAL	
FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED TO THE FAILURE OF THE RAISE ON	
8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	
MANAGEMENT AUTHORIZED THESE TWO MINERS TO REPEORE THIS DLASTING TACK WELLOW FURTHER	
PERSONS TRAINED AND EXPERIENCED IN BLASTING HANGUPS FROM A MANWAY AND THEREBY ENGAGED IN ACCERAVATED	
CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.	
See Continuation Form (MSHA Form 7000 20)	— <u>—</u>
9. Violation A. Health	
Safety B. Section C. Part/Section of	
Other         of Act         -         Title 30 CFR         5         7         .         6         3         0         0           Section II Inspector's Evaluation         -         -         Title 30 CFR         5         7         .         6         3         0         0         -	
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood 🗌 Unlikely 🗌 Reasonably Likely 🦳 Highly Likely 🗍 Occurred 🕅	
B. Injury or Illness could rea-	
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal	X
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0	X
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       D. Number of Persons Affected       0	X 0 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard	X 0 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       14. 0       13. Type of Issuance (check one)       Image: Check one)       Image: Check one)	X 0 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       -	X 0 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       14. Initial Action       D. Written       E. Citation       Order       X       Safeguard       14.	X 04
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       D. Written       D. Written       E. Citation/       Order       F. Dated       Mo       Da         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da	X 0 4 Υr
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       D       -       -       Safeguard       0       5       1       0       5       1       0	X 0 4 Yr 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/ Notice       4       4       1       0       4       2       1       F. Dated       Mo       Da       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1<	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       1       ,       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Notice       4       4       1       0       4       2       F. Dated       Mo       Da         15. Area or Equipment       CHRISTIANSEN\TRUETT - USE OF EXPLOSIVES       CHRISTIANSEN\TRUETT - USE OF EXPLOSIVES       EXPLOSIVES       EXPLOSIVES	X 0 4 Yr 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       Mo       Da       Yr       Vr       Vr       Vr       Vr       Vr	X 0 4 Yr 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       1       ,       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       A. Date       Mo       Da       Yr       B. Time (24       I       <	X 0 4 Yr 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       1       ,       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       CHRISTIANSEN\TRUETT - USE OF EXPLOSIVES       E. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock       Hr. Clock       Hr. Clock	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       X       Safeguard       0       5       1       0         15. Area or Equipment       CHRISTIANSEN/TRUETT - USE OF EXPLOSIVES       B. Time (24       Hr. Clock)       Hr. Clock)       Hr. Clock)       A. Date       Mo       Da       Yr         8. Section III - Termination Action       7. Action to Terminate       Permanentate       Permanentate       Permanentate	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       D. Order       X       B. Order       C. Safeguard       Notice       Order       Y       Safeguard       0       5       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0	Yr           9           4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       CHRISTIANSEN\TRUETT - USE OF EXPLOSIVES       E. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock)       Hr. Clock       Hr. Clock)       Hr. Clock       Hr. Clock)       Hr. Clock       Hr. MINERS ARE DECEASED.       Hr. Lop       Hr. Clock       Hr. Clock<	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Order       X       Safeguard         15. Area or Equipment       C. Mod       Da       Yr       B. Time (24       Hr. Clock)       Hr. Clock)       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       -       -       -         17. Action to Terminate       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       -	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       0         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation/ Order       A 4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       C. Formination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       THE MINERS ARE DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       1       5         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       1       5	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       0         14. Initial Action       A. Otation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard       0       5       1<0	X 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Catation       X       B. Order       C. Safeguard       Order       X       Safeguard         15. Area or Equipment       D. Anate       Mo       Da       Yr       B. Time (24       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       0       7       1       5         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       0       7       1       5         Section IV - Automated System Data       10       9       4       1       0       2       0       5       1       1       1       1       1       1       1       1       1 </td <td>X 0 4 9 4</td>	X 0 4 9 4
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 11. Negligence (check one) A. None B. Low C. Moderate D. High X E. Reckless Disregard 1 12. Type of Action 1 0 4 - D - 1 , 1 13. Type of Issuance (check one) Citation Order X Safeguard 1 14. Initial Action A. Citation X B. Order C. Safeguard D. Written Notice Order A. Notice Order Number 4 4 1 0 4 2 1 F. Dated Mo Da 15. Area or Equipment CHRISTIANSENITRUETT - USE OF EXPLOSIVES 16. Termination Action 7. A. Date Mo Da Yr A. Date Mo Da Yr THE MINERS ARE DECEASED. 18. Terminated A. Date Mo Da Yr A. Date No Da Yr B. Time (24 Hr Clock) 0 7 1 5 Section IV - Automated System Data 19. Type of Inspection 0 3 0 0 0 5 1 1 6 1 8 21. Primary or Mill P (activity code) 0 3 0 0 0 5 1 1 6 1 8 21. Primary or Mill P	Х 0 4 9 4
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       A 1       0       A 2       1       F. Dated       Mo       Da         15. Area or Equipment       C       Section III - Termination Action       T       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       T       A. Date       D       Yr       B. Time (24 Hr Clock)       0       7       1       5         Section III - Terminated       A. Date       0	X 0 4 9 4

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
0 5 1 0 9 4 0 7 1 5	Number 4 4 1 0 4 3 6
4. Served To 5.	Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine 7.	Mine ID
	0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
ALL REPSONS WERE NOT OF FARED AND DEMOVED FROM THE DE	
COMPARTMENT IN THE 865 BAISE TWO MINERS WERE DRESENT I	AST AREA WHEN BLASTING HANGUPS FROM THE MANWAY
BLAST WAS INITIATED ONE MINER WAS IN THE MANWAY COMPART	MENT WITHIN THE BLAST AREA. THIS VIOLATION IS DADT OF A
GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REC	QUIREMENTS AND CONTRIBUTED TO THE SEVERITY OF THE
ACCIDENT INVOLVING THE FAILURE OF THE RAISE ON 8/10/93 WHIC	CH RESULTED IN THE DEATH OF FOUR MINERS.
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTI	NG MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENSURE
THAT ALL PERSONS WERE CLEARED AND REMOVED FROM THE BL	AST AREA. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act	Title 30 CFR 5 7 . 6 3 7 5
10 Gravity	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely Highly Likely Occurred X
sonably be expected to be: No Lost Workdays Lost Wo	prkdavs or Restricted Duty Permanently Disabling Estate
sonably be expected to be: No Lost Workdays Lost Wo	orkdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No	orkdays or Restricted Duty Permanently Disabling Fatal X D. Number of Persons Affected 0 0 4
B. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       B. Low       C. Moderate	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       Image: Comparison of the second sec
b. Injury of intress could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       13. Type	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       9         ype of Issuance (check one)       0       0       0
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13. Type	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13. Type         14. Initial Action       D. Written	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       0         ype of Issuance (check one)       Order       X       Safeguard         L. Citation       Order       X       Safeguard
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       1       -       -       13. Type         14. Initial Action       D. Written       No C. Safeguard       D. Written       Notice	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard         Litation       Order       X       Safeguard         E. Citation/       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       4       1       0       4       2       1       No       Da       Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Type         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       Count       C. Safeguard       Notice	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         E. Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       C         14. Initial Action       X       B. Order       C. Safeguard       D. Written       Notice         15. Area or Equipment       -       -       -       -       -	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       Image: Constraint of Persons Affected       Image: Constraint of Persons Affected       0       0       4         Image: D. High       X       E. Reckless Disregard       Image: Constraint of Persons Affected
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment       J. CHRISTIANSEN - USE OF EXPLOSIVES       VER       VER       VER	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard         Litation       Order       X       Safeguard         Order       Y       Y       0       5       1       0       9       4
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard          E. Citation/       Order       Y       Safeguard          Order       Y       Y           Order       Y       Y           Ymber       Y        Y          Order       Y       Y           Ymber       Y
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard          E. Citation/       Order       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard          E. Citation/       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard          Citation       Order       X       Safeguard           E. Citation/       Order       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard          ype of Issuance (check one)       Order       X       Safeguard          Citation       Order       X       Safeguard           E. Citation/       0       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Number       4       4       1       0       4       2       1
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       C         14. Initial Action       X       B. Order       C. Safeguard       D. Written       Notice         15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       C         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
b. Injury of intress could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       C         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment	orkdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   ype of Issuance (check one)   Citation Order   X Safeguard     E. Citation/ 4   Yr 0   Order X   Number 4     Yr   Order   Yr   Order   Yr   Order   Yr   Order   Yr   Yr   Order   Yr   Yr   Order   Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       D. USE OF EXPLOSIVES       D. Written       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINER IS DECEASED.       0       5       1       0       9       4       0         Section IV Automated System Data       19. Type of Inspection       20. Event Number       0       0       5       0       0       1       0       9       4       0	orkdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   ype of Issuance (check one)   Citation Order   X Safeguard     E. Citation/ 4   Qrder 4   Number 4     Yr   Order X   Safeguard     Yr   Order   Number     Yr   Order   Y   Yr   Order   Y   Yr
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       D. USE OF EXPLOSIVES       D. Written       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINER IS DECEASED.       0       5       1       0       9       4       0         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0         Section IV Automated System Data       10       9       4       B. Time (24 Hr Clock)       0	orkdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   ype of Issuance (check one)   Citation Order   X Safeguard     E. Citation/ 4   Qrder 4   Number 4     Ye   Order X   Safeguard     Ye   Order Ye   Number 4   Ye   Order   Ye   Ye   Order   Ye   Ye <
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       D. USE OF EXPLOSIVES       D. Written       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINER IS DECEASED.       0       5       1       0       9       4       B. Time (24 Hr Clock)       0         Section IV Automated System Data       19. Type of Inspection       0       5       1       0       5       1       6       1         22. Signature       0       3       0       20. Event Number       0       5       1       6       1	orkdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   ype of Issuance (check one)   Citation Order   X Safeguard     E. Citation/ 0   Year 0   Order X   Number 4   Year 0   Order X   Number 4   Year 0   Year 0 <
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       D. USE OF EXPLOSIVES       D. Written       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINER IS DECEASED.       0       5       1       0       9       4       B. Time (24 Hr Clock)       0         Section IV Automated System Data       19. Type of Inspection       0       5       1       0       9       4       1       6       1         22. Signature       0       3       0       20. Event Number       0       5       1       6       1	orkdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   ype of Issuance (check one)   Ditation Order   X Safeguard     E. Citation/ 4   Vertice 0   Order X   Safeguard     Image: Construction of the second secon
b. Injury of nimess could reasonably be expected to be:       No Lost Workdays       Lost Workdays         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13. Ty         14. Initial Action       A. Citation       X       D. Written       Notice         15. Area or Equipment       D. Written       Notice       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINER IS DECEASED.       Hr. Clock)       0       5       1       0       9       4       B. Time (24 Hr Clock)       0         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0         19. Type of Inspection       0       3       0       20. Event Number       0       5       1       6       1         22. Signature       Will Action       Willow       Willow       Willow       Willow       Willow	orkdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard

# U.S. Department of Labor

Mine Safety and He	alth Administration
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Section I Violation Data
1. Date         Mo         Da         Yr         2. Time (24 Hr. Clock)         3. Citation/Order           0.5         1.0         9.4         0.7         1.6         3. Citation/Order
4 Served To 5 Operator
DOUGLAS MCGREGOR GENERAL MANAGER
6. Mine 7. Mino ID
8. Condition or Practice
Cd. WhiteH Notice (103g)
ALL PERSONS WERE NOT CLEARED AND REMOVED FROM THE BLAST AREA WHEN BLASTING HANGUPS IN THE 865 RAISE ON "B"
SHIFT, 8/10/93. TWO MINERS WERE USING EXPLOSIVES IN THE MANWAY COMPARTMENT ADJACENT TO THE RAISE. ONE OF THE
MINERS WAS IN THE MANWAY COMPARTMENT WITHIN A FEW SETS OF THE BLAST AREA WHEN THE BLAST WAS INITIATED.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS AND CONTRIBUTED
FOUR MINERS
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENGLIDE
THAT THESE TWO MINERS WERE CLEARED AND REMOVED FROM THE BLAST AREA. THIS VIOLATION IS AN UNWARRANTABLE
FAILURE.
See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other         of Act         -         Title 30 CFR         5         7         .         6         3         7         5
10. Gravity:
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred X
B. Injury or Illness could rea
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal
11 Negligence (check one)
A. None B. Low C. Moderate D. Hinh X. F. Reckless Discogard
12 Type of Action
14. Initial Action D. Written F. Citation/ E. Dated Mo. Da Vr.
A. Citation X B. Order C. Safeguard Notice Order 4 4 1 0 4 2 1 0 5 1 0 9 4
15 Area or Equipment
J. CHRISTIANSEN - USE OF EXPLOSIVES
16. Termination Due Mo Da Yr
Section III Termination Action
17. Action to Terminate
THE MINER IS DECEASED.
18 Terminated Mo Da Vr
A. Date       B. Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6 1 8 P
22. Signature 23. AR Number
Immed tongo
MSHA Form 7000-3 Mar 85 (Revised)
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U.S. Department of Labor Mine Safety and Health Administration

1. Date Mo Da Yr 2. Time (24 Hr. Clock)				3. Citation/Order
0 5 1 0 9 4	0	7 1	7	Number  4  4  1  0  4  3  8
4. Served to			1	5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER				MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
			·   ·	
8 Condition or Practice				0 2 - 0 0 1 5 2 - 0 (contractor)
				Ba. written Notice (103g)
ADEQUATE WORKPLACE EXAMINATIONS WERE NOT	CON		TE	
WHICH ADVERSELY AFFECTED THE HEALTH AND SA	FET	YOF	ТН	MINERS WERE NOT DETECTED OR CORRECTED THIS VIOLATION IS
PART OF A PRACTICE OF A FAILURE TO CONDUCT A	DEQ	UATE	EX	AMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON
8/10/93 WHICH RESULTED IN THE DEATH OF FOUR M	INEF	RS.		
AN ADEQUATE EXAMINATION OF THE 865 RAISE WOR	RKPL	ACE	S A	ND SUPPORT STRUCTURE WOULD HAVE DETERMINED THAT:
(1)STRUCTURAL CONDITIONS IN THE RAISE WERE H		RDOU	JS; (	(2)LADDERS HAD NOT BEEN SECURED; (3)TIMBER, BLOCKING, AND
CRIBBING HAD SHIFTED; (4)ARMORED CRIBBING WA	SDR		GE	D AND DAMAGED IN AT LEAST TWO AREAS BETWEEN THE ORE PASS
AND MAINWAT COMPARTMENT, AND (S)ORE AND AR	NUR		RIB	BING PIECES HAD FALLEN INTO THE MANWAT COMPARTMENT.
DURING THIS PERIOD MINERS WERE REGULARLY RE	EQUI	RED	то	TRAVEL THE MANWAY COMPARTMENT TO WORK PLACES TO
ELIMINATE HANGUPS AND FOR ACCESS TO OTHER L	EVE	LS. N	MAN	AGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING
				See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health				
Safety B. Section				C. Part/Section of
Other of Act -				Title 30 CFR 5 7 . 1 8 0 0 2 a
Section II Inspector's Evaluation				
A. Injury or Illness (has) (is): No tikelihood	likelv	,		Reasonably Likely Highly Likely Occurred X
b. Injury or liness could rea- sonably be expected to be: No Lost Workdays	<u> </u>	10		Norkdays or Postricted Duty
The East Workaayo			nsi u	
C. Significant and Substantial (See Reverse): Yes	x	No		D. Number of Persons Affected 0 0 4
C. Significant and Substantial (See Reverse):       Yes         11. Negligence       (check one)         A. None       B. Low	С. М	No	nte	D. Number of Persons Affected     0     0     4       D. High     X     E. Reckless Disregard
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       Image: Check one	<u>х</u> с. м	No lodera	nte 13.	D. Number of Persons Affected     0     0     4       D. High     X     E. Reckless Disregard     1
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -	С. М	No lodera	nte 13.	D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       1         Type of Issuance (check one)       Order       X       Safeguard
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       1       ,       -         14. Initial Action       -       -       -       -       -       -       -	С. М	No lodera -	itter	D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       0         Type of Issuance (check one)       Order       X       Safeguard         E. Citation       Order       F. Dated       Mo       Da
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       C.	С. М с. М	No lodera -	itter	D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       0       0       4         Type of Issuance (check one)       Order       X       Safeguard       0       0       9       4         E. Citation/       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       104 - D - 1,       -         14. Initial Action       A. Citation       X. B. Order       C. Safeguard         15. Area or Equipment	С. М []	No lodera -	itter	D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       0       4         Type of Issuance (check one)       Order       X       Safeguard       0         E. Citation       Order       Y       Safeguard       0       9       4
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       104 - D - 1, -       -         14. Initial Action       A. Citation       X. B. Order       C. Safeguard         15. Area or Equipment	С. М []	No lodera - D. Wri Not	itter	D. High       X       E. Reckless Disregard         D. High       X       E. Reckless Disregard         Type of Issuance (check one)       Order       X         Safeguard       Safeguard         Image: D. High       Image: Deckless Disregard         Type of Issuance (check one)       Order         Citation       Order         Image: Deckless Disregard       Image: Deckless Disregard         I
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard	C. M	No lodera -     D. Wri Not	itter itter ON	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       Image: Comparison of the persons affected       0       0       4         Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of the persons affected       0       0       5       1       0       9       4         Image: Comparison of the persons of the pe
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M	No lodera -     Not	itter itter ON:	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment       DAHLSTRAND\MCCONNEL\ALLISON - WORKPLACE EX         16. Termination Due       A. Date       Mo       Da       Yr       B. Time	C. M C. M [ ] XAM	No lodera -     Not INATI	itter 13. itter itter	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard	C. M C. M [] [] [] [] [] [] [] [] [] [] [] [] []	No lodera 	itter 13. itter itter	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       ,       -         12. Type of Action       1       0       4       -       0       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M [ ] XAM	No lodera Wri Not INATI 4. ck)	itter 13.	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M [ ] XAM	No lodera 	itter itter ON:	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M [] [] [] [] [] [] [] [] [] [] [] [] []	No lodera - D. Wri Not INATI	itter itter ON:	Volkdays of Restricted Duty       Permanenty Disability       Patal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M [] ] XAM (24) Close (24	No Iodera 	itter itter ON:	Volkdays of Restricted Duty       Permanenty Disability       Padal (X)         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment       -       -       1       ,       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time         16. Termination Due       A. Date       Mo       Da       Yr       B. Time         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24)         Section IV Automated System Data       System Data       -       -       -	C. M C. M [] ] XAM (24) . Cloc	No lodera 	itter 13. itter itter	Volkdays of Restricted Duty     D. Number of Persons Affected     0      0
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       0       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment       -       -       A. Date       Mo       Da       Yr       B. Tim         16. Termination Due       A. Date       Mo       Da       Yr       B. Tim         17. Action to Terminate       -       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24         Section IV Automated System Data       19. Type of Inspection       20. Event Number       -	C. M C. M [] [] XAM . Cloc	No lodera 	itter 13. itter itter	Volkdays of Restricted Duty     D. Number of Persons Affected     0      0
C. Significant and Substantial (See Reverse): Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment       -       -       A. Date       Mo       Da       Yr       B. Time         16. Termination Due       A. Date       Mo       Da       Yr       B. Time         17. Action to Terminate       -       -       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24         Section IV Automated System Data       19. Type of Inspection       20. Event Number       0	C. M C. M [] [] [] [] [] [] [] [] [] [] [] [] []	No           Iodera           -           D. Writ           Not           INATI           4           ck)           Clock)           1           1	itter 13. ON: 6	Volkdays of Restricted Duty     D. Number of Persons Affected     0      0
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M C. M C C. M C C C C C C C C C C C C C C C C C C C	No           Iodera           -           D. Wrin           Not           INATI           4           ck)           Clock)           1           1	ate 13. itter tice 0N: 6	Volkdays of Restricted Duty Permanenty Disability   D. Number of Persons Affected 0   0 0   Image: Determining in the image of the ima
C. Significant and Substantial (See Reverse):       Yes         11. Negligence (check one)       A. None       B. Low         12. Type of Action       1       0       4       -       D       -       1       ,       -         12. Type of Action       1       0       4       -       D       -       1       ,       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       -         15. Area or Equipment	C. M C. M C. M C. M C C. M C C C C C C C C C C C C C C C C C C C	No           Iodera           -           D. Wrin           Not           INATI           4           ck)           Clock)           1           1	ate 13. itter tice 0N: 6	Volkdays of Restricted Duty Permanenty Disability   D. Number of Persons Affected 0   0 0   Image: Description of the second se

MSHA Form 7000-3 Mar 85 (Revised)

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

Continuation				IVIII	ie 3	alety an		stration	
Section I Subsequent	Action/Continuation D	lata						· _· _· _· _· _·	
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 1 (	) Yr 9 9	4	3. Citation/Order Number	4 4 1 0 4	3 8 - 1
4. Served To		<u> </u>		15. Or	Derato	l r			
DOUGLAS MCGREC	GOR, GENERAL MAN	NAGER		м	AGM	A COPPER	COMPANY, SUPERIO	R MINING DIVISION	
6. Mine	· · · · · · · · · · · · · · · · · · ·			7. Mi	ne ID	TIT			
MAGMA MINE						02-	00152-	(contractor)	
Section II Justification	for Action							<u></u>	
MORE THAN ORDIN				COPE	ГОТ			THOMAS	
UNWARRANTABLE	FAILURE.	INTALLING TO BETEC		UURN	EUI		E STATED HAZARDS.	THIS VIOLATION IS	<u>AN</u>
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				_				See Continuat	ion Form
Section III Subsequent /           8. Extended To           A. Date	Action Taken Mo Da ate	Yr B. Time (24 Hr. )	Clock)			C.	Vacated D. Term	ninated E. Moo	lified
Section IV Inspection D	ata				1				·····
9. Type of Inspection	10. Ev	ent Number							
	030	05	1 1	6 1	8				
11. Signature	101 10/1	ARI	Numbe	r 12	. Date	Mo	Da Yr 13. Time	(24 Hr. Clock)	
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MSHA Form 7000-3a, Mar 85 (Revised)

1 Date Mo Da Yr 2 Time (24 Hr Clock) 3. Citation/Order	
	20
0 5 1 0 9 4  0 7 1 6 Number  4 4 1 0 4	39
DOUGLAS MUGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION	
MAGMA MINE	
ADEQUATE WORKPLACE EXAMINATIONS WERE NOT CONDUCTED IN THE 865 RAISE ON "A" SHIET, 8/4/93, IN THAT CONDITIONS	
WHICH ADVERSELY AFFECTED THE HEALTH AND SAFETY OF THE MINERS WERE NOT DETECTED OR CORRECTED. THIS VIOLATION	NIS
PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE	ON
8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	
AN ADEQUATE EXAMINATION OF THE 865 RAISE WORKPLACES AND SUPPORT STRUCTURE WOULD HAVE DETERMINED THAT:	
(1)STRUCTURAL CONDITIONS IN THE RAISE WERE HAZARDOUS; (2)LADDERS HAD NOT BEEN SECURED; (3)TIMBER, BLOCKING, AND	)
CRIBBING HAD SHIFTED; (4)ARMORED CRIBBING WAS DISLODGED AND DAMAGED IN AT LEAST TWO AREAS BETWEEN THE ORE PAS	SS
AND MANWAY COMPARTMENT; AND (5) ORE AND ARMORED CRIBBING PIECES HAD FALLEN INTO THE MANWAY COMPARTMENT.	
DURING THIS PERIOD MINERS WERE REGULARLY REQUIRED TO TRAVEL THE MANWAY COMPARIMENT TO WORK PLACES TO	
ELIMINATE HANGUPS AND FOR ACCESS TO OTHER LEVELS. MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING	
	-
9. Violation A. Health	
Other of Act J J J J J J J J J J J J J J J J J J J	
Section II Inspector's Evaluation	1l
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred X	
B. Injury or Illness could rea-	
ana bis har a march a da har an Alla da da da an an 💭 da a da d	
sonably be expected to be: No Lost vvorkdays Lost vvorkdays or Restricted Duty Permanently Disabling Patal	X
Sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabiling Patal	X
C. Significant and Substantial (See Reverse): Yes X No     D. Number of Persons Affected	X 04
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard	X 04
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       C. Moderate       D. High       X       E. Reckless       D. High       X	X 04
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1.0       4       D       1       13. Type of Issuance (check one)       Other       Software       Other       Other       Software       D. High       X       E. Reckless Disregard       Image: Check one)       Image: Check one	X 04 ]
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       -	X 04 ]
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       D. Written       E. Citation       Order       X       Safeguard       D	X 04 ]
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       D. Order       X       B. Order       C. Safeouard       Notice       Order       4       4       1       0       4       2       1       0       5       1       0	X 04 ] Yr 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       D. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         14. Initial Action       C. Safeguard       Notice       Order       View       0       5       1       0	X 0 4 ] Yr 9 4
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       D. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       Equipment       E.       Safeguard       D       1       0       5       1       0	X 0 4 ] 9 4
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       No       Da         15. Area or Equipment	X 04 } Yr 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS	X 0 4 ] 9 4
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       Y       Yes       No       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       Image: Content of the second of the sec	X 04 7 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       No         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       E       EXAMINATIONS       16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       1       0       4       2       1       No       1       0       5       1       0	X 04 7 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabiling       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       12.         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       14.         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       E       E       E       E       E       1       0       4       2       1       F. Dated       0       5       1       0         16. Termination Due       A. Date       Mo       Da       Yr	X 04 7 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentify Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       D.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       E       EXAMINATIONS       E <t< td=""><td>X 04 7 94</td></t<>	X 04 7 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETTCHRISTIANSEN - WORKPLACE EXAMINATIONS       E       E       E       Image: Clock (Check (Che	X 04 7 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanenty Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       C. Moderate       D. High       X       E. Reckless Disregard       1         14. Initial Action       1       0       4       -       D       -       -       C. Station/       Order       X       Safeguard       D         15. Area or Equipment       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       -       -       -       -       -       -       -       -       -	X 04 7 94
Sonably de expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETTCHRISTIANSEN - WORKPLACE EXAMINATIONS       EXAMINATIONS       EDWARDS\TRUETTCHRISTIANSEN - WORKPLACE EXAMINATIONS       Exection III - Termination Action       17. Action to Terminate       THE MINERS ARE DECEASED.         18. Terminated       Mo       Da       Yr       B. Time (24       Hr. Clock)       Execution to Terminate       Execution to Terminate         17. Action to Terminate       Mo       Da       Yr       Execution to Terminate       Execution to Terminate       Exec	X 0 4 3 9 4 9 4
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentry Disabling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       0         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard       0       5       1       0         15. Area or Equipment       EDWARDS\TRUETTICHRISTIANSEN - WORKPLACE EXAMINATIONS       EDWARDS\TRUETTICHRISTIANSEN - WORKPLACE EXAMINATIONS       16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       17. Action to Terminate         17. Action to Terminate       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       1       0       7       1       0       1       0       1       1       1       1       1       0	X 0 4 ] 9 4 
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentry Disabling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       C. Citation       Order       X       Safeguard       1       0       4       1       0       4       1       0       4       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0 <td>X 0 4 3 9 4 9 4</td>	X 0 4 3 9 4 9 4
Sonably de expected to be:       No Lost Workdays       Lost Workdays of Restricted Duty       Permanently Disabling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       D. Written       E. Citation       Order       X       Safeguard       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       7       1       9       5       1       0       7       1       9       5	X 04 } 94
Sonaby be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       0         12. Type of Action       1       0       4       -       -       -       C. Moderate       D. High       X       E. Reckless Disregard       0         14. Initial Action       A. Citation       D. Order       X       Safeguard       0       5       1       0       4       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETNCHRISTIANSEN - WORKPLACE EXAMINATIONS       EDWARDS\TRUETNCHRISTIANSEN - WORKPLACE EXAMINATIONS       If The MINERS ARE DECEASED.       If The MINERS ARE DECEASED.       If The MINERS ARE DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       1       9         Section IV – Automated System Data       10       9       4       1       6       1       1       1 <td>X 04 } 94</td>	X 04 } 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentity Disabiling       Patal         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       X       B. Order       C. Safeguard       D. Written       C. Etation/ Order       4       4       1       0       4       2       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       0       5       1       <	X 04 94
Sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanentry Disabiling       Paral         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       1       1, Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Order       X       Safeguard         15. Area or Equipment       E. Otation// A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       O       7       1       9         Section III - Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       O       7       1       9         Section IV - Automated System Data       20. Event Number       0       5       1       6       1       8       P         22. Signature       0       3       0       5       1	X 04 94
Sortably de expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabiling       Paral         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       A. None       D. Viritten       C. Safeguard       Order       X       Safeguard         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation/       0       4       1       0       4       2       1       F. Dated       Mo       Da         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       E       Etaiton       The Rinc (24       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       The MINERS ARE DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       1       9         2. S	X 0 4 9 4 

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

Section I Subsequent 1. Subsequent Action	Action/Continuation D	ata		•											
1. Subsequent Action	1a. Continuation														
	X	2. Dated (Original Issue)	Мо 0 5	Da 1 0	Yr 94		3. Citation/Order Number	4	4	1	0 4	4 3	9	- 1	Γ
4. Served To				5.07											
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6. Mine				7. Mi	ne ID						nsic.	/N			
MAGMA MINE				1		02-	00152-		  (co	ntre	ictor)	•			
Section II Justification	for Action														
MORE THAN ORDIN	ARY NEGLIGENCE		פה די	CODD	ECTI										
UNWARRANTABLE	FAILURE.			00111			L STATED HAZARDS.	пъ	VIU		IUN	IS A	N		
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Section III Subsequent	Action Taken														
8. Extended To A. Da	ate Mo Da	Yr B. Time (24 Hr.	Clock)			C.	Vacated D. Termi	nated	[		E. N	lodifi	ed		
Section IV Inspection D	ata	ent Number											_		
	0 3 0	0 5	1 1	6 1	8										
11. Signature	W. Withou		Numbe	r 12. 3	. Date	Мо 0 5	Da Yr 13. Time (; 1 0 9 4	24 Hr.	Clo	;k)			0 7	, 1	8

MSHA Form 7000-3a, Mar 85 (Revised)

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

. Date Mo Da Yr 2. Time (24 Hr. Clock) 3. Citation/Order 9.
I. Served To 5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
5. Mine ID 7. Mine ID
MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)
3. Condition or Practice 8a. Written Notice (103g)
ADEQUATE WORKPLACE EXAMINATIONS WERE NOT CONDUCTED IN THE 865 RAISE ON "B" SHIFT, 8/9/93, IN THAT CONDITIONS
PART OF A PRACTICE OF A FAILURE TO CONDUCT ADFOLIATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE BAISE ON
8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.
AN ADEQUATE EXAMINATION OF THE 865 RAISE WORKPLACES AND SUPPORT STRUCTURE WOULD HAVE DETERMINED THAT:
(1)STRUCTURAL CONDITIONS IN THE RAISE WERE HAZARDOUS; (2)LADDERS HAD NOT BEEN SECURED; (3)TIMBER, BLOCKING, AND
CRIBBING HAD SHIFTED; (4)ARMORED CRIBBING WAS DISLODGED AND DAMAGED IN AT LEAST TWO AREAS BETWEEN THE ORE PASS
AND MANWAT COMPARTMENT, AND (S)ORE AND ARMORED CRIBBING PIECES HAD FALLEN INTO THE MANWAT COMPARTMENT.
DURING THIS PERIOD MINERS WERE REGULARLY REQUIRED TO TRAVEL THE MANWAY COMPARTMENT TO WORK PLACES TO
ELIMINATE HANGUPS AND FOR ACCESS TO OTHER LEVELS. MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING
See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other         of Act         -         Title 30 CFR         5         7         .         1         8         0         0         2         a
10. Gravity:
A. Injury or Illness (has) (is): No Likelihood 🔲 Unlikely 🗌 Reasonably Likely 🗍 Highly Likely 🗍 Occurred 🛛
B. Injury or Illness could rea-
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatai X
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0 4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of the comparison
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       Image: Comparison of the comparison of
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         I1. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       III.         I2. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       D.         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       D.
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       D.         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       D.         14. Initial Action       D. Written       E. Citation/       0       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       4       4       1       0       4       2       1       0       9       4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       D.         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       D.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       D.         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       D.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       E.       Equipment       E.       <
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0       4         12. Type of Action       Image: Comparison of Persons Affected       Image: Comparison of Persons Affected       0       0       4         12. Type of Action       Image: Comparison of Persons Affected       Image: Comparison of Persons Affected       0       0       4         12. Type of Action       Image: Comparison of Persons Affected       Image: Comparison of Persons Affected       0       0       4         14. Initial Action       D. Viriten       E. Citation/ Notice       Image: Comparison of Persons Affected       0       5       1       0       9       4         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       EXAMINATIONS       Image: Comparison of Persons Affected       0       5       1       0       9       4
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0       4         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0       4         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       X       Safeguard       Yr         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       EXAMINATIONS       Image: Comparison of Compari
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       D. Viritten       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       B. Time (24       D       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       C. Station/       A 4       1       0       4       2       1       F. Dated       Mo       Da       Yr         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       E </td
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       X       Safeguard       0       5       1       0       9       4         15. Area or Equipment       EDWARDS\TRUETT\CHRISTIANSEN - WORKPLACE EXAMINATIONS       B. Time (24       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock)       E. Termination Action
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       D. Number       Order       X       Safeguard         15. Area or Equipment       D. Order       A. Date       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       D. Written       E. Citation/       Order       X       Safeguard         15. Area or Equipment       EDWARDS\TRUETTICHRISTIANSEN - WORKPLACE EXAMINATIONS       E. Time (24       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         7. Action to Terminate       THE MINERS ARE DECEASED.       Mo       Da       Yr
C. Significant and Substantial (See Reverse):       Yes       Yes       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       Image: Comparison of the
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Check one)         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Check one)         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       Image: Check one)         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation       Order       Yr       Safeguard       Image: Check one)         15. Area or Equipment       EDWARDSITRUETTCHRISTIANSEN - WORKPLACE EXAMINATIONS       E       Check one)       Image: Che
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0<
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       4         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       D. Written       C. Safeguard       Order       X       Safeguard       -         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation/ Order       F. Dated       Mo       Da       Yr         15. Area or Equipment       EDWARDS\TRUETTICHRISTIANSEN - WORKPLACE EXAMINATIONS       E       E       E       -
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0<
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0 4 11. Negligence (check one) A. None B. Low C. Moderate D. High X E. Reckless Disregard 12. Type of Action 1 0 4 - D - 1 , Catation Order X Safeguard 14. Initial Action A. Catation X B. Order C. Safeguard D. Written Notice C. Safeguard V. C. Moderate V
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0<

MSHA Form 7000-3 Mar 85 (Revised)

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

				T						T
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	М 0	。 5	Da 1 0	9 4	1	3. Citation/Or Number	rder 4	4 1 0 4 4 0 -
4. Served To				ŧ	5. Op	erator	_		I	
DOUGLAS MCGRE	GOR, GENERAL MAN	NAGER			M	AGMA	CO	PPER COMPANY, S	UPERIOR MIN	ING DIVISION
. Mine			-	7	7. Mir	ie ID	Τ			
MAGMA MINE							0	2 - 0 0 1 5	2 -	(contractor)
Section II Justification	for Action				,					
			OT 01							
UNWARRANTABLE		IN FAILING TO DETE	CTO	RC	ORR	ECT	HE /	ABOVE STATED HA	ZARDS. THIS	VIOLATION IS AN
								· · · · · · · · · · · · · · · · · · ·		
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		••								
										See Continuation Form
ection III Subsequent	Action Taken									
. Extended To A. D	ate Mo Da	Yr B. Time (24 Hr.	Cloc	k)				C. Vacated	D. Terminated	E. Modified
ection IV - Inspection [	Data		1 1							
. Type of Inspection	0 3 0 10. Ev	vent Number 0 5	5 1	1	6 1	8				
		··· ······			-+	<u>і                                    </u>				

MSHA Form 7000-3a, Mar 85 (Revised)

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Section I Violation Data				-						
1. Date Mo Da Yr 2. Time (24 Hr. Clock)						3. Citatio	on/Order			
0 5 1 0 9 4	07	22	0			Num	or	4 4 1	04	4 1
4. Served To		<b>_</b>	5. Opera	tor		Num			0 4	
DOUGLAS MCGREGOR, GENERAL MANAGER			MAG		FR COMP	ANY SUPE	RIOR MINING	DIVISION		
6. Mine			7. Mine	D				Dividicit		
MAGMA MINE				02	- 0 0	1 5 2 -	(00	intractor)		
8. Condition or Practice							8a. Written No	tice (103g)	)	
ADEQUATE WORKPLACE EXAMINATIONS WERE NOT	CON	IDUC	TED IN TH	E 865 RAI	SE ON "C"	SHIFT, 8/9/	93, IN THAT C	ONDITION	s	
WHICH ADVERSELY AFFECTED THE HEALTH AND S	AFET	YOF	THE MINE	RS WERE	NOT DETE	CTED OR	CORRECTED.	THIS VIO	LATIO	VIS
PART OF A PRACTICE OF A FAILURE TO CONDUCT A	DEQ		EXAMINA	TIONS TH	AT CONTR	IBUTED TO	THE FAILUR	E OF THE	RAISE	ON
8/10/93 WHICH RESOLTED IN THE DEATH OF FOUR N	IINER	(5.								
AN ADEQUATE EXAMINATION OF THE 865 RAISE WO	RKPL	ACES		PORT ST	RUCTURE	WOULDH		NED THAT	r	
(1)STRUCTURAL CONDITIONS IN THE RAISE WERE H	IAZAF	RDOU	S; (2)LADI	ERS HAD	NOT BEE	N SECURE	D; (3)TIMBER,	BLOCKING	G, AND	)
CRIBBING HAD SHIFTED; (4)ARMORED CRIBBING WA	S DIS	SLOD	GED AND	DAMAGEE	IN AT LEA	ST TWO A	REAS BETWE	EN THE O	RE PA	ss
AND MANWAY COMPARTMENT; AND (5) ORE AND AR	MOR	ED CF	RIBBING P	ECES HA	D FALLEN	INTO THE	MANWAY CON	PARTMEN	NT.	
DURING THIS PERIOD MINERS WERE REGULARLY R		RED			NWAY CO		IT TO WORK I	PLACES TO		
ELIMINATE HANGUES AND FUR ACCESS TO UTHER	LEVE	LS. N	ANAGEM	ENTENGA	AGED IN AG	GGRAVATE		7000 20	TING	
9 Violation A Health		<u> </u>			See Conur	nualion For		7000-3a)		
Safety B Section				C. Part/Se	ction of					
Other of Act -				Title 30	CFR	5	7.18	0 0 2 a		
Section II – Inspector's Evaluation							<u></u>	-   -   -		JJ
10. Gravity:		<b></b>	_					_	. 57	 ר
	niikely		Reas	nably Like	#y	Highly		Occurre	ed 🗡	
B. Injury or Illness could rea-										
sonably be expected to be. No Lost vvorkdays		ĻO	st vvorkday	s or Restri		Pe	rmanently Disa		Fatal	X
C. Significant and Substantial (See Reverse): Yes	X	No			·	D. Numbe	er of Persons At	ffected	0	04
11. Negligence (check one)	~ <sup>'</sup> ••		. г			Ń		-		7
	C. M	odera	le [		D. High	<u> </u>	E. Reckles	s Disregard		<u> </u>
12. Type of Action			13. Type of	Issuance (	check one)		5			
1 0 4 - D - 1 ,     -		-  [	Citatio	1	<u> </u>	Order	X	Safeguard		
14. Initial Action	 D	) Wri	tten	E Citati	ion/		E Dated	Mo	Da	Vr
A. Citation X B. Order C. Safeguard	ר [	Not	ice	Orde	r 44	1 0 4 2	1	0 5	10	94
15 Area or Equipment				Num	ber					
10. Alea of Equipment										
DAHLSTRAND\MCCONNEL\ALLISON - WORKPLACE E	XAMI	NATIO	ONS							
16. Termination Due   Mo Da Yr   A Date         B Tir	ne (74	1								
	r. Cloc	r :k)								
Section III Termination Action						-	•••			
17. Action to Terminate										
18. Terminated Mo Da Yr							<u> </u>	·		
A. Date B. Time (24	4 Hr C	lock)								
Section IV - Automated System Data										
19 Type of Inspection 20 Event Number				1 Driman	or Mill					
	5 1		6 1 0							
22. Signature, 0	10 1		0 1 0			P	23 AP Num	her		<u>, , , , , , , , , , , , , , , , , , , </u>
(1)AU. = (1) 11th							20.7 IX HUHI			
WUXUUM IV. WUXON								0	05	73
MSHA Form 7000-3 Mar 85 (Revised)										

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

Statistic         State					TATU		and health Authinistration
1. SUbsequent Action       1a. Continuation       2       Delif up       1a. ClassicolOnder       4       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       1       1       1       1       1       0       1       0       1       0       1       0       1       1       0       1<	Section I Subsequent	Action/Continuation [	Data				
4. Seven To       5. Operator         DOUGLAS MCGREGOR, GENERAL MANAGER       MARMA COPPER COMPANY, SUPERIOR MINING DIVISION         6. Mme       7. Mme ID       0       2       0       1       5       2	1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 1	) Yr 9 4	3. Citation/Order         4         4         1         0         4         4         1         -         1           1         Number         4         4         1         0         4         4         1         -         1
DOUGLAS MIGREGOR, GENERAL MANAGER         MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION           6. Mre         7. Mine ID         0         2         0         0         1         5         2	4. Served To				5. Op	perator	
6. Mine 7. Mine ID 0 2 - 0 0 1 1 5 2 - 1 (contractor) MACRAM MINE Section 3 - Justification for Action MORE THAN ORDINARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN UWWARRANTABLE FAILURE MORE THAN ORDINARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN UWWARRANTABLE FAILURE Section 8 - Justification for Action MORE THAN ORDINARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN UWWARRANTABLE FAILURE Section 8 - Subsequent Action Taken Extended To A. Date MO De YY Section 10 - Inspection 0 3 0 10 Event Number 12 Date MO De YY 13. Time (24 Hr. Clock) 0 5 1 1 1 6 1 8 1. Signature A. R. Number 12 Date MO De YY 13. Time (24 Hr. Clock) 0 7 2 0 0 7 7 13 0 7 13 1 10 0 4 1 0 7	DOUGLAS MCGRE	GOR, GENERAL MA	NAGER	_	M	AGMA	COPPER COMPANY, SUPERIOR MINING DIVISION
MACAM MINE         0 2 - 0 0 1 5 2 - 1         (contractor)           Section 11 - Justification for Action         MORE THAN DORWARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.           UNWARRANTABLE FAILURE.         UNWARRANTABLE FAILURE.           UNWARRANTABLE FAILURE.	6. Mine				7. Mi	ne ID	
Section II - Justification for Action          MORE THAN ORDINARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         Image: Section II - Subsequent Action Taken         Section III - Subsequent Action Taken         Image: Section III - Subsequent Action Taken         Image: Subsequent Acti	MAGMA MINE						0 2 - 0 0 1 5 2 - (contractor)
MORE THAN ORDINARY NEGLIGENCE IN FAILING TO DETECT OR CORRECT THE ABOVE STATED HAZARDS. THIS VIOLATION IS AN           UNWARRANTABLE FAILURE           Section II - Subsequent Action Taken           Section III - Subsequent Action Taken           Interpretion Data           1 Type of Inspection           0         3           1 Signature           VI Linspection           0         3           1 Signature           VI Linspection           0         3           AR Number         12. Date           Mon Da         Yr           1. Signature         0           0         0	Section II Justification	for Action					
UNWARRANTABLE FAILURE.           UNWARRANTABLE FAILURE.           Section III - Subsequent Action Taken           Section III - Subsequent Action Taken           Section IV - Inspection Data           1. Signature           1. Signature           A. Date           0 3 0           10. Event Number           0 5 1 1 6 1 8           1. Signature           A. W. W. Sea           O 5 1 1 6 1 8	MORE THAN ORDIN					FOTT	
See Continuation Form           Sectori III - Subsequent Action Taken           I Extended To           A Date           Mo           Date           I Statement To           I Signature           AR Number           I Signature           I Signature           I Signature	UNWARRANTABLE	FAILURE.	INTRICING TO DETEC		JURK	EUTT	HE ABOVE STATED HAZARDS. THIS VIOLATION IS AN
See Continuation Form           See Continuation Form           See Continuation Form           Settended To           A Date           Mo           Data           Yi           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Khondited           iaction IV - Inspection Data           1. Signature           A. Wurber           0							
See Continuation Form           See Continuation Form           Section III - Subsequent Action Taken           1 Extended To         A. Date           9 Extended To         D. Terminated           9 Extended To         D. S 1 1 6 1 8           1. Signature         A. R Number           1. Signature         A. R Number           0 0 5 5 1 7 13         D 5 1 1 0 9 4 4			-				
Secton IV - Inspection Data         No         Data         E. Modified           1. Type of Inspection         0         3         0         10. Event Number         0         5         1         6         1         8           1. Signature         0         3         0         10. Event Number         0         5         1         6         1         8							
Section III - Subsequent Action Taken           Section III - Subsequent Action Taken           . Extended To           . Extended To           . Date           . Extended To           . Date           . Date           . Extended To           . Date           . Date           . Extended To           . Date           . Date           . Type of Inspection Data           . Type of Inspection           0           . Signature							
See Continuation Form           Section II Subsequent Action Taken           3. Extended To           A. Date           Mo           Da           Yr           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Modified           isection N Inspection Data           1. Type of Inspection           0         3           10. Event Number           0         5           1         6           1. Signature           A. With Gau           A. Uniter           D. Terminated           D. Terminated      <							
Section III - Subsequent Action Taken           3           Extended To           A           Date           Mo           Date           Yr           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Modified           Section IV - Inspection Data           1. Type of Inspection           0           0           1. Signature           A. With Gan           A. With Gan							
Secton II Subsequent Action Taken           3. Extended To           A. Date           Mo           Da           Y1           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Modified           Section IV - Inspection Data           1. Type of Inspection           0         3           1. Signature           A. Number           12. Date           Mo         Da           Y1         10. Event Number           0         5           1         1           1. Signature         AR Number           VI (Line W. Williew         0							· · · · · · · · · · · · · · · · · · ·
Section III - Subsequent Action Taken           Section III - Subsequent Action Taken           . Extended To           A. Date           Mo           Da           Yr           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Modified           Section IV - Inspection Data           I. Type of Inspection           0         3           1. Signature           A. Number           12. Date           Mo           Da           Yr           Section IV - Inspection           0           0           0           0           VI (Line W. Willing W. W. Water							
Section III Subsequent Action Taken         See Continuation Form           3. Extended To         A. Date         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         Mo         Da         Yr         I. Signature         AR Number         12. Date         Mo         Da         Yr         13. Time (24 Hr. Clock)         0 <td< td=""><td></td><td>······································</td><td></td><td></td><td></td><td></td><td></td></td<>		······································					
See Continuation Form           Section III – Subsequent Action Taken           3. Extended To           A. Date           Mo           Da           Yr           B. Time (24 Hr. Clock)           Section IV – Inspection Data           1. Type of Inspection           0         3           1. Signature           A. Number           12. Date           Mo           Da           Yr           B. Time (24 Hr. Clock)           O           J. Signature           A. Number           I. Signature           A.R. Number           I. Signature           A.R. Number           I. Signature           A.R. Number           I. Signature           A.R. Number           I. Solo I. J. D. J. J. D. J. J. J. D. J. J. J. D. J. J. J. D. J.							
Section III Subsequent Action Taken           3. Extended To         A. Date           Mo         Da         Yr           B. Time (24 Hr. Clock)         C. Vacated         D. Terminated           Section IV - Inspection Data         10. Event Number         0 5 1 1 6 1 8           1. Signature         AR Number         12. Date         Mo         Da         Yr         13. Time (24 Hr. Clock)							
See Continuation Form           Section III Subsequent Action Taken           3. Extended To           A. Date           Mo           Da           Yr           B. Time (24 Hr. Clock)           C. Vacated           D. Terminated           E. Modified           Section IV - Inspection Data           Y. Type of Inspection           0         3           1. Signature           A.R Number           12. Date           Mo           Da           Yr           13. Signature           A.R Number           12. Date           Mo           Da           Yr           Signature           AR Number           12. Date           Mo           Da           Yr           Yr <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
Section III - Subsequent Action Taken           3. Extended To         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         Mo         Da         Yr         B. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           3. Extended To         A. Date         0         5         1         1         6         1         8           1. Signature         AR Number         12. Date         Mo         Da         Yr         13. Time (24 Hr. Clock)         0         7         2         0				• • • • • • • • • • • • • • • • • • • •			
Section III - Subsequent Action Taken           3. Extended To         A. Date           Mo         Da           Yr         B. Time (24 Hr. Clock)           C. Vacated         D. Terminated           E. Modified           Section IV - Inspection Data           Type of Inspection           0         3           1. Signature           William W. Withow							
See Continuation Form           Section III - Subsequent Action Taken           3. Extended To         A. Date           9. Type of Inspection Data         C. Vacated           9. Type of Inspection         0           0         3           1. Signature         AR Number           12. Date         Mo           0         5           1. Signature         AR Number           12. Date         Mo           0         5           14. Date         0				· · ·			
Section III - Subsequent Action Taken           3ection III - Subsequent Action Taken           3. Extended To         A. Date           Mo         Da         Yr           B. Time (24 Hr. Clock)         C. Vacated         D. Terminated           Section IV - inspection Data         10. Event Number         0           1. Signature         A. Number         12. Date         Mo           Mo         0         5         1         1           Mo         0         5         1         0         5           Mo         0         5         1         1         6         1							
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Section III – Subsequent Action Taken  Section III – Subsequent Action Taken  Extended To  A. Date  Mo Da Yr B. Time (24 Hr. Clock)  C. Vacated D. Terminated E. Modified  Section IV – Inspection Data  Type of Inspection 0 3 0 10. Event Number 0 5 1 1 6 1 8  AR Number 12. Date Mo Da Yr 13. Time (24 Hr. Clock)  AR Number 12. Date Mo Da Yr 13. Time (24 Hr. Clock)  C. Vacated D. Terminated D. Te							
See Continuation Form Section III - Subsequent Action Taken  Extended To A. Date Mo Da Yr B. Time (24 Hr. Clock) C. Vacated D. Terminated E. Modified Section IV - Inspection Data Type of Inspection Data To be a final to be a f	• . <u>•</u>						
Section III - Subsequent Action Taken         3. Extended To       A. Date         Mo       Da       Yr         B. Time (24 Hr. Clock)       C. Vacated       D. Terminated         Section IV - Inspection Data         P. Type of Inspection       0       3         0       3       0       10. Event Number         1. Signature       AR Number       12. Date       Mo       Da       Yr         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)							
Section III Subsequent Action Taken 3. Extended To A. Date Mo Da Yr B. Time (24 Hr. Clock) C. Vacated D. Terminated E. Modified Section IV Inspection Data Type of Inspection 0 3 0 10. Event Number 0 5 1 1 6 1 8 1. Signature AR Number 12. Date Mo Da Yr 13. Time (24 Hr. Clock) 0 7 2 0 7 7 2 0 7 7 2 0 7 7 7 7							
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See Continuation Form         Section III – Subsequent Action Taken         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         Section IV – Inspection Data         7. Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7       2       0							
See Continuation Form         Section III Subsequent Action Taken         3. Extended To       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       0       3       0       10. Event Number       0       5       1       1       6       1       8         3. Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7       2       0         William       W. William       0       5       7       3       0       5       1       0       9       4       0       7       2       0			· · · · · · · · · · · · · · · · · · ·				
See Continuation Form         See Continuation Form         3. Extended To       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         Section IV - Inspection Data         3. Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7       2       0							
See Continuation Form         Section III Subsequent Action Taken         3. Extended To       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       0       3       10. Event Number       0       5       1       1       6       1       8         3. Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7       2       0							
Section III – Subsequent Action Taken         3. Extended To       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         3. Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         Section IV – Inspection Data         0       3       0       10. Event Number       0       5       1       1       6       1       8         11. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7       2       0							See Continuation Form
Section IV - Inspection Data       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         Section IV - Inspection Data         9. Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         11. Signature       W. W	Section III - Subsequent	Action Taken	<u> </u>				
Section IV – Inspection Data $0 \ 3 \ 0 \ 10.$ Event Number $0 \ 5 \ 1 \ 1 \ 6 \ 1 \ 8$ $1.$ Signature $AR$ Number 12. Date Mo Da Yr 13. Time (24 Hr. Clock) $0 \ 7 \ 2 \ 0 \ 7 \ 2 \ 0 \ 7 \ 10 \ 10$	8. Extended To A. Da	te Mo Da	Yr B. Time (24 Hr. (	Clock)			C. Vacated D. Terminated E. Modified
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Section IV - Inspection D	ata			······································		
11. Signature $AR$ Number 12. Date Mo Da Yr 13. Time (24 Hr. Clock) $0 0 5 7 3 0 5 1 0 9 4$	9. Type of Inspection	0 3 0 10. Ev	ent Number 0 5	1 1	6 1	8	
	11. Signature	J. Ultra		S 7	12. 3	Date	Mo Da Yr 13. Time (24 Hr. Clock)

MSHA Form 7000-3a, Mar 85 (Revised)

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

Section   Violation Data					
1. Date Mo Da Yr 2 Time (24 Hr Clock)				3 Citation/Order	
	0 7	2	1	Number	1110112
4. Served To	<u>v                                     </u>	2	-	5. Operator	4410442
DOUGLAS MCGREGOR, GENERAL MANAGER				MAGMA COPPER COMPANY, SUPERIOR MINING I	DIVISION
6. Mine				7. Mine ID	
MAGMA MINE				02-00152-0000000000000000000000000000000	ntractor)
8. Condition or Practice				8a. Written No	tice (103g)
JEFE S CHRISTIANSEN DID NOT RECEIVE SPECIFIC T	ASK	TR			
RAISE ON "B" SHIFT, 8/10/93. HE WAS ACCOMPANIED	BY A		THE	ER UNTRAINED MINER DURING THIS ACTIVITY, BLAS	STING HANGUPS
FROM THE MANWAY COMPARTMENT IS A UNIQUELY H	HAZ	ARD	ου	S TASK FOR WHICH SPECIFIC TRAINING IS REQUIRE	D. THIS
VIOLATION CONTRIBUTED TO THE FAILURE OF THE R	AIS	E ON	8/1	10/93 WHICH RESULTED IN THE DEATH OF FOUR MIN	IERS, INCLUDING
CHRISTIANSEN.					
THE 865 RAISE STRUCTURE IS A 364 FOOT, TWO-COM	IPAF	RTME	INT	FRAMED-TIMBER RAISE CONSISTING OF A MANWA	Y/TIMBER SLIDE
AND ORE PASS COMPARTMENT. THE RAISE WAS DEV	VEL	OPEI	D A	T AN APPROXIMATE SLOPE OF 81 DEGREES BETWE	EN THE 3636 AND
4000 LEVELS WITH ACTIVE DUMP POINTS AT THE 3763	3, 37	'00, A	\NE	D 3636 LEVELS. MINER ENTRANCES TO THE RAISE V	VERE AT THE
4000, 3763 AND 3700 LEVELS.				· · · · · · · · · · · · · · · · · · ·	
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT	со	NST	τυ	TING MORE THAN ORDINARY NEGLIGENCE IN ALLO	WING THIS
				See Continuation Form (MSHA Form	7000-3a) X
9. Violation A. Health					
Safety B. Section	Ì			C. Part/Section of	
Section II Inspector's Evaluation					
10. Gravity:					
A. Injury or Illness (has) (is): No Likelihood Unli	kely			Reasonably Likely Highly Likely	Occurred X
B. Injury or Illness could rea-					
	]		ost	VVorkdays or Restricted Duty Permanently Disat	ling Fatal X
C. Significant and Substantial (See Reverse): Yes	x	No		D. Number of Persons Aff	ected 0 0 4
A. None B. Low C	C. M	odera	te	D. High X E. Reckless	Disregard
12. Type of Action			13.	Type of Issuance (check one)	
1  0  4  -  D  -  1  ,      -	-	•		Citation Order X S	afeguard
14. Initial Action	 D	. Wr	itte	n E Citation/	Mo Da Yr
A. Citation X B. Order C. Safeguard	-	Not	lice	Order 4 4 1 0 4 2 1	0 5 1 0 9 4
15. Area or Equipment				Number	
					·
J. CHRISTIANSEN					
16. Termination Due A. Date Mo Da Yr A. Date B. Time	e (24				· · · ·
Section III Termination Action		<u>N</u>	1		
17. Action to Terminate					
THE MINER IS DECEASED.					
18. Terminated         A. Date         Mo         Da         Yr         B. Time (24 F)	Hr Cl	lock)		0 7 2 2	
Section IV Automated System Data	··· T ··				
19. Type of Inspection 20. Event Number				21. Primary or Mill	
(activity code)   0   3   0   0   5	5   1	1	6	1 8   P	·····
William W. Wilson				23. AR Numb	er 00573

MSHA Form 7000-3 Mar 85 (Revised)

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

1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 {	Da 5 1	1 Y 0 9	′r  4	3. Citation/Order Number 4 4 1 0 4 4 2 - 1
4 Served To							
DOUGLAS MCGREG	OR GENERAL MAN			5.0	perat		
6. Mine	SON, GENERAL MAI			7 M	lino If		OPPER COMPANY, SUPERIOR MINING DIVISION
MAGMA MINE				1.10		1	0 2 0 0 1 5 2
Section II - Justification f	or Action					. I.	
UNTRAINED MINER	TO BLAST HANGUP	S IN THE RAISE. THI	S VIO	LATIC	N IS	AN I	JNWARRANTABLE FAILURE.
· · · · · · · · · · · · · · · · · · ·							
					_		
	· · · · · · · · · · · · · · · · · · ·						
						_	,
······································							
					_		
	·						
							See Continuation Form
8. Extended To A. Da	te Mo Da	Yr B. Time (24 Hr. C	Clock)	<u>.</u>			C. Vacated D. Terminated E. Modified
Section IV Inspection Da	ata						
9. Type of Inspection	0 3 0 10. Eve	ent Number 0 5	1 1	6 1	8		
11. Signature William (	N. Uthou		lumbe	r 12 3	2. Dat	te	Mo         Da         Yr         13. Time (24 Hr. Clock)         0         7         2         1           0         5         1         0         9         4         0         7         2         1

MSHA Form 7000-3a, Mar 85 (Revised)

Section I Violation Data	
1. Date Mo Da Yr 2 Time (24 Hr Clock)	3 Citation/Order
4. Served To	Number         4         4         1         0         4         4         3
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - 0 (contractor)
8. Condition or Practice	8a. Written Notice (103g)
NICHOLAS P. TRUETT DID NOT RECEIVE SPECIFIC TASK TRAINI	NG PRIOR TO PARTICIPATING IN BLASTING OPERATIONS IN THE 865
FROM THE MANWAY COMPARTMENT IS A UNIQUELY HAZARDOL	IS TASK FOR WHICH SPECIFIC TRAINING IN DECURISE THE
VIOLATION CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8	10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS, INCLUDING
TRUETT.	
AND ORE PASS COMPARTMENT THE PAISE WAS DEVELOPED	T, FRAMED-TIMBER RAISE CONSISTING OF A MANWAY/TIMBER SLIDE
4000 LEVELS WITH ACTIVE DUMP POINTS AT THE 3763 3700 AN	AT AN APPROXIMATE SLOPE OF 81 DEGREES BETWEEN THE 3636 AND
4000, 3763 AND 3700 LEVELS.	D 3030 LEVELS. MINER ENTRANCES TO THE RAISE WERE AT THE
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITU	JTING MORE THAN ORDINARY NEGLIGENCE IN ALLOWING THIS
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act	C. Part/Section of
Section II Inspector's Evaluation	
10. Gravity:	
A. Injury of lillness (nas) (IS): No Likelihood Unlikely	Reasonably Likely Highly Likely Occurred X
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays Lost	Workdays or Restricted Duty Permanently Disabling Fatal X
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4
sonably be expected to be: No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       B. Low       C. Moderate	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       0
sonably be expected to be: No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       13	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       .       .       .
sonably be expected to be: No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       D       -       1       ,       -       -       13	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       B. Low       C. Moderate         A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       Image: Comparison of the second se
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       15. Area or Equipment       16       17       16       16	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       N. TRUETT       N. TRUETT       No       No       No	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard         . Main       E. Citation/       0       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         . Order       Number       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment       N. TRUETT       Mo       Da       Yr	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard         . Order       Number       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       D       -       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       N. TRUETT       N. TRUETT       A. Date       Mo       Da       Yr       B. Time (24	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard          Order       X       Safeguard       .          Order       Y       1       0       4       2       1       F. Dated       Mo       Da       Yr          Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         Notice       N. TRUETT       -       -       -       -       14. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       -       -       -       -	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard         . Type of Issuance (check one)       Order       X       Safeguard          Order       X       Safeguard          Order       Y       1          Order       Y       1          Order       X       Safeguard
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         No TRUETT       No TRUETT       No       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       T/A. Colock       THE MINER IS DECEASED.       ECENTION	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard       .         . Type of Issuance (check one)       Order       X       Safeguard       .         . Type of Issuance (check one)       Order       X       Safeguard       .         . Type of Issuance (check one)       Order       X       Safeguard       .
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         14. Initial Action       X       B. Order       C. Safeguard       D. Writte         A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment       .       .       .       .       .       .         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .       .	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       4         D. High       X       E. Reckless Disregard       .         . Type of Issuance (check one)       Order       X       Safeguard       .         . Type of Issuance (check one)       Order       X       Safeguard       .         . Type of Issuance (check one)       Order       X       Safeguard       .          Order       A       2       1       F. Dated       Mo       Da       Yr          Order       4       4       1       0       4       2       1
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       N. TRUETT       If the colspan="2">A. Date       Mo       Da       Yr       B. Time (24         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINER IS DECEASED.       If the colspan="2">A. Date         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)	Workdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   . Type of Issuance (check one) Order X   Citation Order Y   Safeguard 9
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13         12. Type of Action       1       0       4       -       D       -       1       ,       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINER IS DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       0       5       1       0       9       4	Workdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   . Type of Issuance (check one) Order X   Citation Order X   Safeguard 0   Image: D. High Image: Disregard   . Type of Issuance (check one) Order   Citation Order   . Type of Issuance (check one)   Order Number   . Type of Issuance   . Type of Issuance   . Type of Issuance   . Type of Issuance   . Order   . Type of Issuance   . Type o
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13         12. Type of Action       1       0       4       -       D       -       1       ,       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III - Termination Action       17. Action to Terminate       THE MINER IS DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV - Automated System Data       0       5       1       0       9       4	Workdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   . Type of Issuance (check one)   Citation Order   Citation/ 4   4 1   0 4   2 1   F. Dated Mo   Da Yr   Order X   Safeguard
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       0       -       -       13         12. Type of Action       1       0       4       -       D       -       1       ,       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         N. TRUETT       Image: Color of the second seco	Workdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   . Type of Issuance (check one)   Citation Order   X Safeguard   In E. Citation/ Order A 4 4 1 0 4 2 1 F. Dated Mo Da Yr 0 5 1 0 9 4 0 7 2 3 2 1. Primary or Mill P
sonably be expected to be:       No Lost Workdays       Lost         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13         12. Type of Action       1       0       4       -       D       -       1       ,       -       -       13         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writte         N. TRUETT       .       .       .       .       .       .       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       .       .       .       .         17. Action to Terminate       .       .       .       .       .       .         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV - Automated System Data       .       .       .       .       .       .         19. Type of Inspection	Workdays or Restricted Duty Permanently Disabling Fatal   D. Number of Persons Affected 0 0   D. High X E. Reckless Disregard   . Type of Issuance (check one)   Citation Order   Citation Order   Number 4   4 1   0 7   2 3     21. Primary or Mill   1     23. AR Number

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

Section I Subsequent Action/Continuati	on Data																
1. Subsequent Action 1a. Continuation	on 2. Dated (Original Issue)	Мо 0 5	Da 1 0	Yr 9	4			3.	C N	itati lum	on/ ber	/Or	der			4	4 1 0 4 4 3 - 1
4. Served To	····		5. Op	erato	י אד			1									
DOUGLAS MCGREGOR, GENERAL	MANAGER		M/	AGM	A C	OP	PER	со	M	PAN	٩Y,	ຸຣເ	JPE	RIO	R MI	NI	NG DIVISION
6. Mine			7. Min	ie ID								ŀ	T				
MAGMA MINE						0 2	2 -	0	C	) 1	5	5	2	•			(contractor)
																	· · · · · · · · · · · · · · · · · · ·
UNTRAINED MINER TO BLAST HAN	GUPS IN THE RAISE. TH	IS VIOL	ATION			INW		201	JT.		FI	FAI					
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Action III - Subsequent Action Taken	-															5	ee Continuation Form
. Extended To A. Date	a Yr B. Time (24 Hr. (	Clock)					C. V	aca	ate	d [		0	). T	ermi	nated	1	E. Modified
ection IV Inspection Data	<u> </u>				L												
Type of Inspection 0 3 0	Event Number 0 5	1 1 (	5 1 8	в													
1. Signature		Number	12. [	Date		M	0	Da		Yr		13.	Tin	ne (2	4 Hr	. C	lock)

MSHA Form 7000-3a, Mar 85 (Revised)

Section I Violation Data
1. Date         Mo         Da         Yr         2. Time (24 Hr. Clock)         3. Citation/Order         4         4         1         0         4
4. Served To 5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine 7. Mine ID 7. Mine ID
MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice 8a. Written Notice (103g)
TWO UNTRAINED MINERS WERE USING EXPLOSIVES AND SAFETY FUSE TO BLAST HANGUPS IN THE 865 RAISE ON "B" SHIFT, 8/10/93.
ONLY ONE MINER WAS PRESENT WHEN THE SAFETY FUSE WAS LIT. THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW
FEDERAL EAPLOSIVES USAGE REQUIREMENTS.
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN AUTHORIZING THESE
PRACTICES AND FITHER PERMITTED OR DIRECTED THE UNSUPERVISED BI ASTING BY UNTRAINED MINERS TO CONTINUE. THIS
VIOLATION IS AN UNWARRANTABLE FAILURE.
See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other         of Act         -         Title 30 CFR         5 / / .         6 / 5 / 0 / 2 / h         -           Section II - Inspector's Evaluation         -
10. Gravity:
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred
B Injury or Illness could rea-
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0 1
A None R Low C Moderate D High X Backless Discovered
12. Type of Action
1  0  4  -  D  -  1  ,
A Citation X B Order C Safeguard Notice C Order 4 4 1 0 4 2 1 0 5 1 0 9 4
15. Area or Equipment
CHRISTIANSENTRUETT - USE OF EXPLOSIVES
16. Termination Due Mo Da Yr
A. Date       B. Time (24
Section III Terreirot Auton
17. Action to Terminate
THE MINERS ARE DECEASED.
18. Terminated Mo Da Yr
A. Date
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
22 Signature 23 AB Number
Acamil Hones 00597
MSHA Form 7000-3 Mar 85 (Revised)

Section I	Violation Data		·		7.000.000000000000000000000000000000000		
1. Date	Mo Da Y	r 2. Time (24 Hr. Clock)	0.7.0.4			3. Citation/Order	
4. Served T	. <u>1019111019</u>		0724	5 Operator		Number	4 4 1 0 4 4
DOUGL	AS MCGREGOR	, GENERAL MANAGER		MAGMA COP			DIVISION
6. Mine				7. Mine ID			DIVISION
MAGMA				0 2	2 - 0 0 1	52- (0	ontractor)
8. Condition	n or Practice					8a. Written N	otice (103g)
	R WAS TRANSPO						
AREA T	O THE 865 RAIS	F AT ABOUT 1830 HOURS (CAP)	PED SAFETY FI	USE/CAP- SENSI	TIVE EMULSIC	N) FROM THE 4000 L	EVEL STORAGE
NONCO	NDUCTIVE CON	TAINER, THIS TRANSPORT		MATERIAL WAS	TRANSPORT	ED WITHOUT USING	A CLOSED,
MATER	IAL WAS TO BE U	JSED FOR THE BLASTING O	OF HANGUPS IN	THE RAISE TH	IS VIOLATION	IS PART OF A CENER	CES. THE
FOLLO	V FEDERAL EXP	LOSIVES USAGE REQUIRE	MENTS.			IOTAICI OF A GENER	AL FAILURE TU
MANAC		DINAGODAN					
MINER		D IN AGGRAVATED CONDU	JCT CONSTITU	TING MORE THA	N ORDINARY I	NEGLIGENCE IN ALLO	OWING THE
	TO ENGAGE IN T	RANSFORTING POWDER IN	I THIS MANNEL	R. THIS VIOLATIC	ON IS AN UNW	ARRANTABLE FAILUI	RE.
	······				See Continuat	tion Form (MSHA Form	7000-3a)
9. Violation	A. Health						
	Other	B. Section		C. Part/Se	ection of		
Section II	Inspector's Evalua	of Act	-	Title 30	CFR	5 7 . 6 2	0 5
10. Gravity:					<u> </u>		
A. Injury c	or Illness (has) (is):	No Likelihood 📃 🛛	Jnlikely	Reasonably Like	ely X	Highly Likely	Occurred
B. Injury	y or Illness could re	ea-					
sona	ably be expected to	be: No Lost Workdays	Lost V	Vorkdays or Restri	cted Duty	Permanently Disa	bling Eatal X
C. Signi	ificant and Substar	tial (See Reverse): Ves	X No	T			
11. Negligen	ice (check one)					. Number of Persons At	fected 0 0 2
A. None	) (	B. Low	C. Moderate		D. High 🛛	E. Reckles	s Disregard
12. Type of A	Action		13	Type of Issuance (			
	10	4 - D - 1 ,	-	Citation		Order X S	Safeguard
14. Initial Act	tion		D. Written	E. Citati	on/	E Dated	Mo Da Vr
A. Citat 15. Area or E	ion X B. Ord	ler C. Safeguard	Notice	Order Numt	r 4 4 1 ( ber	0 4 2 1	0 5 1 0 9 4
	MANSEN - USE	OF EXPLOSIVES					
16. Terminati	ion Due A. Date	Mo Da Yr B. Ti	me (24				
Section III	Termination Action		Ir. Clock)				
17. Action to	Terminate	l,,, _,					
THE MIN	ER IS DECEASEI	D.					
						······································	
18. Terminate	A. Date	Mo Da Yr         B. Time (2 ) 5 1 0 9 4	4 Hr Clock)	725			
Section IV ,	Automated System	n Data	·		· · · · · · · · · · · · · · · · · · ·		
9. Type of Ir	nspection	20. Event Number		21. Primary	or Mill		
(activit	y code) 03	3 0 0	5 1 1 6 1	8		P	
2. Signature	2		n n			23. AR Numb	er
	~	francis f	for an				
ISHA Form	7000-3 Mar 85 (R	evised)	X				10 0 5 9 7
		X (	0				
	$\bigcirc$	v U					

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Section I Violation Data
1. Date Mo Da Yr 2. Time (24 Hr. Clock) 3. Citation/Order
4. Served To 15 Operator 4 4 4 1 0 4 4 6
6. Mine 7. Mine ID 7.
8. Condition or Practice 8a, Written Notice (103a)
TWO MINERS WERE TRANSPORTING EXPLOSIVES (CAPPED SAFETY FUSE/CAP- SENSITIVE EMULSION) FROM THE 4000 LEVEL
STORAGE AREA TO THE 865 RAISE AT ABOUT 1930 HOURS ON 8/10/93. THE MATERIAL WAS TRANSPORTED WITHOUT USING A
CLOSED, NONCONDUCTIVE CONTAINER. THIS TRANSPORT INCLUDED WALKING AND CLIMBING LADDERS IN CONFINED SPACES.
FAILURE TO FOLLOW EEDERAL EXPLOSIVES USAGE REQUIREMENTS
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN ALLOWING THESE
MINERS TO ENGAGE IN TRANSPORTING POWDER IN THIS MANNER. THIS VIOLATION IS AN UNWARRANTABLE FAILURE
See Continuation Form (MCUA Form 7000.2.)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other of Act - Title 30 CFR 5 7 , 6 2 0 5
Section II Inspector's Evaluation
A. Injury or Iliness (has) (is): No Likelihood Unlikely Resconsbly Likely IV Likely IV
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Dischling Dischling Total X
C. Significant and Substantial (See Reverse): Yes X No     D. Number of Persons Affected     0 0 2
A. None B. Low C. Moderate D High X E. Reckloss Discogard
12. Type of Action
14. Initial Action D. Written E. Citation/ F. Dated Mo Da Yr
A. Citation         X         B. Order         C. Safeguard         Notice         Order         4         4         1         0         4         2         1         0         5         1         0         9         4
15. Area or Equipment
CHRISTIANSENTRUETT - USE OF EXPLOSIVES
16. Termination Due Mo Da Yr
A. Date B. Time (24
Section III - Termination Action
17. Action to Terminate
THE MINERS ARE DECEASED.
18. Terminated Mo Da Yr A. Date J J B Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6 1 8 P
22. Signature 23. AR Number
timme Tones
MSHA Form 7000-3 Mar 85 (Revised)
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# U.S. Department of Labor

Mine Safety and H	ealth Administration
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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	2 Citatian (Outland
051094	S. Challon/Order
4. Served To	5 Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAR AND A CA	
THEY WERE DROPPED TO THE BOTTOM OF THE 865 BAISE AND	AP-SENSITIVE EMULSION WERE EXPOSED TO IMPACT WHEN
VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDER	AL EXPLOSIVES USAGE REQUIREMENTS
A MINER WAS PLACING A CHARGE TO BLAST A HANGUP ON "B" S	SHIFT, 8/10/93, WHEN THE EXPLOSIVE MATERIALS WERE
ANOTHER MINER ENERGIZED THE VIRBATING FEEDER TO DETE	HE MINER CLIMBED DOWN THE MANWAY TO THE FEEDER DECK,
EMULSION DID NOT, OTHER PERSONNEL WERE ON THE EEEDER	REVE THE EXPLOSIVES. THE CAPPED FUSE CAME OUT BUT THE
THE EXPLOSIVE MATERIALS HAD EXPLODED.	V DECK AND COULD HAVE BEEN SERIOUSLY INJURED OR KILLED IF
THERE WAS NO TRAINING NOR PROVISIONS INITIATED BY THE M	INE OPERATOR FOR RETRIEVING EXPLOSIVES WHICH WERE
DROPPED OR FELL OUT OF THEIR PLACE AND DOWN THE ORE P	ASS COMPARTMENT. THESE OCCURRENCES WERE
9 Violation A Health	See Continuation Form (MSHA Form 7000-3a)
Safety B Section	
Other of Act -	Title 30 CER 57 630 2 b
Section II Inspector's Evaluation	
A. Iniury or Illness (has) (is): No Likelihood	
D. ITTULY OF HIMESS COULD FER-	
sonably be expected to be: No Lost Workdays	
sonably be expected to be: No Lost Workdays Lost V	Workdays or Restricted Duty Permanently Disabling Fatal X
sonably be expected to be: No Lost Workdays Lost V <u>C. Significant and Substantial (See Reverse): Yes X No</u> 11. Nedligence, (check one)	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5
sonably be expected to be:     No Lost Workdays     Lost V       C. Significant and Substantial (See Reverse):     Yes     X     No       11. Negligence (check one)     B. Low     C. Moderate	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard       1
sonably be expected to be:     No Lost Workdays     Lost V       C. Significant and Substantial (See Reverse):     Yes     X     No       11. Negligence (check one)     A. None     B. Low     C. Moderate       12. Type of Action     13.	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard       Type of Issuance (check one)
sonably be expected to be:     No Lost Workdays     Lost V       C. Significant and Substantial (See Reverse):     Yes     X     No       11. Negligence     (check one)     A. None     B. Low     C. Moderate       12. Type of Action     1     0     4     -     -     -     13.	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard       1         Type of Issuance (check one)       Order       X       Safeguard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       1         14. Initial Action       D. Writter       D. Writter       D. Writter	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard       1         Type of Issuance (check one)       Order       X       Safeguard         E. Citation       Order       F. Dated       Mo       Da       Yr
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       D. Writter       O. Writter       Notice       Notice	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writter         15. Area or Equipment       D.       View       C. Safeguard       Notice	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       13.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writter         15. Area or Equipment       D. UpportAction       D. UpportAction       D. UpportAction       D. UpportAction	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard       Image: Check one)         Citation       Order       X       Safeguard         Image: Citation/Order       4       4       1       0       4       2       1       F. Dated       Mo.       Da       Yr         Image: Citation/Order       Yr       4       1       0       4       2       1       Image: Citation       Image: Citation       Image: Citation       Yr         Image: Citation/Order       Yr       4       1       0       4       2       1       Image: Citation       Image: Citation
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       13.         14. Initial Action       A. Citation       D. Writter       Notice       Notice         15. Area or Equipment       CHRISTIANSEN/TRUETT - USE OF EXPLOSIVES       CHRISTIANSEN/TRUETT - USE OF EXPLOSIVES	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       13.         14. Initial Action       D. Order       C. Safeguard       D. Writter         15. Area or Equipment       C. Safeguard       Notice         16. Termination Due       Mo       Da       Yr	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       13.         14. Initial Action       D. Order       C. Safeguard       D. Writter         15. Area or Equipment       C. Safeguard       Notice         CHRISTIANSEN/TRUETT - USE OF EXPLOSIVES         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost N         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       B. Low       C. Moderate         12. Type of Action       B. Low       C. Moderate         14. Initial Action       D       -       -         A. Citation       X       B. Order       C. Safeguard       D. Writter         A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment       C. HRISTIANSEN\TRUETT - USE OF EXPLOSIVES       Explosive (24 Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr         B. Time (24 Hr. Clock)       Section III       Termination Action       D. Writer	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard          Type of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         1       E. Citation/ Order       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       4       1       0       5 </td
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       D       -       13.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writter         15. Area or Equipment       CHRISTIANSEN/TRUETT - USE OF EXPLOSIVES       16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       D       D       Yr	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard          Type of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         D. High       Yr       Yr          Citation       Order       Y       Safeguard         D. E. Citation/ Order       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Y       1       0       4       2       1       F. Dated       Mo       Da       Yr         Order       Y       1       0       4       2       1       Yr       Yr       Yr         O       5       1       0       9       4       Yr       Yr       Yr
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       13.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writter         15. Area or Equipment       CHRISTIANSEN\TRUETT - USE OF EXPLOSIVES       16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       HIMERS ARE DECEASED.       D. Writer	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard          Type of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         1       E. Citation/ Order       4       1       0       4       2       1       F. Dated       Mo. 0       5       1       0       9       4
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       D. Vritter       -       -       13.         14. Initial Action       D. Order       C. Safeguard       D. Writter         15. Area or Equipment       C. Safeguard       Notice         16. Termination Due       A. Date       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr         17. Action to Terminate       THE MINËRS ARE DECEASED.       THE MINËRS ARE DECEASED.	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       1       1         14. Initial Action       D. dt       -       -       13.         14. Initial Action       D. dt       -       C. Safeguard       D. Writter         15. Area or Equipment       C. Safeguard       D. Writter       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       18. Terminated       Mo       Da       Yr       B. Time (24 Hr Clock)	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       D       -       1         14. Initial Action       D. definitial       D. definitial       C. Safeguard       D. Writter         15. Area or Equipment       Equipment       C. Safeguard       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       Ho       Da       Yr       B. Time (24 Hr Clock)	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard          Type of Issuance (check one)       Order       X       Safeguard         Citation       Order       X       Safeguard         1       E. Citation/ Order       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         0       5       1       0       9       4       1       0       4       1       0       4       1       0       1       0       9       4         0       7       2       7       1       1       1       1       1       1       1       1       1       1       1       1       1
sonably be expected to be:       No Lost Workdays       Lost N         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       No       D       -       1       -       -       13.         14. Initial Action       No Citation       D       -       C. Safeguard       D. Writter         15. Area or Equipment       D. Order       C. Safeguard       D. Writter       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       10       9       4       10       9         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       Section IV Automated System Data         19. Type of Inspection       Vir end Inspection       Joing 10       9       4       Joing 10       Joing 10	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       No       D       -       1       -       -       13.         14. Initial Action       No Citation       No       D       -       1       -       -       13.         15. Area or Equipment       D. Order       C. Safeguard       D. Writter       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       18. Terminated       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       20. Event Number       0       5       1       0       9       4	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       D       -       1       -       -       13.         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Writter         15. Area or Equipment       C.HRISTIANSENITRUETT - USE OF EXPLOSIVES       D.       Writter       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Yr. Clock)       Section III Termination Action       17. Action to Terminate       THE MINERS ARE DECEASED.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       20. Event Number       0       5       1       6         22. Signature + O       0       3       0       7       1       6	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard
sonably be expected to be:       No Lost Workdays       Lost No         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       D. dt       -       -       -       13.         14. Initial Action       D. Order       C. Safeguard       D. Writter         A. Citation       X       B. Order       C. Safeguard       Notice         15. Area or Equipment       C. HRISTIANSENITRUETT - USE OF EXPLOSIVES       -       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE MINERS ARE DECEASED.       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       10       9       4       -       -         19. Type of Inspection       0       3       0       -       0       5       1       1         22. Signature <t< td=""><td>Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard      </td></t<>	Workdays or Restricted Duty       Permanently Disabling       Fatal       X         D. Number of Persons Affected       0       0       5         D. High       X       E. Reckless Disregard

MSHA Form 7000-3 Mar 85 (Revised)

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

Section I - Subsequent	Action/Continuation D	ata		_										
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 5 1 0	Yr 9 4		3. Citation/Order Number	4	4	1	04	4	7 -	1
4 Served To		l			<u>_       </u>									
DOUGLAS MCGRE	SOR GENERAL MAN			5. Of										
6. Mine	BON, OLIVEINAL MAI	AGER		7.14		COPPER	COMPANY, SUPERIOR	MIN	ING	DIV	'ISIOI	<u>N</u>		
MAGMA MINE				7.100	neiD									
Section II Justification	for Action					02-	00152-		(co	ntra	ictor)			
FORESEEABLE AND WE	RE EVENTS FOR WHICH	THE OPERATOR DID NOT	PLAN	FOR NO	R TRAI	MINERS.								
THAT THESE MINER	S WERE NOT EXPO	SING EXPLOSIVES T			AORE T	THAN AG	GRAVATED NEGLIGENC	EIV	FA	LIN	G TO	ENS	URE	
		CONTRACTOR CONTRACTOR		AUT.	THIS V	OLATION	IIS AN UNWARRANTAB	LE F	AILU	JRE	•			
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									<u> </u>					
									See	Cor	ntinua	tion F	orm	
Section III Subsequent A	ction Taken													
A. Dat		Yr B. Time (24 Hr. C	lock)			C. V	/acated D. Termina	ited		f	E. Mo	dified	[	
Section IV Inspection Da						· · · · · · · · · · · · · · · · · · ·								
	0 3 0	nt Number 0 5	1 1	6 1	8									
11. Signature	). Uthou		umber	12.	Date	Mo 0 5	Da Yr 13. Time (24	Hr. (	Cloci	k)	•		<b>.</b>	
				<u> </u>			1004					10		20

MSHA Form 7000-3a, Mar 85 (Revised)

Section I Violation Data	
1. Date Mo Da Yr 2 Time (24 Hr Clock)	
	3. Citation/Order
4. Served To	Number         4         4         1         0         4         4         8
DOUGLAS MCGREGOR GENERAL MANAGER	
6. Mine	7. Mine ID
MAGMA MINE	02 - 00152 - 000152 - 00000000000000000000000000000000000
8. Condition or Practice	8a. Written Notice (103g)
DURING THE SECOND OF THREE REACTOR FYRE CONVENTION	
EMULSION WERE EXPOSED TO IMPACT WHEN THEY WERE LISE	S CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE
7/30/93. DURING THIS PERIOD, THREE BLASTS WERE INITIATED	WITH PARTICIPATION BY A TEAM LEADER AN ACENT OF THE
OPERATOR, AND TWO MINERS. THE HANGUP, OR LOOSE MUCK I	N THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND
INITIATED THE EXPLOSIVES.	
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FE	
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE TH	AN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT
EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION	IS AN UNWARRANTABLE FAILURE.
	See Continuation Form (MSHA Form 7000 2-)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act -	Title 30 CFR 5 7 . 6 3 0 2 b
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely X Highly Likely Occurred
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays Lost V	Vorkdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes X No	D. Number of Persons Afforded 0.0.2
11. Negligence (check one)	
A. None B. Low C. Moderate	D. High X E. Reckless Disregard
12. Type of Action 13.	Type of Issuance (check one)
<sup>1</sup>  0 4 - D - 1 ,     -  -  -	Citation Order X Safeguard
14. Initial Action D. Written	E Citation/
A. Citation X B. Order C. Safeguard Notice	Order 4 4 1 0 4 2 1 0 0 5 1 0 9 4
15. Area or Equipment	Number
DAHLSTRAND/MCCONNEL/ALLISON - USE OF EXPLOSIVES	
16. Termination Due Mo Da Yr	
A. Date B. Time (24	
A. Date B. Time (24 Section III – Termination Action	
A. Date B. Time (24 Section III – Termination Action 17. Action to Terminate	
A. Date B. Time (24 Section III – Termination Action 17. Action to Terminate	
A. Date B. Time (24 Section III Termination Action 17. Action to Terminate 18. Terminated Mo Da Yr	
A. Date     B. Time (24 Hr. Clock)       Section III Termination Action       17. Action to Terminate       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)	
A. Date B. Time (24 Section III – Termination Action 17. Action to Terminate 18. Terminated A. Date Mo Da Yr B. Time (24 Hr Clock) Section IV – Automated System Data	
A. Date         B. Time (24 Hr. Clock)           Section III – Termination Action         17. Action to Terminate           17. Action to Terminate         17. Action to Terminate           18. Terminated         A. Date           Mo         Da           Yr         B. Time (24 Hr Clock)           Section IV – Automated System Data           19. Type of Inspection         20. Event Number	21. Primary or Mill
A. Date       B. Time (24         Section III – Termination Action       Hr. Clock)         17. Action to Terminate       Image: Clock of the section is a section in the section is a section in the section is a section in the section is a section is section is a section i	21. Primary or Mill
A. Date     B. Time (24 Hr. Clock)       Section III Termination Action     17. Action to Terminate       17. Action to Terminate     18. Terminated       18. Terminated     A. Date       Mo     Da       Yr     B. Time (24 Hr Clock)       Section IV Automated System Data       19. Type of Inspection     20. Event Number       (activity code)     0       30     0	21. Primary or Mill 23. AR Number
A. Date     B. Time (24 Hr. Clock)       Section III - Termination Action     17. Action to Terminate       17. Action to Terminate     17. Action to Terminate       18. Terminated     A. Date     Mo       18. Terminated     A. Date     Mo       19. Type of Inspection     20. Event Number     0       19. Type of Inspection     0     0       22. Signature     0     0	21. Primary or Mill 23. AR Number 23. AR Number
A. Date       B. Time (24 Hr. Clock)         Section III – Termination Action         17. Action to Terminate         18. Terminated         A. Date       Mo         Da       Yr         B. Time (24 Hr. Clock)         Section IV – Automated System Data         19. Type of Inspection (activity code)       0         22. Signature         MSHA Form 7000-3 Mar & TRevised)	21. Primary or Mill 23. AR Number 0 0 0 5 9 7
A. Date       B. Time (24         Section III – Termination Action       Hr. Clock)         17. Action to Terminate       Image: Action to Terminate         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV – Automated System Data       19. Type of Inspection       20. Event Number       0       5       1       1       6       1         22. Signature       MSHA Form 7000-3 Mar 85 (Revised)       Image: Commission       Image: Commission </td <td>21. Primary or Mill 23. AR Number 0 0 0 5 9 7</td>	21. Primary or Mill 23. AR Number 0 0 0 5 9 7

1. Date       Mo       Da       Yr.       2. Time (24 Hr. Gock)       0       7       2       8       3. Chatlon(Xnter       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       1       0       4       4       4       1       0       4       4       4       1       0       4 <t< th=""><th></th></t<>	
Image: Second	1. Date Mo Da Yr 2 Time (24 Hr Clock)
4: Served To       [10] (2] 11 [0] (2] (3]       [3] Operator       [4] (4] [1] (1] (4] (4] (9]         5: Operator       DOLGLAS MIGREGOR, GENERAL MANAGER       MAGMA COPPER COMPANY, SUPERIOR MINING DUSION         6. Mine       7. Mine D       [0] (2] - [0] (0] (1] (5] (2] - []       [] (contradion)         8. Condition or Practice       8. Written Notice (103g)       10         DURING THE THIRD OF THREE BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND CAP SENTITY EXULSION       8. Written Notice (103g)         Condition or Practice       10       11 <t< td=""><td></td></t<>	
DUBLAS MCGREGOR, GENERAL MANAGER       Magina COPPER COMPANY, SUPERIOR MINING DIVISION         6 Miles       7. Mine ID       0 2 - 0 0 1 1 5 2 - 1       (contracter)         8 Constants or Practice       8. Witten Mone (105g)       8. Witten Mone (105g)         9 Uption of Practice       8. Witten Mone (105g)       8. Witten Mone (105g)         9 Uption Practice       9. Social of Practice       8. Witten Mone (105g)         9 Uption Practice       9. Social of Practice       8. Witten Mone (105g)         9 Uption Practice       9. Social of Practice       9. Social of Practice         9. Volation of Practice       9. Social of Practice       9. Social of Practice         9. Volation A Meeth       9. Mone Mone Social of Practice       9. Mone Mone Social of Practice         9. Volation A Meeth       9. Social of Practice       9. Social of Practice       9. Social of Practice         9. Volation A Meeth       9. Social of Practice       9. Social of Practice       9. Social of Practice       9. Social of Practice         9. Volation A Meeth       9. Social of Practice       9. Social of Practice       9. Social of Practice       9. Social of Practice         9. Volation A Meeth       9. Social of Practice       9. Social of Practice       9. Social of Practice       9. Social of Practice         9. Volation A Meeth       9. Social of Practice	4 Served To 5 (10) 5 (4) 4 (4) 4 (4) 9 (5) (10) 4 (4) (4) (10) 4 (4) (4) (4) (4) (4) (4) (4) (4) (4)
6. Mane         7. Mme ID         0         2         0         1         0         2         0         1         0         2         0         1         0         2         0         1         0         2         0         1         0         2         0         1         1         0         1 <th1< th="">         1         1</th1<>	
MAGMA NINE         0         0         2         0         1         S         Condition or Practice         Be. Written Notice (103g)         Condition or Practice         Description Notice (103g)         Condition Notice (103g)	6. Mine 7. Mine ID 7.
B. Condition or Practice B. Witten Notice (103g) UDUING THE THIED OF THREE BLASTS. EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP SENTY E EMULSION WERE EXPOSED TO MINACH WEIT THEY WERE WITTATE USED TO BLAST HANGUPS IN THE BIS RAISE DURING 'B' SHIFT, 73093. DURING THIS PERIOD. THREE BLASTS WERE WITTATE USED TO BLAST HANGUPS IN THE BIS RAISE DURING 'B' SHIFT, 73093. DURING THIS PERIOD. THREE BLASTS WERE WITTATE USED TO BLAST HANGUPS IN THE BIS RAISE DURING 'B' SHIFT, 73093. DURING THE SPEND. THE EXAMPLE THE WARDUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INTITATED THE EXPLOSIVES. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INTITATED THE EXPLOSIVES. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INTITATED THE EXPLOSIVES. CONDUCT CONSTITUTING MORE THAN OPDINARY INEGLIGENCE IN FAULING TO ENSURE THAT EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE  See Continuation Form (MSHA Form 7000-3a) Section IL - Ingedote the Conduct of the original factor of the original factor of a dat.  THES VIOLATION IS AND THE MEMORY IN THE VIOLATION IS AN UNWARRANTABLE FAILURE  See Continuation Form (MSHA Form 7000-3a) Section IL - Ingedote 'Evaluation  General Conduct reactions of a dat.  C. Part/Section of Signed 'G' A dat.  C. Significant and Substantial (San Reverse): Yes IX No  10. Crimity: A form of these quecked to be: No Lost Workdays or Restricted Duty Permanenty Disabiling Fatal X: C. Significant and Substantial (San Reverse): Yes IX No  11. Neigence (check one) A form of B. Low C. Moderate D. High K. E. Recidess Diarogard  12. Type of Action  11. 0. 4. D 1 Steguard D. Number of Persons Affected  13. Type of Insurance (check one) A form of B. Order C. Safeguard D. Number of Persons Affected  14. Initial Action  A Contain X. B. Order C. Safeguard D. Number  15. Type of Insurance (check one)  14. Initial Action  A Date Mo Da Y H.  5. Time (24 Hr. Clock)  15. Type of Insurance (check one)  16	MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)
DURING THE THIRD OF THREE BLASTS. EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE EMULSION         WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST HANGUPS IN THE 865 RASE DURING ** SHITT, 73093.         DURING THE PERIOD, THREE BLASTS WERE MATERATED WITH FERENA AD AGENT OF THE         OPERATOR, AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT. COULD HAVE FALLEN AND         THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREWENTS. MANAGEMENT         ENADAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLICENCE IN FAILURE TO ENSURE THAT         EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNMARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         9. Violation       A Headth         Safety       B. Section         Of Act       C. Part/Section of         Section 1       Or Act         Section 1       Or Act         B. Injury or Illness could reas:       No Lost Workdays         B. Injury or Illness could reas:       No Lost Workdays         B. Injury or Illness could reas:       Yes X         No no       B. Low       C. Moderale       D. Highly Likely       Occurred         10. 4 / 0 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1	8. Condition or Practice 8a. Written Notice (103g)
DURING THE THIRD OF THREE BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND C ACRESSINSTITUE EMULSION         WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST HANGUPS IN THE 685 RAISE DURING TS SHIFT, 70803.         DURING THIS FERIOD, THREE BLASTS WERE INITIATED WITH PARTICIPATION BY A TEAM LEADER, AN AGENT OF THE         OPERATOR AND TWO MINERS, THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND         MITHATED THE EXPLOSIVES.         THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT         ENGAGED NA MACRO CONDUCT CONSTITUTION MORE THAN ORDINARY NEGLOENCE MENT REQUIRENCE INFLAINT         ENGAGED NO EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         9. Violation       A Health         Safety       B. Section         0 Other       Safety         B. Section       -         10. Gravity.       A Injury or Illness (neb) (6): No Likelhood       Unlikely         A Injury or Illness (neb) (6): No Likelhood       Unlikely       Resignably Likely       Permanently Disabiling         11. Mediginance (check one)       A low       C. Moderate       D. Number of Persons Affected       0 [0 13]         12. Type of Action       1       0. 4       -       -       Clasion       Order       Safeguard       -         14. Initial Action       B. Order       C. Safeguard	
Interest EAr-USED UNRING * SHIT, 750033.         DURING FINIS PERIOD. THREE LANSTS WERE UNSED TO BLASH MARQUPS IN THE BBS RAISE DURING * SHIT, 750033.         DURING FINIS PERIOD. THREE LANSTS WERE INTATED WITH PARTICIPATION BY A TEAM LEADER. AN AGENT OF THE         OPERATOR, AND TWO MINERS, THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND         INITIATE OF THE EXPLOSIVES.         THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT         ENGAGED IN AGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLICENCE IN FAILUNG TO ENSURE THAT         EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         Section       C. Part/Section of         Section       of Act         Section of Act       Section of         Solidation       No Likelihood       Unlikely         Rangeotric Evaluation       OL CarWig         Logiprices could real       No Logiprices could real         Singling of Times could real       No Lost Workdays or Restricted Duty       Permanently Disabiling         A None       B. Low       C. Moderate       D. High       E Reckies Diaregard         12. Type of Action       I 0. 4 - D - 1       -       -       C. Badewide or CarWight or Mill         14. Initial Action       A. Date       Mo       Da       Y       Notice <td>DURING THE THIRD OF THREE BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE EMULSION</td>	DURING THE THIRD OF THREE BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE EMULSION
OPERATOR. AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT. COULD HAVE FALLEN AND INTIGED THE EXPLOSIVES.           THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT ENAGED WINA GGRAVATED CONDUCT CONTITUTING MORE THAN ORDINARY INEGLICENCE IN PAILING TO ENSURE THAT ENAGED WINA GGRAVATED CONDUCT CONTITUTING MORE THAN ORDINARY INEGLICENCE IN PAILING TO ENSURE THAT EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE:           3. Violation         A Health         See Continuation Form (MSHA Form 7000-3a)           3. Violation         A Health         See Continuation Form (MSHA Form 7000-3a)           3. Violation         A Health         See Continuation Form (MSHA Form 7000-3a)           3. Violation         A health         See Continuation Form (MSHA Form 7000-3a)           3. Violation         A health         See Continuation Form (MSHA Form 7000-3a)           3. Violation         A health         B Section of rate 30 CFR         S 7 . 6 3 0 2 b           3. Violation         B No Likelihood         Unskey         Reasonably Likely         Highly Likely         Occurred           3. Injury or Illness (Mas) (se): No Likelihood         Unskerdays or Restricted Duty         Permanently Disabiling         Fatal         Ki           C. Significant and Substantial (See Reverse): Yes (X NO         D. Number of Persons Affected         0 10 13 11         Negligence (sheck cone)         Creation	DURING THIS PERIOD THREE REASTS WERE INITIATED WITH PARTICIPATION BY A TEAM FARED AN AGENT OF THE
INITIATED THE EXPLOSIVES.         THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT ENCAGED IN AGGRAVATED CONDUCT CONSTITUTION MORE THAN ORDINARY MEGLIGENCE IN FAILING TO ENSURE THAT EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)         See Continuation Form (MSHA Form 7000-3a)         See Continuation Form (MSHA Form 7000-3a)         Safety other is evaluation         One of Act         The Solid Form (MSHA Form 7000-3a)         Safety other is evaluation         One of Act         Safety other is evaluation         One of Act         Solid Constructions of Solid Solid Colspan="2">Solid Construction of Solid Sol	OPERATOR, AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOILOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Form (MSHA Form 7000-3a)       See Continuation Form (MSHA Form 7000-3a)         9. Violation I – Inspector's Evaluation       C. Part/Section of of Act       Section of Tate 30 CFR         10. Gravity: C. Significant and Substantial (See Reverse): Yes X       No       D. Number of Persons Affacted         11. Negligence (check one) A. None B. Low       C. Moderate       D. High X       E. Reckless Diaregard         12. Type of Action 14. Initial Action X. C. Safeguard       B. Order       C. Safeguard       D. Written Notice       C. Cater         14. Initial Action X. Cater       X. Order       C. Safeguard       D. Written Notice       C. Cater       A for Y A         15. Area or Equipment       DA Mone Da       Y       B. Time (24 Hr. Clock)       Hr. Clock)       Y         16. Termination Due       A. Date       Mo       Da       Y       B. Time (24 Hr. Clock)       P         19. Yee of Inspection III – Termination Action TY. Action To Termination       D. S. 11. 6. 1. 8       P       P         22. Signature       0       0       S. 11. 6. 1. 8       P       P	INITIATED THE EXPLOSIVES.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIRENTS: MANAGEMENT         ENAGRED IN AGGRAVATED CONDUCT CONSTITUTION MONETARY NEGLIGENCE IN FAILING TO ENSURE THAT         EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         9. Violation       A. Health         9. Violation       Other         9. Violation       A. Health         9. Violation       Other         9. Norwhy:       A. Injury or Illness could rea-         9. Injury or Illness could rea-       sonably Desegred/s Evaluation         9. None       B. Low       C. Moderate       D. Number of Parsons Affected         10. Gravity:       A. None       B. Low       C. Moderate       D. High X       E. Reckless Diaregard         11. Neglopence (check one)       C. Stafeguard       D. Viriten       C. Stafeguard       Mo Da       Yr         12. Type of Action       D. Order       C. Safeguard	
EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE         EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE         3. Violation       A. Health         See Continuation Form (MSHA Form 7000-3a)         3. Violation       A. Health         Section       0         1. Inspector's Evaluation         1. Other       Section         3. Injury or liness (heis) (b): No Likelihood       Unlikely         Reasonably Likely       Highly Likely         C. Significant and Substantial (See Reverse):       Yes X         1. Negligence (check one)       A. Nome         A. Iniury or liness cauld reasonably Likely       D. Number of Persone Affected       0 0 131         11. Negligence (check one)       A. Nome       B. Low       C. Moderate       D. High       E. Reckless Disregard         12. Type of Action       1 0 4 - D - 1 .       -       -       Citation       Order       X Safeguard         14. Initial Action       X. Order       C. Safeguard       D. Written       Creation       Of 5 1 0 9 4         DAHLSTRANDIMCCONNELULIISON - USE OF EXPLOSIVES       I. Time (24       Htr. Clock)       I. Terminated       A. Date       D 5 1 1 6 1 8         22. Significant and Substential       20. Section III - Terminated Actio	THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT
See Continuation Form (MSHA Form 7000-3a)         9. Violation       A. Health         Seetion II - Inspector's Evaluation         10. Gravity:         A. Injury or Illness (hab) (s): No Likelihood       Unlikely         Reasonably Likely       Highly Likely         Occurred       D. Number of Persona Affected         10. Gravity:       A. Injury or Illness (hab) (s): No Likelihood       Unlikely         Reasonably Likely       Highly Likely       Occurred         Significant and Substantial (See Reverse):       Yes       X         11. Negliqueer (check one)       B. Low       C. Moderate       D. Highly         12. Type of Action       1       O. C. Moderate       D. Highly       E. Reckless Disregard         11. Negliqueer (check one)       1       0       1       Type of Action       Order       X Safeguard         14. Initial Action       D. Order       C. Safeguard       D. Written       E. Catation       O 5 1 0 9 14         15. Area or Equipment       Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       Hr. Clock)         Section III - Termination Due       A Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       E. Chattory         18. Terminated       A Date       Mo<	ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT
9. Violation       A. Health       B. Section       C. Part/Section of Tite 30 CFR       5 7 . 6 3 0 2 b         10. Gravity:       A. Inspector's Evaluation       Tite 30 CFR       5 7 . 6 3 0 2 b       2 b         10. Gravity:       A. Inspector's Evaluation       Unlikely       Reasonably Likely X       Highly Likely       Occurred         10. Gravity:       A. Injury or Illness (thes) (s):       No Loet Workdays or Restricted Duty       Permanently Disabiling       Fatal       X:         11. Negligence (check one)       No Loet Workdays or Restricted Duty       Permanently Disabiling       Fatal       X:         11. Negligence (check one)       C. Moderate       D. High       E. Reckless Diaregard       1         12. Type of Action       10 4 - D - 1 .       -       -       13 Type of Issuance (check one)       Order       X Safeguard         14. Initial Action       A. Order       C. Safeguard       D. Written       Order       X Safeguard       Mo       Da         15. Area or Equipment       DAHLSTRANDIMCCONNELUALLISON - USE OF EXPLOSIVES       Notice       Order       Y and Y an	EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.
9. Violation       A. Health       B. Section       -       C. Part/Section of       5       7       . 6       3       0       2       b         9. Violation       II - Inspector's Evaluation       of Act       -       C. Part/Section of       5       7       . 6       3       0       2       b         10. Gravity:       A. Injury or Illness could reasonably Likely       C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       13         11. Negligence (check one)       A. Inone       B. Low       C. Moderate       D. High       E. Reckless Disregard       0       0       13         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       0       14. Initial Action       A. None       B. Low       C. Safeguard       Number       Order       X       Safeguard       0       15       10       9       4         14. Initial Action       A. Chation       X       B. Order       C. Safeguard       Number       Number       0       5       10       9       4         15. Area or Equipment       DAHLSTRANDMCCONNELVALLISON - USE OF	
See Continuation Form (MSHA Form 7000-3a)         9. Violation       A. Health       B. Section       -       C. Part/Section of       5       7       .6       3       0       2       b         10. Gravity:       A. Injury or Illness (has) (s): No Likelihood       Unlikely       Reasonably Likely       X       Highly Likely       Occurred       -         B. Injury or Illness (has) (s): No Likelihood       Unlikely       Reasonably Likely       X       Highly Likely       Occurred       -         10. Gravity:       A. Injury or Illness (has) (s): No Likelihood       Unlikely       Reasonably Likely       X       No       Occurred       -         11. Negligence (check one)       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X:         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard       -         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       -         14. Initial Action       A. Order       C. Safeguard       D. Witten       Notice       Order       Notice       Notice       Notice       Notice       Notice	
9. Viciation A. Health B. Section of Act C. Part/Section of Title 30 CFR 5 7 . 6 3 0 2 b 1 1 1 Inspector's Evaluation of Act C. Part/Section of Title 30 CFR 5 7 . 6 3 0 2 b 1 1 1 1 Inspector's Evaluation 10. Gravity. A. Injury or liness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred B. Injury or liness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred 1 8. Injury or liness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred 1 8. Injury or liness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred 1 8. Injury or liness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred 1 1. Nogligence (check one) B. Low C. Moderate D. High X E. Reckless Disregard 11. Nogligence (check one) B. Low C. Moderate D. High X E. Reckless Disregard 12. Type of Action 1 0 4 - D - 1 1, Catation Order X Safeguard 1 14. Initial Action A. Catation X B. Order C. Safeguard Notice Order Number / Order X Safeguard 1 15. Area or Equipment DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES 16. Termination Due A. Date Mo Da Yr B. Time (24 Hr Clock) Section II - A. Date Mo Da Yr B. Time (24 Hr Clock) Section II - A. Date Mo Da Yr B. Time (24 Hr Clock) Section II - A. Date Mo Da Yr B. Time (24 Hr Clock) 21. Primary or Mill catation 0 3 0. Occurred Hr. Clock 0 3 0 0 5 1 1 6 1 8 . Torkec 0 3 5 9 7 Mill P 23. AR Number 0 5 9 7 Mill A. Date Mo Da Yr B. Time (24 Hr Clock) 1 0 0 5 9 7 Mill A. Date Mo Da Yr B. Time (24 Hr Clock) 1 0 0 5 9 7 Mill Catation V Automated System Data	See Continuation Form (MSHA Form 7000-3a)
Safety       B. Section       C. Part/Section of Title 30 CFR       5       7       .6       3       0       2       b         Section II - Inspector's Evaluation       Other       Title 30 CFR       5       7       .6       3       0       2       b         10. Gravity:       A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Highly Likely       Occurred       E. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       Negatively       Permanently Disabiling       Fatal       X:         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0	9. Violation A. Health
Section II - Inspector's Evaluation       Intel 30 CFR       [5 / ]. [6 3 0 2 [b]         A. Injury or Illness (has) (is): No Likelihood       Unlikely       Reasonably Likely       X         B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes X       No       D. Number of Persons Affected       0 0 3         11. Negligence (check one)       B. Low       C. Moderate       D. High       E. Reckless Disregard       1         12. Type of Action       1 0 4 - D - 1 .       -       -       13. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       X       B. Order       C. Safeguard       Notice       Order       X       Safeguard         14. Initial Action       X       B. Order       C. Safeguard       Notice       Order       X       Safeguard         15. Area or Equipment       D.ALLSTRANDMCCONNELVALLISON - USE OF EXPLOSIVES       If the 2 0 1 1 0 9 14       If the 2 0 1 1 0 9 14       If the 2 0 1 1 0 9 14       If the 2 0 1 1 0 9 14       If the 2 0 1 1 0 9 14       If the 2 0 1 0 1 0 1 0 9 14       If the 2 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	Safety B. Section C. Part/Section of
10. Gravity:       A. Injury or Illness (nas) (is): No Likelihood       Unlikely       Reasonably Likely       X       Highly Likely       Occurred         B. Injury or Illness (nas) (is): No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabiling       Fatal       X:         C. Significant and Substantial (See Reverse): Yes       X       No       D. Number of Persons Affected       0       0       3         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       10       4       -       -       -       13. Type of Issuance (check one)         A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       10       4       -       -       -       13. Type of Issuance (check one)         A. None       B. Order       C. Safeguard       D. Written       C. Editation/       Order       X       Safeguard         14. Initial Action       X       B. Order       C. Safeguard       D. Written       Notice       Order       No       Da       Yr         DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       -       -       -       -       - <t< td=""><td>Section II Inspector's Evaluation</td></t<>	Section II Inspector's Evaluation
A. Injury or Illness Could rea- sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X:         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       0       13         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. B. Order       C. Safeguard       D. Written       Order       No       Da       Yr         DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       If. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       If. Action to Terminate         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       If. A laber       P       23. AR Number       0 lo 5 9 7       NO lo 5 9 7         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       If. 6 1 8	10. Gravity:
B. Injury or Illness could reasonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       3         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       E. Reckless Disregard	A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred
sonably be expected to be:       No Lost Workdays       Lost Workdays or Restricted Duty       Permanently Disabling       Fatal       X         C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       3         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0       3         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Critation       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0       3       1	B. Injury or Illness could rea-
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0       13         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       X       B. Order       C. Safeguard       D. Written       C. Citation       Order       X       Safeguard       -         15. Area or Equipment       DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       -	sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal X
11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       104-D-11,       -       -       13. Type of Issuance (check one)       Order       X       Safeguard         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard         15. Area or Equipment       D. Written       E. Citation       Virtuen       F. Dated       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         17. Action to Terminate       Notice       Image: Clock       Image: Clock       Image: Clock       Image: Clock         16. Terminated       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       Image: Clock       Image: Clock         17. Action to Terminate       Image: Clock       Image: C	C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0 3
A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard	11. Negligence (check one)
12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       A. Citation       B. Order       C. Safeguard       D. Written Notice       E. Citation// Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       -	
1       0       4       -       1       -       -       Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDMCCONNELVALLISON - USE OF EXPLOSIVES       DAHLSTRANDMCCONNELVALLISON - USE OF EXPLOSIVES       Time (24       Hr. Clock)       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       Hr. Clock)         Section III Termination Action       17. Action to Terminate	A. None B. Low C. Moderate D. High X E. Reckless Disregard
14. Initial Action       D. Written       D. Written       Order       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock       Hr. Clock)         Section III - Termination Action       17. Action to Terminate       18. Time (24 Hr Clock)       P         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         19. Type of Inspection       10       20. Event Number       0       5       1       1         22. Signature       23. AR Number       0       0       5       9       7	A. None     B. Low     C. Moderate     D. High     X     E. Reckless Disregard       12. Type of Action     13. Type of Issuance (check one)
A. Citation       X       B. Order       C. Safeguard       D. Wittern       Order       Notice       Order       Number       4       4       1       0       4       2       1       P. Dated       Notice       Notice       Order       Number       4       4       1       0       4       2       1       P. Dated       Notice       Notice       Order       Number       4       4       1       0       4       2       1       P. Dated       Notice	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         Citation       Order       X       Safeguard
Number         Number         IS. Area or Equipment         DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)         Section III - Termination Action         17. Action to Terminate       Time (24 Hr. Clock)         IS. Terminated         A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       Section IV Automated System Data         19. Type of Inspection       all 20. Event Number       0       5       1       1       6       1       8       P         22. Signature       23. AR Number         MSHA Form 7000-3 Mar 85 (Revised)	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         Citation       Order       X       Safeguard       -         14. Initial Action       D. Written       E. Citation       E. Deted       Ma
DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III - Termination Action       Hr. Clock)       Hr. Clock)       Hr. Clock)         Section III - Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       19. Type of Inspection       10       20. Event Number       0       5       1       1       6       1       8       P         22. Signature       Image: Context of the system       Image: Context of the system       Image: Context of the system       0       0       5       9       7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         Citation       0       0       -       -       -       -       Citation       Order       X       Safeguard         14. Initial Action       D. Written       D. Written       E. Citation/       0       0       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)         Section III Termination Action       17. Action to Terminate	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         14. Initial Action       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard         15. Area or Equipment       D. High       X       E. Citation/       0       4       1       0       4       2       1       F. Dated       Mo       Da       Yr
16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Section III Termination Action       17. Action to Terminate       17. Action to Terminate       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       19. Type of Inspection       10. J       20. Event Number       0. J       11. 6       1. 8       P         22. Signature       23. AR Number       0. 0. 5       9. 7       MSHA Form 7000-3 Mar 85 (Revised)       0. 0. 5       9. 7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         14. Initial Action       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard       Vr         15. Area or Equipment       0       5       1       0       9       4
10. Termination Doe       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)         17. Action to Terminate       17. Action to Terminate       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       Hr. Clock)         Section IV Automated System Data       19. Type of Inspection       120. Event Number       0 5 1 1 6 1 8       P         22. Signature       23. AR Number       0 0 5 9 7       MSHA Form 7000-3 Mar 85 (Revised)       0 0 5 9 7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard       Yr         15. Area or Equipment       D. USE OF EXPLOSIVES
Section III Termination Action         Hr. Clock)           17. Action to Terminate         17. Action to Terminate           18. Terminated         A. Date         Mo         Da         Yr         B. Time (24 Hr Clock)           18. Terminated         A. Date         Mo         Da         Yr         B. Time (24 Hr Clock)           Section IV Automated System Data         19. Type of Inspection         20. Event Number         0 5 1 1 6 1 8         P           22. Signature         23. AR Number         0 0 5 9 7         MSHA Form 7000-3 Mar 85 (Revised)         0 0 5 9 7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       C. Citation       Order       X       Safeguard       Vr         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRAND/MCCONNEL/ALLISON - USE OF EXPLOSIVES       Date       Mo       Date       A       A       A       A       A       A       A       A       A       A       A       A       A       A       A       A       A       A       B       B       A       A       B       A       A       A       A       A       A       A       A       B       B       A       B       B       B       B       B       B       B       B       B       B       B       B       B <t< td=""></t<>
Section III 1 ermination Action         17. Action to Terminate         18. Terminated         18. Terminated         A. Date       Mo         Da       Yr         B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection         (activity code)       0         30       0         51       1         61       8         22. Signature       23. AR Number         0       0         51       1         61       8         7       7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       C. Citation/       Order       A       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       Da       Yr
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P         22. Signature       23. AR Number       0       0       5       9       7         MSHA Form 7000-3 Mar 85 (Revised)       With a state of the state	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action A. Citation       D. Written A. Citation       D. Written Notice       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRAND\MCCONNELVALLISON - USE OF EXPLOSIVES       -       <
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P         22. Signature       23. AR Number       0       0       5       9       7         MSHA Form 7000-3 Mar 85 (Revised)       With a state of the	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       Notice       Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       -
18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data         19. Type of Inspection       0       20. Event Number       0       5       1       1       6       1       8       P         22. Signature         MSHA Form 7000-3 Mar 85 (Revised)	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       13. Type of Issuance (check one)         14. Initial Action       C. Safeguard       -       -       -       Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       -       -       C. Safeguard       -<
Section IV Automated System Data           19. Type of Inspection         20. Event Number         0         5         1         1         6         1         8         P           22. Signature         23. AR Number         0         5         9         7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard
Section IV Automated System Data           19. Type of Inspection         20. Event Number         0         5         1         1         6         1         8         P           22. Signature         23. AR Number         0         5         9         7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       E. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock)       E. Time (24 Hr. Clock)       E. Time (24 Hr. Clock)
19. Type of Inspection (activity code)       0       3       0       0       5       1       1       6       1       8       P         22. Signature       23. AR Number         MSHA Form 7000-3 Mar 85 (Revised)       0       5       9       7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)         14. Initial Action       D. Written       C. Safeguard       Order       X       Safeguard         14. Initial Action       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       D. High       X       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Image: Construction of the provided in the provi
(activity code)         0         3         0         0         5         1         1         6         1         8         P           22. Signature	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       -
22. Signature         23. AR Number           MSHA Form 7000-3 Mar 85 (Revised)         0 0 5 9 7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action A. Citation       X       B. Order       C. Safeguard       D. Written Notice       C. Citation       Order       Yr       Safeguard         15. Area or Equipment       D. Written       Notice       Order       Yr       A       Da       Yr         DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Image: Content of the
MSHA Form 7000-3 Mar 85 (Revised) 0 0 5 9 7	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written Notice       Order       Yr       Safeguard       -         15. Area or Equipment       C. Safeguard       Notice       Order       Yr       I       0       5       1       0       9       4         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       Hr. Clock)       -<
MSHA Form 7000-3 Mar 85 (Revised)	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written Notice       Order       Vr       F. Dated       Mo       Da       Yr         15. Area or Equipment       D. Written       Notice       Order       Number       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       - <td< td=""></td<>
	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       104-D-11,       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       Yr       Safeguard       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       E. Citation       4410421       0421       F. Dated       Mo       Da       Yr         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       P         19. Type of Inspection       Q       Q       Q       D       Setion IV - Automated System Data       P         19. Type of Inspection       Q       Q       Q       D       Set P       P         22. Signature       Q       Q       Q       D       Set P       Q       Q       Set P
	A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       104-D-11,       -       -       13. Type of Issuance (check one) Citation       Order       X       Safeguard         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       Yr       Safeguard         15. Area or Equipment       D. Altation Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       Hr. Clock)         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       Hr. Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       P         19. Type of Inspection       Q       Q       Yr       B. Time (24 Hr Clock)       P         22. Signature       Q       Q       Q       D       Safeguard       Q <td< td=""></td<>

Section I Violation Data
1. Date Mo Da Yr 2. Time (24 Hr. Clock)
4 4 4 1 0 4 5
DOUGLAS MCGREGOR, GENERAL MANAGER
6. Mine 7. Mine ID 7.
MAGMA MINE 0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice 8a. Written Notice (103g)
DURING THE FIRST OF TWO BLASTS FYRI OON IS MATERIAL
WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST HANGURS IN THE SEE DATE DURING THE MULSION
DURING THIS PERIOD, TWO BLASTS WERE INITIATED WITH PARTICIPATION BY A TEAM LEADER AN AGENT OF THE OPENATOR
AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INITIATED THE
EXPLOSIVES
THIS VIOLATION IS PART OF A CENERAL FAILURE TO FOLLOW FERFORM FURL ON VERY AND A STATE
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN OPDINARY NECHOENCE IN FAILURE TO FOLLOWING THAT THE AND T
WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAIL URE
9. Violation A. Health 9. Violation Form (MSHA Form 7000-3a)
Safety B. Section C. Part/Section of
Other of Act - Title 30 CFR 5 7 . 6 3 0 2 b
10. Gravity:
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely C Occurred
B. Injury or Illness could rea-
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Estat
C. Significant and Substantial (See Reverse): Ves. X Ne
11. Negligence (check one)
A. None B. Low C. Moderate D. High X E. Reckless Disregard
12. Type of Action 13. Type of Issuance (check one)
1 0 4 - D - 1 ,
A. Citation X B. Order C. Safeguard Notice C. Safeguard C. Notice C. Citation/
DAHLSTRAND/MCCONNEL/ALLISON - USE OF EXPLOSIVES
A. Date   B. Time (24
Section III Truck III Hr. Clock)
17. Action to Terminate
18. lerminated Mo Da Yr A Date I I B Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6 1 8 P
22. orginature 23. AR Number
(Immil) [ /ong 005/9/7
MSHA Form 7000-3 Mar 85 (Revised)

من موجعه .... مو<sup>جعه</sup> م

Section I Violation Data	
1. Date Mo Da Yr 2 Time (24 Hr Clock)	T
4 Served To 6 Served To 6 Served To 6 Served To 7 Serv	1
DOUGLAS MCGREGOR GENERAL MANAGER	
6. Mine 7 Mine 10 7 Mine 1	
8. Condition or Practice 8a. Written Notice (103n)	-
	1
DURING THE SECOND OF TWO BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE EMULSION	
WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST HANGUPS IN THE 865 RAISE DURING "B" SHIFT, 8/2/93. DURING	
MINERS, THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INITIATED THE ONE PASS	
ACTIVITY OF A STATE OF	••
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT	
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT EXPLOSIVES	;
WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.	
See Continuation Form (MSHA Form 7000-3a)	
9. Violation A. Health	Ħ
Safety B. Section C. Part/Section of	
Other         of Act         -           Title 30 CFR         5   7   .   6   3   0   2   b           -             Section II – Inspector's Evaluation         -   <t< td=""><td></td></t<>	
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood 📃 Unlikely 🗌 Reasonably Likely 🔀 Highly Likely 🗍 Occurred 🦳	
· B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays 📃 Lost Workdays or Restricted Duty 📃 Permanently Disabling 🗌 Fatal	X
	<b>N</b> 1
C. Significant and Substantial (See Reverse): Yes X No	<u>م</u>
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       Image: Comparison of the second seco	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       1       ,       -       -       Citation       Order       X       Safeguard	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       1       ,       -       -       13. Type of Issuance (check one)         Citation       Order       X       Safeguard       -	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)         14. Initial Action       D. Written       E. Citation/       Order       X       Safeguard       Yes	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       1       ,       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         A. Citation       X       B. Order       C. Safeguard       Order       Ye       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Citation       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       F. Dated       Mo       Da       Yr         15. Area or Equipment       C.       Mo       Ca       Mo       Da       Yr	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRAND/MCCONNEL/ALLISON - LISE OF EXPLOSIVES       DAHLSTRAND/MCCONNEL/ALLISON - LISE OF EXPLOSIVES       DAHLSTRAND/MCCONNEL/ALLISON - LISE OF EXPLOSIVES	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Constraint of Persons Affected       0       0         12. Type of Action       1       0       4       -       1       ,       -       -       13. Type of Issuance (check one)       Image: Citation       Order       X       Safeguard       Image: Citation       Order       X       Safeguard       Image: Citation       Image: Citatio	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       -	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)         12. Type of Action       1       0       4       -       -       -       -       Citation       Order       X       Safeguard       -         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       Hr. Clock)       F. Dated       Mo       Da       Yr         6. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)       Hr. Clock)       F. Clock)       F. Dated       Hr. Clock)       F. Clock)	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0         12. Type of Action       1       0       4       -       0       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0       0       1       0       4       2       1       F. Dated       Mo       Da       Yr       Notice       Order       Notice       Notice       Notice       Order       Notice       0       5       1       0       9       1       0       9       1       0       9       1       0       9       1       0       9       1       0       9       1       0       9       1       0       9       1       0       5	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       E. Time (24 Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)       Hr. Clock)	3 
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       D. Written       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       Image: Conder of the second o	3 
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       C. Moderate       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       Image: Clear High	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       0       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Image: Constant on the function of the fu	3 
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       Image: Comparison of Persons Affected       0       0         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0       0         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       Image: Comparison of Persons Affected       0       0       0       7         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation/       A float       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Image: Comparison of Person	
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         12. Type of Action       1       0       4       -       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation/       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Image: Cock of the two of the two of tw	
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Citation       X       B. Order       C. Safeguard       D. Written       E. Citation       Order       X       Safeguard       0       1       9         15. Area or Equipment       DAHLSTRANDIMCCONNELVALLISON - USE OF EXPLOSIVES       Imme (24       Hr. Clock)       Hr. Clock)       Imme (24       Hr. Clock)       Imme (24       Hr. Clock)       Imme (24       Hr. Clock)       Imme (24       Imme (24 Hr Clock)       Imme (24 Hr Cloc	3 - - - - - - - - - - - - -
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard       1         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       1         14. Initial Action       A. Order       C. Safeguard       D. Written       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         15. Area or Equipment       D. High       X       E. Citation/ Order       4       4       1       0       4       2       1       F. Dated       Mo       Da       Yr         DAHLSTRANDIMCCONNELIALLISON - USE OF EXPLOSIVES       Image: Safe and the safe an	3
C. Significant and Substantial (See Reverse):       Yes       X       No       D. Number of Persons Affected       0       0         11. Negligence       (check one)       A. None       B. Low       C. Moderate       D. High       X       E. Reckless Disregard         12. Type of Action       1       0       4       -       -       13. Type of Issuance (check one)       Order       X       Safeguard       -         14. Initial Action       A. Catation       X       B. Order       C. Safeguard       D. Written       E. Citation/       Order       X       Safeguard       0       5       1	

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

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
4. Served To 5. Operator	Number 4 4 1 0 4 5 2
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine 7 Mine 10	APANY, SUPERIOR MINING DIVISION
MAGMA MINE 8. Condition or Practice	D 1 5 2 - (contractor) 8a. Written Notice (103a)
DUPING THE TURD OF BIX DI 4070 THE	
WERE EXPOSED TO IMPACT WHEN THEY WERE HARD CONSISTING OF A FUSED CA	P AND A CAP-SENSITIVE EMULSION
DURING THIS PERIOD, SIX BLASTS WERE INITIATED MITH DADTIONATION AND THE 865 RA	ISE DURING "B" SHIFT, 8/3/93.
AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE DASS COMPARTMENT OF	DER, AN AGENT OF THE OPERATOR,
EXPLOSIVES.	OULD HAVE FALLEN AND INITIATED THE
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USA	GE REQUIREMENTS, MANAGEMENT
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGEN	CE IN FAILING TO ENSURE THAT
LAT LOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE	FAILURE.
See Con	tinuation Form (MSHA Form 7000 0-)
9. Violation A. Health	
Safety B. Section C. Part/Section of	
Other of Act - Title 30 CFR	576302b
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood	
B Injuny or Illness could rea	Highly Likely Occurred
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty	Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No	
1. Negligence (check one)       A. None       B. Low       C. Moderate       D. High	X     E     Post/loss     0     0     3
2. Type of Action	
	) Order X Safeguard
4. Initial Action D. Written E. Citation/ A. Citation X B. Order C. Safeguard Notice Order 4.4	1 0 4 2 1 F. Dated Mo Da Yr
5. Area or Equipment	
DAHLSTRAND MCCONNEL ALLISON - USE OF EXPLOSIVES	
6. Termination Due Mo Da Yr A. Date B. Time (24	
Hr. Clock)	
Cition III Termination Action	
3. Terminated A. Date Mo Da Yr B. Time (24 Hr Clock)	
ection IV Automated System Data	
9. Type of Inspection 20. Event Number 21. Primary or Mill	
(activity code) $\begin{bmatrix} 0 & 3 & 0 \end{bmatrix}$ $\begin{bmatrix} 0 & 5 & 1 & 1 & 6 \end{bmatrix}$	P
2. Signature	// 22 AD All
	23. AK Number
SHA Form 7000.3 Mar 85 Revised Acmment Oneo	0 0 5 9 7
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Section I	Violation Data							-		
1. Date	Mo Da	Yr 9 4	2. Time (24 Hr. Clock)	0.7.2	2		3. Citation/Order			
4. Served T	0			013	5 000	rator	Number	4 4	1 0 4	53
DOUGL	AS MCGREG	OR. GE	NERAL MANAGER		0. Ope					
6. Mine					7 Min		ANT, SUPERIOR MINI	NG DIVISION	1	
MAGMA	MINE					02-00	152	(		
8. Condition	or Practice						8a Written	(contractor)	( <b>a</b> )	
-				· · · · · · · · · · · · · · · · · · ·					9/	<u> </u>
DURING	G THE FOURT	TH OF S	SIX BLASTS, EXPLOSIVE	MATERIALS	CONSIS	TING OF A FUSED CA	AP AND A CAP-SENSIT		ON	
WERE E	EXPOSED TO	IMPAC	T WHEN THEY WERE U	SED TO BLA	ST HANG	UPS IN THE 865 RAIS	SE DURING "B" SHIFT,	8/3/93.		
	THIS PERIO		BLASTS WERE INITIATE	D WITH PAF	RTICIPATI	ON BY A TEAM LEAD	ER, AN AGENT OF THE	OPERATO	R,	
EXPLOS	SIVES	ME HA	INGUP, OR LOOSE MUCH	K IN THE OR	E PASS C	OMPARTMENT, COU	LD HAVE FALLEN AND	) INITIATED	THE	
	517 2.0.									
THIS VIO	OLATION IS P	PART C	F A GENERAL FAILURE	TO FOLLOW	FEDERA	EXPLOSIVES USAG				
ENGAG	ED IN AGGRA	VATE	D CONDUCT CONSTITUT	ING MORE	THAN OR	DINARY NEGLIGENC	E IN FAILING TO ENSU	RE THAT	<u> </u>	
EXPLOS	SIVES WERE	NOT E	XPOSED TO IMPACT. TH	IS VIOLATIO	ON IS AN I	JNWARRANTABLE F	AILURE.			
9. Violation	A Health					See Conti	nuation Form (MSHA Fo	rm 7000-3a)		
	Safety		B. Section			C Part/Soction of				
	Other		of Act	-		Title 30 CFR	5 7 6 3	2026		
Section II	Inspector's Eve	aluatior						/ 0 2 0 1		
A. Injury o	or lilness (has)	(is): 1	No Likelihood	Unlikely	Reas	onably Likely X	Highly Likely	Occur	red	
B. Injury	y or Illness cou	ld rea-								
					st workda	s or Restricted Duty	Permanently D	sabling	Fatal	X
C. Signi	ificant and Sub	stantia	(See Reverse): Yes	X No			D. Number of Persons	Affected	0	03
A. None	ice (check on	e)	B. Low	C. Moderat	te [	D. High	X E. Reck	less Disregar	d   ]	
12. Type of A	Action				13. Type of	Issuance (check one)			J	
	1	0 4	- D - 1 ,		Citatio	n (,	Order X	Safeguard		
14. Initial Act	tion			D. Wri	tten	E. Citation/	F. Dat	ted Mo	Da	Yr
A. Citati 15. Area or E	ion XB.	Order	C. Safeguard	Noti	ce	Order 4 4 Number	1 0 4 2 1	0 5	5 1 0	94
DAHLST	RAND\MCCO	NNELV	ALLISON - USE OF EXPLO	OSIVES						
16. Terminati	ion Due A. C	Date	Mo Da Yr B. Ti	ime (24						
Section III	Termination Ac	ction	<u> </u>	fr. Clock)				<u>-</u>		
10 Tarminata										
ro. reminate	A. Date	•	Da Yr     B. Time (2	4 Hr Clock)						
Section IV	Automated Sys	stem Da	ata		- I					
19. Type of In	nspection		20. Event Number			21. Primary or Mill				
(activity	y code) (	0 3 0		5 1 1 6	5 1 8		Р			
22. Signature			$\rho$	$\sim$	>		23. AR Nu	nber	1. F. T.	
		<	Iminio V	Tom	_					
VISHA Form	7000-3 Mar 85	Revis	ed)	Tores	· · · · ·			10	101219	14
	$\bigcirc$	$\sim \gamma$		1						
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### U.S. Department of Labor Mine Safety and Health Administration

Section I Violation Data
1. Date Mo Da Yr 2. Time (24 Hr. Clock) 3. Citation/Order
4 4 1 0 4 5 4
DOUGLAS MCGREGOR GENERAL MANAGER
6. Mine 7 Minute Company, Superior Mining Division
8. Condition or Practice 0 0 1 5 2 - 0 (contractor)
8a. Written Notice (103g)
DURING THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUELD OAD AND A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUELD OAD AND A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTENCE OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTENCE OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE MATERIALS CONSISTENCE OF A FUEL FOR THE FIFTH OF SIX BLASTS, EXPLOSIVE A FUEL FOR THE FO
WERE EXPOSED TO IMPACT WHEN THEY WERE LISED TO BLAST HANGLIDS IN THE SEE DATE DURING THE RULESION
DURING THIS PERIOD, SIX BLASTS WERE INITIATED WITH PARTICIPATION BY A TEAM LEADED AND A STATE DURING "B" SHIFT, 8/3/93.
AND TWO MINERS. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INITIATED THE
EXPLOSIVES.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS. MANAGEMENT
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT
EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.
9. Violation A. Health See Continuation Form (MSHA Form 7000-3a)
Safety B. Section C. Port/Section of
Other of Act - Title 30 CEP 5 7 C 2 0 0 L
Section II Inspector's Evaluation
Childry of hillness (has) (is). No Likelinood Unlikely Reasonably Likely X Highly Likely Occurred
B. Injury or Illness could rea-
sonably be expected to be. No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No
11. Negligence (check one)
A. NoneB. LowC. ModerateD. HighK F. Reckloss Discovered
12. Type of Action
1 0 4 - D - 1
14. Initial Action D. Written E. Citation/
A. Citation X B. Order C. Safeguard Notice Order 4 4 1 0 4 2 1 F. Dated Mo Da Yr
15. Area or Equipment
DAHLSTRAND/MCCONNEL/ALLISON - USE OF EXPLOSIVES
A Date
Hr. Clock)
Section III Termination Action
17. Action to Terminate
18. Terminated Mo Da Vr
A. Date       B. Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 0 5 1 1 6 1 8
22. Signature 23. AR Number 1
MSHA Form 7000-3 Mar 85 (Revised) 0 0 5 9 7

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
4. Served To	Number 4 4 1 0 4 5 5
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine	7 Mine ID
MAGMA MINE	
8. Condition or Practice	1 0 2 - 0 0 1 3 2 - 0 (contractor)
	ca. white house (103g)
DURING THE SIXTH OF SIX BLASTS, EXPLOSIVE MATERIALS COM	SISTING OF A FUSED CAP AND A CAP-SENSITIVE EMULSION
WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST	HANGUPS IN THE 865 RAISE DURING "B" SHIFT, 8/3/93.
AND TWO MINERS, THE HANGUR, OR LOOSE MUCK IN THE ODE	CIPATION BY A TEAM LEADER, AN AGENT OF THE OPERATOR,
EXPLOSIVES.	PASS COMPARTMENT, COULD HAVE FALLEN AND INITIATED THE
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FE	EDERAL EXPLOSIVES USAGE REQUIREMENTS, MANAGEMENT
ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE TH	AN ORDINARY NEGLIGENCE IN FAILING TO ENSURE THAT
EXPLOSIVES WERE NOT EXPOSED TO IMPACT. THIS VIOLATION	IS AN UNWARRANTABLE FAILURE.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act -	Title 30 CFR 5 7 . 6 3 0 2 b
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely X Highly Likely Consumed
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays	
C. Significant and Substantial (See Powerse)	
11. Negligence (check one)	D. Number of Persons Affected 0 0 3
A. None B. Low C. Moderate	D. High X E. Reckless Disrogard
12. Type of Action	
1 0 4 - D - 1 ,   -   -   <sup>13.</sup>	Citation Order X Safeguard
14. Initial Action D. Writter A. Citation X B. Order C. Safeguard Notice	E. Citation/         A         C         B         Dated         Mo         Da         Yr           Order         4         4         1         0         4         2         1         F. Dated         Mo         Da         Yr           Order         4         4         1         0         4         2         1         F. Dated         Mo         Da         Yr           0         5         1         0         9         4         1         0         9         4
15. Area or Equipment	Number
DAHLSTRAND/MCCONNEL/ALLISON - USE OF EXPLOSIVES	
16. Termination Due A. Date Mo Da Yr B. Time (24	
Section III Termination Action	
17. Action to Terminate	
18 Termineted	
A. Date     B. Time (24 Hr Clock)	
Section IV – Automated System Data	
19. Type of Inspection 20. Event Number	21. Primary or Mill
(activity code)  0 3 0 0 5 1 1 6	1   8   P
	23. AR Number
MSHA Form 7000-3 Mar 85 (Revised)	010597

Section I V	iolation Data									
1. Date	Mo Da	Yr 2. Time	(24 Hr. Clock)		1		2 04-4			
	0 5 1 0	9 4		0 7 2	r		S. Citatio	n/Order		
4. Served To	L <u></u>			073	5		Numb	er	4 4 1 0	4 5
DOUGLA	S MCGREGO	R GENERAL			5. Operato	r • • • • • • • • • • • •				
6. Mine					7 Mine ID	A COPPER COM	PANY, SUPER	OR MINING	DIVISION	
MAGMA	MINE									
8. Condition of	or Practice					02-00	152-	(co	intractor)	
								Ba. Written No	otice (103g)	
EXPLOSI	VE MATERIA	LS CONSISTIN	G OF A FUSED		AP-SENSIT					
WERE US	SED TO BLAS	T HANGUPS I	N THE 865 RAIS	E DURING "E	" SHIFT 8/1	1/93 DURING TH	ERE EXPOS		T WHEN THE	<u>Y</u>
ANOTHE	R ATTEMPTE	D BY TWO MI	NERS. THE THE	REE RAISE D	UMPING LOC	ATIONS WERE N		BLAST WAS	INITIATED AN	
HANGUP	S AND MATE	RIAL FLOWED	INTO THE RAIS	SE. ADDITION	AL MATERI	AL DUMPED INTO	THE RAISE		LASTING THE	SE
EXPLOSI	VES FROM T	HE IMPACT. A	LSO, THE HAN	GUP COULD	<b>HAVE FALLE</b>	N AND INITIATED	THE EXPLO	SIVES	- MINATED II	
THIS VIO		DT 00 1 200								
	DIN ACCEAN	ATED CONDI	ERAL FAILURE	TO FOLLOW	FEDERAL EX	PLOSIVES USAG	E REQUIREN	ENTS. MAN	AGEMENT	
MINERS		ATED CONDU	CT CONSTITUT	TING MORE T	HAN ORDIN	ARY NEGLIGENC	E IN FAILING	TO ENSURE	THAT THESE	TWO
	MERCE NOT E	AF USING EXP	LUSIVES TO IM	PACT. THIS	VIOLATION I	S AN UNWARRAM	TABLE FAIL	JRE.		
				····		Son Conti	nuntion Come			
9. Violation	A. Health					See Conti	nuation Form (	MSHA Form 7	7000-3a)	
	Safety	B. Section			Ċ	Dart/Spotion of				
	Other	of Act		-	U.	Title 30 CER	5			
Section II In:	spector's Eval	uation						1.030	20	
A Injuny or	lilbooo (boo) (i	a). No.1.212	. —							
	inness (nas) (i	s). No Likelino		Unlikely	Reasona	bly Likely X	Highly Lik	ely	Occurred	
B. Injury c	or illness could	rea-								
sonabl	ly be expected	to be: No	Lost Workdays	Los	t Workdays o	Restricted Duty	Perm	anently Disab	ling Fat	al
C. Signific	ant and Subs	lantial (See Rev	erse): Yes	X No	T T					
11. Negligence	e (check one)						D. Number o	f Persons Affe	ected	0 0
A. None		B. Low		C. Moderate		D High	X	E Dooklose	Distant	
12. Type of Ac	tion						<u> </u>	E. Reckless	Disregard	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1 0	4 - 0 -	1	- 1.	5. Type of Issi	Jance (check one)		<u> </u>		
			•   •	-	Citation		Order	X Sa	ifeguard	
4. Initial Action	n				an E	Citation	· · · · · · · · · · · · · · · · · · ·			
A. Citation	n 🗙 B.C	)rder 🗍 (	. Safeguard	Notic		Order 44	10121	F. Dated	Mo Da	
5 Area or Equ	uipment					Number			0510	9
J. Alea UI Equ									////	
CHRISTIAN	SEN/TRUET	T-USE OF FX	PLOSIVES							
				<u> </u>						
6. Termination	1 Due	Mo Da	Yr							
	A. Da	te	B. Ti	ime (24						
Section III Te	rmination Acti			Ir. Clock)						
7. Action to Te	erminate									
THE MINER	RS ARE DECI	EASED.								
		Mo Da '	Yr			1				
8. Terminated			B. Time (2	4 Hr Clock)						
8. Terminated	A. Date				017126					
8. Terminated	A. Date	0 5 1 0 9	4		01100					
8. Terminated ection IV Au 9. Type of Inc.	A. Date	0 5 1 0 9 em Data	ant Number							
8. Terminated ection IV Au 9. Type of Insp	A. Date	0 5 1 0 9 em Data 20. Eve	ent Number		21. F	rimary or Mill				
8. Terminated ection IV Au 9. Type of Insp (activity of	A. Date Itomated Systi pection code) 0	0 5 1 0 9 em Data 20. Eve 3 0	ent Number 0	5 1 1 6	21. F	rimäry or Mill	P			
8. Terminated ection IV Au 9. Type of Insp (activity of 2. Signature	A. Date Itomated Syst pection code) 0	05109 em Data 20. Evi 30	ent Number 0	5 1 1 6	21. F	rimåry or Mill	P 2	3. AR Number	r	
8. Terminated ection IV Au 9. Type of Insp (activity of 2. Signature	A. Date	0 5 1 0 9 em Data 20. Evi 3 0	ent Number 0 6mmi ()		21. F	rimäry or Mill	P 2	3. AR Number		
8. Terminated ection IV Au 9. Type of Insp (activity of 2. Signature ISHA Form 70	A. Date	0 5 1 0 5 em Data 20. Evi 3 0	ent Number 0 6 6 7 14		21.F	rimary or Mill	P 2	3. AR Number	005	9

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

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1. Date       Mo       Da       Yr       2. Time (24 Hr. Clock)       0       7       3       6       3. Citation/Order       4       4       1       0       4       5         4. Served To       Number       4       4       1       0       4       5         5. Operator       MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION       MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION       6         6. Mine       7. Mine ID       0       2       0       1       5       2       -       (contractor)         8. Condition or Practice       0       2       0       0       1       5       2       -       (contractor)
4. Served To       5. Operator       Number       4 4 1 0 4 3         6. Mine       7. Mine ID       0 2 - 0 0 1 5 2 -       (contractor)         8. Condition or Practice       20 1 1 5 2 -       20 1 1 5 2 -       (contractor)
DOUGLAS MCGREGOR, GENERAL MANAGER     MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION       6. Mine     7. Mine ID     0       0. AGMA MINE     0     2       9. Condition or Practice     2     0
6. Mine 7. Mine ID 0 2 - 0 0 1 5 2 - (contractor)
MAGMA MINE         0 2 - 0 0 1 5 2 - 0 (contractor)           8. Condition of Practice         2. Write Number (2021)
9 Condition or Dractico
o. Contractor of Fractice     8a. Written Notice (103g)
DURING THE FIRST OF TWO BLASTS, EXPLOSIVE MATERIALS CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE
EMULSION WERE EXPOSED TO IMPACT WHEN THEY WERE USED TO BLAST HANGUPS IN THE 865 RAISE DURING "A" SHIFT,
7/31/93. THE HANGUP, OR LOOSE MUCK IN THE ORE PASS COMPARTMENT, COULD HAVE FALLEN AND INITIATED THE
EXPLOSIVES.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS.
See Continuation Form (MSHA Form 7000-3a)
9. Violation A Health
Safety B. Section C. Part/Section of
Other         Other         Of Act         Image: Construction         Image: Construticion         Image: Constructicion
10. Gravity:
A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely X Highly Likely Occurred
B. Injury or Illness could rea-
sonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0 0
A. None B. Low C. Moderate X D. High E. Reckless Disregard
12. Type of Action 13. Type of Issuance (check one)
1         0         4         -         A         -         -         Citation         X         Order         Safeguard
14. Initial Action D. Written E. Citation/ F. Dated Mo Da Yr
A. Citation B. Order C. Safeguard Notice Notice Number
15. Area or Equipment
A. Date   B. Time (24
Section III – Termination Action
17. Action to Terminate
·
18. Terminated A. Date Mo Da Yr B. Time (24 Hr Clock)
Section IV Automated System Data
19. Type of Inspection 20. Event Number 21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6 1 8 P
22. Signature 23. AR Number
fimmil fores 0059
MSHA Form 7000-3 Mar 857(Revised)

Section I Violation Data	
r. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
	Number 4 4 1 0 4 5 8
4. Served to	5. Operator
6 Mine	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
8. Condition or Practice	0 2 - 0 0 1 5 2 - 0 (contractor)
DURING THE SECOND OF TWO BLASTS, EXPLOSIVE MATERIALS	CONSISTING OF A FUSED CAP AND A CAP-SENSITIVE
EMULSION WERE EXPOSED TO IMPACT WHEN THEY WERE USE	D TO BLAST HANGUPS IN THE 865 RAISE DURING "A" SHIFT,
EXPLOSIVES	PARTMENT, COULD HAVE FALLEN AND INITIATED THE
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW F	EDERAL EXPLOSIVES USAGE REQUIREMENTS
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Section II - Inspector's Evaluation	Title 30 CFR 5 7 6 3 0 2 b
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely X Highly Likely Occurred
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays Lost	Workdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Vee V No.	
11. Negligence (check one)	D. Number of Persons Affected 0 0 2
A. None B. Low C. Moderate	X D. High E. Reckless Disregard
12. Type of Action	
14. Initial Action D. Writte	n E. Citation/ F. Dated Mo Da Yr
A, Citation B. Order C. Safeguard Notice	Order     Number
15. Area or Equipment	
16. Termination Due Mo Da Yr	
A. Date B. Time (24	
	1 6 0 0
17. Action to Terminate	
A. Date     B. Time (24 Hr Clock)	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number	21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6	1 8 P
	23. AR Number
Fimmil fore	00597
MSHA Form 7000-3 Mar 85 (Revised)	

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock) 0 7 3 8	3. Citation/Order
4. Served To 5. Operator	
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPA	NY, SUPERIOR MINING DIVISION
6. Mine ID 7. Mine ID	
MAGMA MINE 0 2 - 0 0 1	5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
THE 865 PAISE ON "A" SHIET 7/21/02, ONLY ONE MINER WAS DESENT WITH THE ASSESSMENT OF THE SALEST AND CAPPED	SAFETY FUSE TO BLAST HANGUPS IN
PART OF A GENERAL FAILURE TO FOLLOW FEDERAL EXPLOSIVES USAGE REQUIREMENTS	USE WAS LIT. THIS VIOLATION IS
	·
See Continu	uation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act C. Part/Section of Trilo 20 CEP	5765025
Section II Inspector's Evaluation	
10. Gravity:	
A. Injury of Illness (nas) (is): No Likelihood Unlikely Reasonably Likely X	Highly Likely Occurred
B. Injury or Illness could rea-	
Soliably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty	Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No	D. Number of Persons Affected 0 0 1
11. Negligence (check one)	
A. None B. Low C. Moderate X D. High	E. Reckless Disregard
12. Type of Action 13. Type of Issuance (check one)	
1 0 4 - A - , Citation X	Order Safeguard
14. Initial Action     D. Written     E. Citation/       A. Citation     B. Order     C. Safeguard     Notice	F. Dated Mo Da Yr
15. Area or Equipment	
16. Termination Due	
A. Date   B. Time (24	
0         5         1         2         9         4         Hr. Clock)         1         6         0         0	· · · · · · · · · · · · · · · · · · ·
17. Action to Terminate	
A. Date       B. Time (24 Hr Clock)	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number 21. Primary or Mill	
(activity code)   0   3   0   0   5   1   1   6   1   8   22 Signature	P
	23. AR Number
MSHA Form 7000 2 Mar 05/ Paris Hemniel Hones	00597

wine Safety	and	Health	Ad	Iminis	trat	ior
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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	2 Citation (Order
4. Served To 5. Operator	Number 4 4 1 0 4 6 0
DOUGLAS MCGREGOR, GENERAL MANAGER MAGMA COPPER COMPAN	IY, SUPERIOR MINING DIVISION
6. Mine 7. Mine ID 7. Mine ID	
8. Condition or Practice	5 2 - (contractor)
	8a. Written Notice (103g)
DURING THE SECOND OF TWO BLASTS, TWO MINERS WERE USING EXPLOSIVES AND CAPPE	D SAFETY FUSE TO BLAST HANGUPS
IN THE 865 RAISE ON "A" SHIFT, 7/31/93. ONLY ONE MINER WAS PRESENT WHEN THE SAFETY	FUSE WAS LIT. THIS VIOLATION IS
USAGE REQUIREMENTS.	
See Continua	ation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section C. Part/Section of	
Section II Inspector's Evaluation	5  <i>1</i>  . 6 5 0 2 h
10. Gravity:	
Reasonably Likely X	Highly Likely Occurred
D. Injury or liness could rea- sonably be expected to be: No Lost Workdays Lost Workdays or Postrieted Duty.	
C. Significant and Substantial (See Deven )	
11. Negligence (check one)	D. Number of Persons Affected 0 0 1
A. None B. Low C. Moderate X D. High	E. Reckless Disregard
12. Type of Action 13. Type of Issuance (check one)	
1 0 4 - A - ,	Order Safeguard
14. Initial Action D. Written E. Citation/	E Dated Mo Da Vr
A. Citation B. Order C. Safeguard Notice Order	
15. Area or Equipment	
	-
16. Termination Due Mo Da Yr	
A. Date 0 5 1 2 9 4 Hr. Clock 1 6 0 0	
Section III Termination Action	
18. Terminated Mo Da Yr A. Date B. Time (24 Hr Clock)	
Section IV Automated System Data	
19. Type of Inspection 20. Event Number 21. Primary or Mill	
(activity code)  0 3 0   0 5 1 1 6 1 8	
	23. AK Number
MSHA Form 7000-3 Mar 85 (Revised)	00597

Mine Safety and	Health Administration
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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3 Citation/Order
0 5 1 0 9 4	
4. Served To	5 Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine	
MAGMA MINE	0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
THIRTY-SIX CAPPED SAFETY FUSES WERE FOUND IMPRODED	
FROM THE EXPLOSIVES MAGAZINE AND THREE YARDS FROM	THE DRIFT AT THE 4000 LEVEL AUXILIARY EVELOSIVES STORAGE
AREA ON AUGUST 19, 1993. SAFETY FUSES FROM THIS STORA	AGE AREA WERE PRIMARILY USED FOR BLASTING HANGUPS AT
THE 865 RAISE.	
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW	
	FEDERAL EXPLOSIVES STORAGE REQUIREMENTS.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Section II Inspector's Evaluation	Title 30 CFR 5 7 . 6 1 6 1 a
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely 🔲 Occurred 📋
B piuny or illness could rea	
sonably be expected to be: No Lost Workdays Los	t Workdays or Restricted Duty Permanently Disabling X Fatal
C. Significant and Substantial (See Reverse): Yes X No	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1
Sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence       (check one)       B. Low       C. Moderate	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. High E. Reckless Disregard
Sonably be expected to be:     No Lost Workdays     Los       C. Significant and Substantial (See Reverse):     Yes     X     No       11. Negligence (check one)     A. None     B. Low     C. Moderate       12. Type of Action     11.     11.     11.	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E. Reckless Disregard 3. Type of Issuance (check one)
Sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       1;	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E X D. High E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard
2. Highly be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard Citation X Order Safeguard en E. Citation/ F. Dated Mo Da Yr
2. Findary of miness could reasonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11;         14. Initial Action       B. Order       C. Safeguard       D. Writt       Notic	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E. Reckless Disregard Safeguard Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E. Reckless Disregard Safeguard F. Dated Mo Da Yr Number
2. Highly of miness could real-sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       1         14. Initial Action       B. Order       C. Safeguard       D. Writt       Notic         15. Area or Equipment       C. Safeguard       D. Writt	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1  E. Chitation X Order Safeguard E. Citation/ Order Number Mumber
b. Highly be impless could real-sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 C. Number of Persons Affected 0 0 1 C. Number of Persons Affected 0 0 1 C. Number of Persons Affected C. Number of Perso
2. Highly be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt         15. Area or Equipment       Mod Data       Vr	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard en E. Citation/ Order H. Dated Mo Da Yr Order Number
b. Injury of Initials Could real-sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       A. Citation       B. Order       C. Safeguard       D. Writt       Notic         15. Area or Equipment	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard en E. Citation/ Order Number F. Dated Mo Da Yr
2. Injuly of initials could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11;         14. Initial Action       B. Order       C. Safeguard       D. Writt         15. Area or Equipment       . <td>t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard en E. Citation/ order Number 0 9 0 0</td>	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard en E. Citation/ order Number 0 9 0 0
b. Injuly of Initess could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       A. Date       Mo       Da       Yr         16. Termination Due       A. Date       0       5       1       0       9       4         17. Action to Terminate       Action       Action       10       9       4       Hr. Clock)	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 e X D. High E. Reckless Disregard 3. Type of Issuance (check one) Citation X Order Safeguard en E. Citation/ re Order F. Dated Mo Da Yr Order Number
b. Injuly of Initess could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       -       -       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE FUSES WERE REMOVED TO AN EXPLOSIVES (PRIMER) MAGE       -       -       -	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Reckless Disregard Citation X Order Safeguard E. Citation/ Order F. Dated Mo Da Yr Number 0 9 0 0
2. Highly be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt       Notic         15. Area or Equipment       . <td< td=""><td>t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Citation E. Reckless Disregard Citation X Order Safeguard en E. Citation/ Order Number 0 9 0 0</td></td<>	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Citation E. Reckless Disregard Citation X Order Safeguard en E. Citation/ Order Number 0 9 0 0
2. Highly be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt       Notic         15. Area or Equipment       .       .       .       D. Writt       Notic         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE FUSES WERE REMOVED TO AN EXPLOSIVES (PRIMER) MAC       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E. Reckless Disregard Citation X Order Safeguard E. Citation/ Order Mumber Order Number 0 9 0 0 SAZINE.
b. Injuly of Initials Could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11;         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       .       .       .       .       .         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Yr       Hr. Clock)       Section III Termination Action       .       .       .       .         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       .       .       .       .       .       .	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. D. High E. Reckless Disregard Citation X Order Safeguard E. Citation/ Be Citation/ Order Number Order Number Order Number O 9 0 0 Citation C Citation/ Order C Citati
b. Injuly of Initials Could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt         15. Area or Equipment       D. Writt       Notice       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       11       0       9       4       Hr. Clock)         Section III Terminate       THE FUSES WERE REMOVED TO AN EXPLOSIVES (PRIMER) MAG       NAG         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       20. Event Number       0       5       1       0       9       4	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 D. Number of Persons Affected 0 0 1 E. Citation E. Reckless Disregard Citation X Order Safeguard en E. Citation/ Order Number 0 9 0 0 SAZINE.
b. Inglary of ninness could rea- sonably be expected to be:       No Lost Workdays       Los         C. Significant and Substantial (See Reverse):       Yes       X       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       D. Writt         15. Area or Equipment       O       5       1       0       9       4       Hr. Clock)         Section III Termination Action       THE FUSES WERE REMOVED TO AN EXPLOSIVES (PRIMER) MAGE       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       10       9       4       B. Time (24 Hr Clock)         Section IV Automated System Data       19. Type of Inspection       20. Event Number       0       5       1       1         19. Type of Inspection       0       3       0       0       5       1       1       6       1	t Workdays or Restricted Duty Permanently Disabling X Fatal D. Number of Persons Affected 0 0 1 E. Reckless Disregard Citation X Order Safeguard E. Citation/ Order Number E. Citation/ Proder Number Order Number D 0 0 0 Citation Z Order Citation Z Order Number D 0 0 0 Citation Z Order Number D 0 0 Citation Z Order D 0 0 Cita

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

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	
051094	
4. Served To	Number   4   4   1   0   4   6   2
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - 0 (contractor)
8. Condition or Practice	8a. Written Notice (103g)
SIXTEEN BOYES OF EVELOSINGS WEDE STORED IN THE	
NORMAL AMOUNT OF EXPLOSIVES WERE STORED IN THE 4000 LE	VEL AUXILIARY STORAGE FACILITY ON AUGUST 19, 1993. THE
WEEK. THE AMOUNT STORED WOULD ACCOMMODATE 1000-200	OBLASTS WHICH WAS MODE THAN A ONE WEEK SUBSILY THE
EXPLOSIVES WERE PRIMARILY USED TO BLAST HANGUPS IN TH	E 865 RAISE.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FE	DERAL EXPLOSIVES STORAGE REQUIREMENTS.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act	C. Part/Section of
Section II Inspector's Evaluation	
10. Gravity:	
A. Injury of hiness (has) (is): No Likelihood X Unlikely	Reasonably Likely Highly Likely Occurred
B. Injury or Illness could rea-	
Lost Vorkdays X Lost	Norkdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes No	X D. Number of Persons Affected 0 0 0
11. Negligence (check one)	
B. LOW C. Moderate	X D. High E. Reckless Disregard
12. Type of Action 1 0 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Type of Issuance (check one)
1   0   4   -   A   -   ,       -   -   -	Citation X Order Safeguard
14. Initial Action D. Written	E Citation(
A. Citation B. Order C. Safeguard Notice	Order   F. Dated Mo Da Yr
15. Area or Equipment	Number
16. Termination Due	
A. Date       B. Time (24	
Section III Terminative Active	0 9 0 0
17 . Action to Terminate	
THE EXCESS EXPLOSIVES WERE MOVED TO ANOTHER STORAGE	MAGAZINE.
18. Terminated         Mo         Da         Yr           A. Date         0         1         0         B. Time (24 Hr Clock)	0 7 4 2
Section IV Automated System Data	
19. Type of Inspection 20. Event Number	21. Primary or Mill
(activity code) 0 3 0 0 5 1 1 6	1  8   P
22. Signature A A	
	23. AR Number

MSHA Form 7000-3 Mar 85 (Revised)

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

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3 Citation/Order
0 5 1 0 9 4 0 7 4 2	
4. Served To	5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - (contractor)
8. Condition or Practice	8a. Written Notice (103g)
SIXTEEN BOYES OF EXPLOSIVES WERE STORED IN THE 4000 H	
OLDEST PRODUCTS WERE STORED AT THE BOTTOM OF FACH	EVEL AUXILIARY STORAGE FACILITY ON AUGUST 19, 1993. THE
FIRST. THE EXPLOSIVES WERE PRIMARILY USED TO BLAST HA	NGUPS IN THE 865 RAISE
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW F	EDERAL EXPLOSIVES STORAGE REQUIREMENTS.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act	C. Part/Section of
Section II – Inspector's Evaluation	
10. Gravity:	- ten
A. Injury of liness (nas) (is): No Likelihood X Unlikely	Reasonably Likely Occurred
B. Injury or Illness could rea-	
SODEDIV DO OVDORIONI to bot No Look Marked-up V L Look	
sonably be expected to be: No Lost Workdays X Lost	t Workdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes No	t Workdays or Restricted Duty     Permanently Disabling     Fatal       X     D. Number of Persons Affected     0     0
C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence       (check one)       B. Low       C. Moderate	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard       Image: Comparison of
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       11       11       11	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard       3.         3. Type of Issuance (check one)       0       0       0
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       1       0       4       -       -       -       12	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11         14. Initial Action       D. Writte       D. Writte       Notion       Notion       Notion	t Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard       0       0       0         3. Type of Issuance (check one)       Order       Safeguard       0       0       0         en       E. Citation/       F. Dated       Mo       Da       Yr
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writt       Notice	t Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       -       -       -       -	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       -       -       -       -	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment	tWorkdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment	tWorkdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Hr. Clock)       Hr. Clock)       -       -       -	t Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one) Citation Order Safeguard   Citation X Order Mo   Permanently Disabling F. Dated Mo   Order Order Number
Sonably be expected to be:       No Lost Workdays       X       Losi         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment	t Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X   Order Safeguard     en E. Citation/   Order F. Dated   Number     Order     Number
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       A. Citation       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       A. Date       0       5       1       0       9       4       Hr. Clock)         Section III Termination Action         17. Action to Terminate       SOME EXPLOSIVES WEEE REMOVED TO ANOTHER MACAZINE	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       O       5       1       0       9       4       Hr. Clock)         Section III Termination Action         17. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.         FACILITATE USE OF THE OLDEST STOCKS FIRST.	tWorkdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       11;         12. Type of Action       1       0       4       -       -       -       12;       No         14. Initial Action       B. Order       C. Safeguard       D. Writh Notic         15. Area or Equipment       .       .       .       Notic         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         .       .       .       .       .       .       .       .         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         Section III Termination Action       .       .       .       .       .       .         17. Action to Terminate       .       .       .       .       .       .       .       .         SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.       .       .       .       .       .       .	tWorkdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Losi         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         15. Area or Equipment       D. Viritte       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.         FACILITATE USE OF THE OLDEST STOCKS FIRST.       B. Time (24 Hr Clock)	tWorkdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:       No Lost Workdays       X       Losi         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writt         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       -       -       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Yr. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.       FACILITATE USE OF THE OLDEST STOCKS FIRST.       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         South A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         South A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         South A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         South A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         <td colspan="</td> <td>tWorkdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X Order   Safeguard   en   E. Citation/ Order   Order   Number     F. Dated   Mo   Da   Yr     Order     F. Dated   Mo   Da   Yr     Order     F. Dated   Mo   Da   Yr     THE OTHER EXPLOSIVES WERE PROPERLY RESTACKED TO</td>	tWorkdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X Order   Safeguard   en   E. Citation/ Order   Order   Number     F. Dated   Mo   Da   Yr     Order     F. Dated   Mo   Da   Yr     Order     F. Dated   Mo   Da   Yr     THE OTHER EXPLOSIVES WERE PROPERLY RESTACKED TO
Sonably be expected to be:       No Lost Workdays       X       Losi         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       -       -       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Yr. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.       FACILITATE USE OF THE OLDEST STOCKS FIRST.       18. Time (24 Hr Clock)         Section IV – Automated System Data       0       5       1       0       9       4	Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X   Order Safeguard     en E. Citation/   Order F. Dated   Mo Da   Yr   Order   Number     F. Dated   Mo   Da   Yr   Order   Number     THE OTHER EXPLOSIVES WERE PROPERLY RESTACKED TO     0   7   4   3
Sonably be expected to be: No Lost Workdays       X       Losi         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writte         A. Citation       B. Order       C. Safeguard       Notic         15. Area or Equipment       -       -       -       -         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       TO 9       4       Hr. Clock)         Section III Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.       FACILITATE USE OF THE OLDEST STOCKS FIRST.         18. Terminated       A. Date       Mo       Da       Yr         B. Time (24 Hr Clock)       Section IV - Automated System Data       9       4         19. Type of Inspection       20. Event Number       0       5       1       1	tWorkdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X Order   Safeguard   en E. Citation/   Order Safeguard   order Number   THE OTHER EXPLOSIVES WERE PROPERLY RESTACKED TO   0 7   4 3
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         12. Type of Action       1       0       4       -       -       -       -       11;         14. Initial Action       B. Order       C. Safeguard       D. Writte       Notice         15. Area or Equipment       D. Order       C. Safeguard       D. Writte       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.         FACILITATE USE OF THE OLDEST STOCKS FIRST.       18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       10       9       4       B. Time (24 Hr Clock)       Section IV Automated System Data         19. Type of Inspection       20. Event Number       0       5       1       1       6         22. Signature       0	tWorkdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X Order   Safeguard   en E. Citation/   Order Safeguard   Provide the second secon
Sonably be expected to be: No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse): Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -         14. Initial Action       B. Order       C. Safeguard       D. Writh Notic         15. Area or Equipment       D. Voriet       D. Safeguard       Notic         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         Hr. Clock)       Section III Termination Action       17. Action to Terminate       SOME EXPLOSIVES WERE REMOVED TO ANOTHER MAGAZINE.         FACILITATE USE OF THE OLDEST STOCKS FIRST.       18. Terminated       A. Date       0       5       1       0       9       4       Hr Clock)         Section IV - Automated System Data         19. Type of Inspection       0       3       0       0       5       1       1       6       1       1       6       1       1       6       1       1       6       1       1       6       1       1       1       1       1       1       1       1       1       1	tWorkdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0   X D. High E. Reckless Disregard   3. Type of Issuance (check one)   Citation X Order   Safeguard   en E. Citation/   Order Safeguard   order Number   THE OTHER EXPLOSIVES WERE PROPERLY RESTACKED TO   0 7   4 3   23. AR Number

MSHA Form 7000-3 Mar 85 (Revised)

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

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3 Citation/Order
0 5 1 0 9 4 0 7 4 3	
4. Served To	5. Operator
DOUGLAS MCGREGOR, GENERAL MANAGER	MAGMA COPPER COMPANY, SUPERIOR MINING DIVISION
	7. Mine ID
8. Condition or Practice	0 2 - 0 0 1 5 2 -   (contractor)
EXPLOSIVES WERE NOT STORED IN A CLOSED CONTAINER IN T	HAT THE COVER WAS NOT ON ONE PARTIAL CONTAINER OF
EXPLOSIVES WERE IN THIS FACILITY. THE EXPLOSIVES WERE F	FACILITY ON AUGUST 19, 1993. FIFTEEN OTHER BOXES OF
	ANNALLY GOLD TO BEIGH HANGOLS IN THE BOS RAISE.
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW FI	DERAL EXPLOSIVES STORAGE REQUIREMENTS.
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act	C. Part/Section of
Section II Inspector's Evaluation	
A Injury or Illness (has) (is): No Likelihood X Unlikely	
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays X Lost	Workdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes No	Workdays or Restricted Duty     Permanently Disabling     Fatal       X     D. Number of Persons Affected     0.000
C. Significant and Substantial (See Reverse): Yes No 11. Negligence (check one)	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0
Sonably be expected to be:     No Lost Workdays     X     Lost       C. Significant and Substantial (See Reverse):     Yes     No       11. Negligence (check one)     B. Low     C. Moderate	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:     No Lost Workdays     X     Lost       C. Significant and Substantial (See Reverse):     Yes     No       11. Negligence (check one)     A. None     B. Low     C. Moderate       12. Type of Action     1.0.4     A.     1.1.1	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0       0       0         X       D. High       E. Reckless Disregard
Sonably be expected to be:     No Lost Workdays     X     Lost       C. Significant and Substantial (See Reverse):     Yes     No       11. Negligence (check one)     A. None     B. Low     C. Moderate       12. Type of Action     1     0     4     -     -     -     13.	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard
Sonably be expected to be:     No Lost Workdays     X     Lost       C. Significant and Substantial (See Reverse):     Yes     No       11. Negligence (check one)     A. None     B. Low     C. Moderate       12. Type of Action     1     0     4     -     -     -     13.       14. Initial Action     D. Writter	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Safeguard
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence       (check one)       No       No         A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Safeguard         Model       F. Dated       Mo       Da         Yr       Order       Number       Yr
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       A. Citation       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment       .       .       .       .       .       .	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         E. Citation/       Order       F. Dated       Mo         Number       Number       F. Dated       Mo       Da
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written         Notice       15. Area or Equipment       -       -       -       -	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Citation       Order         Citation/       Order       F. Dated       Mo         Description       F. Dated       Mo       Da         Yr       Order       Number       Yr
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written         15. Area or Equipment	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         E. Citation/       F. Dated       Mo       Da         Virtual       Yr       Order       Yr
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       13.         14. Initial Action       A. Citation       B. Order       C. Safeguard       D. Written         15. Area or Equipment	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         E. Citation/       Order       F. Dated       Mo         Number       Image: Construction of the second
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       B. Low       C. Moderate         12. Type of Action       B. Low       C. Moderate         12. Type of Action       B. Low       C. Moderate         14. Initial Action       B. Order       C. Safeguard       D. Written         A. Citation       B. Order       C. Safeguard       Notice         15. Area or Equipment       A. Date       Mo       Da       Yr         16. Termination Due       A. Date       0       5       1       0       9       4       Hr. Clock)	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         0       0.0       P. High       F. Dated         0       0.0       Order       Safeguard         0       9       0       0
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Safeguard         D       E. Citation/ Order Number       F. Dated       Mo       Da         0       9       0       0       0
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       ,       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment       .	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         D.       E. Citation/       F. Dated       Mo         Order       Number       Image: Construction of the second sec
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written       Notice         15. Area or Equipment       -       -       -       -       14.         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         16. Termination Due       A. Date       0       5       1       0       9       4       Hr. Clock)         Section III – Termination Action         17. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.         18. Terminated       Mo       Da       Yr	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         0       E. Citation/       F. Dated       Mo         0       9       0       0
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment       -       -       -       -       14.         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Citation       X         Citation       X       Order       Safeguard         D       E. Citation/ Order Number       F. Dated       Mo       Da         0       9       0       0       9       0
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence       (check one)       No       No         A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written       Notice         15. Area or Equipment       .       .       .       .       .       .       Notice         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         Section III – Termination Action       17. Action to Terminate       .       .       .       .         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV –: Automated       System Data       .       .       .       .       .	Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0 0   X D. High E. Reckless Disregard   Type of Issuance (check one) Citation   Citation X   Order Safeguard   N Order   Number F. Dated   Mo Da   Yr   Order   Number
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       ,       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written         A. Citation       B. Order       C. Safeguard       Notice         15. Area or Equipment       -       -       -       10       9       4       Hr. Clock)         Section III – Termination Action       7. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.       -       -       -       -         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       -         Section IV Automated System Data       10       9       4       B. Time (24 Hr Clock)       -	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Mo         0       E. Citation/       F. Dated       Mo         0       9       0       0         0       9       0       0         21. Primary or Mill       I       I
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment       O       5       1       0       9       4       Hr. Clock)         Section III Termination Action       7       A. Date       Mo       Da       Yr       B. Time (24         17. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.       THE COVER WAS REPLACED ON THE OPEN BOX.       Section IV Automated System Data       9       4       B. Time (24 Hr Clock)         18. Terminated       A. Date       0       5       1       9       4       B. Time (24 Hr Clock)         Section IV Automated System Data       10       9       4       B. Time (24 Hr Clock)       1	Workdays or Restricted Duty       Permanently Disabling       Fatal         X       D. Number of Persons Affected       0 0 0         X       D. High       E. Reckless Disregard         Type of Issuance (check one)       Order       Safeguard         Citation       X       Order       Safeguard         0       E. Citation/ Order Number       F. Dated       Mo       Da       Yr         0       9       0       0       9       0       0         21. Primary or Mill       P       P       P       P       P
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written Notice         15. Area or Equipment       D. Volume       No       Da       Yr       B. Time (24         16. Termination Due       A. Date       Mo       Da       Yr       B. Time (24       Hr. Clock)         Section III – Termination Action         17. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.         18. Terminated       A. Date       0       5       1       0       9       4       Hr Clock)         Section IV Automated System Data         19. Type of Inspection       20. Event Number       0       5       1       1       6         22. Signature       0       3       0       20. Event Number       0       5       1       1       6	Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0 0   X D. High E. Reckless Disregard   Type of Issuance (check one) Order Safeguard   Citation X Order Safeguard   0 E. Citation/ Order F. Dated Mo   0 9 0 0
Sonably be expected to be:       No Lost Workdays       X       Lost         C. Significant and Substantial (See Reverse):       Yes       No         11. Negligence (check one)       A. None       B. Low       C. Moderate         12. Type of Action       1       0       4       -       -       -       13.         14. Initial Action       B. Order       C. Safeguard       D. Written         A. Citation       B. Order       C. Safeguard       Notice         15. Area or Equipment       O       5       1       0       9       4       Hr. Clock)         Section III – Termination Action         17. Action to Terminate       THE COVER WAS REPLACED ON THE OPEN BOX.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)         Section IV Automated System Data       20. Event Number       0       5       1       1       6         22. Signature       W. (Qui W.	Workdays or Restricted Duty Permanently Disabling Fatal   X D. Number of Persons Affected 0 0 0   X D. High E. Reckless Disregard   Type of Issuance (check one) Order Safeguard   Citation X Order Safeguard   0 E. Citation/ Order F. Dated   0 9 0 0

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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	2 Citation/Order
4. Served To	Number  4  4  1  0  4  6  5
DOUGLAS MCGREGOR, GENERAL MANAGER	
6. Mine	7. Mine ID
MAGMA MINE	0 2 - 0 0 1 5 2 - 0 (contractor)
8. Condition or Practice	8a. Written Notice (103g)
AN UNUSED EXPLOSIVE CAPTRIDGE (CAP SENSITIVE ENTRY OF	
FEEDER DECK ON 8/11/93. THIS EXPLOSIVE MATERIAL HAD NOT	N WAS FOUND ON A STEEL BEAM AT THE 865 RAISE SYNTRON
THIS VIOLATION IS PART OF A GENERAL FAILURE TO FOLLOW F	EDERAL EXPLOSIVES STORAGE REQUIREMENTS.
······································	
•	
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Section II Inspector's Evaluation	Title 30 CFR         5         7         6         3         0         5         1         1         1
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely X	Reasonably Likely Highly Likely Occurred
B. Injury or Illness could rea-	
	Vorkdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes No	X         D. Number of Persons Affected         0         0         1
A. None B. Low C. Moderate	
12 Type of Action	
1 0 4 - A - ,	Citation X Order Safeguard
14. Initial Action D. Writte	n E. Citation/
A. Citation   B. Order C. Safeguard Notice	Order Number
16 Termination Due	
A. Date $A$ Date $0.51094$ Hr. Clock	
Section III Termination Action	
THE CARTRIDGE WAS MOVED TO AN EXPLOSIVES STORAGE MAK	
DOZ WIG MOVED TO AN EXPEDSIVES STORAGE MAD	JAZINE.
18. Terminated A. Date Mo Da Yr B. Time (24 Hr Clock)	
Section IV Automated System Data	0   /   4   5
19. Type of Inspection 20. Event Number	21 Primary or Mill
(activity code) 0 3 0 0 5 1 1 6	1 8 P
22. Signature	23. AR Number
- timile An	Neo
MSHA Form 7000-3 Mar 85 (Revised)	10/015/9/7

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

Section I Violation Data	
1 Date Mo Da Yr 2 Time (24 Hr Clock) 0 5 1 0 9 4 0 7 4 5	3. Citation/Order
4. Served To	5 Operator
JOHN MARRINGTON, V.P. / GENERAL MANAGER	
6. Mine	
MAGMA MINE	0.2 - 0.0152 - W16 (
8. Condition or Practice	
GROUND SUPPORT IN THE AREA OF THE 865 RAISE WAS NOT M	AINTAINED TO CONTROL THE GROUND IN PLACES WHERE MINERS
WORK OR TRAVEL MANAGEMENT FAILED TO PROPERLY REPA	IR OR REPLACE THE CRIBBING AND TIMBER IN THE RAISE WHICH WAS
TO THE FAILURE OF THE BAUES ON OR DISLODGED AS A F	RESULT OF POOR MINING PRACTICES. THIS VIOLATION CONTRIBUTED
TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN	THE DEATH OF FOUR MINERS.
THE 865 RAISE STRUCTURE IS A 364 FOOT TWO COMPARTMENT	
AND ORE PASS COMPARTMENT. THE RAISE WAS DEVELOPED	T, FRAMED-TIMBER RAISE CONSISTING OF A MANWAY/TIMBER SLIDE
4000 LEVELS WITH ACTIVE DUMP POINTS AT THE 3763, 3700, AN	D 3636 LEVELS MINER ENTRANCES TO THE BAISE MEDE AT THE
4000, 3763 AND 3700 LEVELS.	LIVER AND
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITU	JTING MORE THAN ORDINARY NEGLIGENCE BY FAILING TO DETERMINE
THAT RAISE TIMBER AND CRIBBING HAD PROGRESSIVELY DETE	RIORATED AND THAT POSTS, DIVIDERS, LAGGING, BLOCKING, WALL
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Other of Act	C. Part/Section of
Section II Inspector's Evaluation	Title 30 CFR 5 7 . 3 3 6 0
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood Unlikely	Reasonably Likely Highly Likely Occurred X
B. Injury or Illness could rea-	
sonably be expected to be: No Lost Workdays Lost	Workdays or Restricted Duty Permanently Disabling Fatal
C. Significant and Substantial (See Reverse): Yes X No.	
11 Negligence (check one)	D. Number of Persons Affected 0004
A. None B. Low C. Moderate	D. High X F Reckless Disregard
12. Type of Action	
104-D-1.	
14. Initial Action D. Written	n E. Citation/ E. Dated Mo Da Vr
A. Citation B. Order C. Safeguard Notice	Order Order
15 Area or Equipment	Number
16 Termination Due	
A. Date       B. Time (24	
0 5 1 0 9 4 Hr. Clock)	0 8 0 0
Section III Termination Action	
THE CONTRACTOR IS NO LONGER ON MINE PROPERTY	
The CONTROPORTONIC HOLENGER ON MINE PROPERTY.	
18. Terminated Mo Da Yr	
A. Date B. Time (24 Hr Clock)	
Section IV Automated System Data	0 7 4 6
19 Type of Inspection 20 Event Number	21 Primary or Mill
19 Type of Inspection 20 Event Number 0 E 111 C	21. Primary or Mill
19 Type of Inspection (activity[code) 0 3\00 0 5 1 1 6	1 8 P
19 Type of Inspection     20 Event Number       (activity[code)     0       22. Sigpeture	21. Primary or Mill       1       8       P       23. AR Number
19 Type of Inspection     20 Event Number       (activity(code)     0       22. Signeture     0	21. Primary or Mill     P       1     8     P       23. AR Number     0     0       0     0     3     4

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

Section I Subsequen	t Action/Continuation D	ata				
1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da Yr 1 0 9 4	3. Citation/Order Number	4 4 1 0 4 6 6 - 1
4. Served To			_i_i_	5. Operator		
JOHN MARRINGT	ON, V.P./GENERAL M	ANAGER		DYNATE	C MINING CORPORATION	
6. Mine				7. Mine ID		
MAGMA MINE					02-00152-	V J 6 (contractor)
Section II - Justification	n for Action					
PLATES AND ARM	ORED CRIBBING HA	D BEEN DAMAGED, L	OOSEN	ED AND DIS	LODGED. MANAGEMENT FAI	
CRIBBING TIMBER	RAND SUPPORT STR	UCTURE AND CONTI	NUED T	O ALLOW T	HE USE OF BOTH THE MANW	AY AND ORE PASS
COMPARTMENTS	DURING THE PERIO	D 8/3-10/93. THIS VIO	LATION	IS AN UNW	ARRANTABLE FAILURE.	
			· · · · · · · · · · · ·			
					· · · · · · · · · · · · · · · · · · ·	<u> </u>
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			·· -			
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	· · · · · · · · · · · · · · · · · · ·					
						See Continuation Form
Section III Subsequer	t Action Taken					
8. Extended To	Date Mo Da	Yr B. Time (24 Hr.	Clock)		C. Vacated D. Ter	minated E. Modified
Section IV Inspection	Data	· · · · ·	, <u>, , , ,</u>			······································
9. Type of Inspection	0 3 0	vent Number 0 5	1 1	6 1 8		
11. Signature	1 K n		Number	12. Date	Mo Da Yr 13. Time	e (24 Hr. Clock)
Upo	nebbed	EFEEN 00	34	1	0 5 1 0 9 4	0 7 4 5
MSHA Form 7000-3a, N	/ar 85 (Revised)	V				

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### U.S. Department of Labor

Mine Safety and Health	Administration
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Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3. Citation/Order
4. Served To	Number 4 4 1 0 4 6 7
JOHN MARRINGTON V.R. / GENERAL MANAGER	Operator
6. Mine	
	Mine ID
8. Condition or Practice	0 2 - 0 0 1 5 2 - W J 6 (contractor)
	8a. Written Notice (103g)
NECESSARY GROUND SUPPORT IN THE AREA OF THE SOL DAIDE W	
MINERS WORK OR TRAVEL DURING THE PERIOD 3/02 8/03 MANAGE	VAS NOT INSTALLED TO CONTROL THE GROUND IN PLACES WHERE
BACKFILLING AND BLOCKING, WAS ADEQUATE TO CONTROL THE	BOUND AND ODOLIND OURDOOD OT OT OT OT OT
CONTRIBUTED TO THE LATERAL MOVEMENT OF STRUCTURAL MED	MEERS MOVEMENT OF THESE ATTINGTURE WHICH
ARMORED CRIBBING TO BE DISLODGED BETWEEN THE MANWAY A	ND ORE PASS COMPARTMENT ALL OWING ORE AND SOUGHT
CRIBBING PIECES TO FALL INTO THE MANWAY COMPARTMENT. TH	IS VIOLATION CONTRIBUTED TO THE FAILURE OF THE DAME
8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	The PAILORE OF THE RAISE ON
THE 865 RAISE STRUCTURE IS A 364 FOOT, TWO-COMPARTMENT, F	RAMED-TIMBER RAISE CONSISTING OF A MAANMANTINEED OVER
AND ORE PASS COMPARTMENT. THE RAISE WAS DEVELOPED AT	AN APPROXIMATE SLOPE OF 81 DEGREES RETWEEN THE 2022 AND
4000 LEVELS WITH ACTIVE DUMP POINTS AT THE 3763, 3700, AND 3	636 LEVELS. MINER ENTRANCES TO THE PAISE WERE AT THE
4000, 3763 AND 3700 LEVELS.	
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Other of Act -	Title 30 CFR 5 7 3 3 6 0
10. Gravity	
A. Injury or Illness (has) (is): No Likelihood	
	Reasonably Likely Occurred X
B. Injury or liness could rea-	
	rkdays or Restricted Duty
C. Significant and Substantial (See Reverse): Yes X No	D. Number of Persons Affected 0 0 4
A. None B. Low C. Moderate	D. High X E. Reckless Disregard
12. Type of Action	
1 0 4 - D - 1 , C	itation Order X Safeguard
14. Initial Action D. Written A. Citation X B. Order C. Safeguard Notice	E. Citation/ Order 4 4 1 0 4 6 6 F. Dated Mo Da Yr
15. Area or Equipment	Number Number
865 RAISE	
16. Termination Due A. Date Mo Da Yr B. Time (24	
Section III Terrine Line Action Hr. Clock)	
17 Action to Termination Action	
THE CONTRACTOR IS NO LONGER ON MINE PROPERTY	
18. Terminated         A. Date         Mo         Da         Yr         B. Time (24 Hr Clock)         0           Continue by (a 1)         Da         1         0         9         4         B. Time (24 Hr Clock)         0	7 4 7
Section IV Automated System Data	
(activity code) 0 3 0 0 1 0 5 1 1 6 1	21. Primary or Mill 8
22. Signature	23. AR Number
UMONE DOUBPEED	

1. Subsequent Action       1a. Continuation       2. Dated       Mo       Da       Yr       3. Citation/Order       4       4       1       0       4       6       7       -         4. Served To       S. Operator       DVNATEC MINING CORPORATION       S. Operator       DVNATEC MINING CORPORATION       PNATEC MINING CORPORATION         8. Mine       7. Mine ID       D       2       -       0       0       1       5       2       -       W       J 6       (contractor)         MAGMA MINE       PNATEC MINING CORPORATION       7. Mine ID       D       2       -       0       0       1       5       2       -       W       J 6       (contractor)         MAGMA MINE       PNATEC MINING CORPORATION       7. Mine ID       D       0       1       5       0       1       5       2       -       W       J 6       (contractor)         MAGMA MINE       PALANTABLE FAILURE       IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY MEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE       Set Confinuation Formation       Set Confinuation Formation         Contractor       Set Confinuation Taken       Set Confinuation Formation       Set Confinuation Formation       Set Confinuation Formation       Set Confinuation Formation	Section I Subsequ	ent Action/Continuation D	ata					······································				
Image: Subsequent Action Taken       Image: Subsequent Action Taken         Image: Subsequent	1. Subsequent Actio	n 1a. Continuation	2. Dated	м	0	Da	Yr	3. Citation/Order				T
4. Served To       5. Operator         JOHN MARRINGTON, V.P. / GENERAL MANAGER       DYNATEC MINING CORPORATION         6. Mine       7. Mine (D)         MACMA MINE       0         Section II Justification (or Action       0         MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. This VIOLATION IS AN UNWARRANTABLE FAILURE.         MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. This VIOLATION IS AN UNWARRANTABLE FAILURE.         MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. This VIOLATION IS AN UNWARRANTABLE FAILURE.         MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. This VIOLATION IS AN UNWARRANTABLE FAILURE.         Sector III - Subsequent Action Taken         Sector III - Subsequent Action Taken         Sector III - Subsequent Action Taken         Extended To       A. Dat         Mo       Da       Yr         B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         Colon IV - Inspection Data       0       5       1       6       1         Type of Inspection       0       3       0       0       3       1       0       7		x	(Original Issue)	0	5	1 0	9 4	Number	4 4	104	6 7	-
A sale to 0       S. Operator         DOWN MARKINSTON, V.P. / GENERAL MANAGER       DVNATEC MINING CORPORATION         Mine       7. Mine 10       0       2       0       0       1       5       2	A Somed To											_
JUNK MARKING LON, V.P. / JENERAL MANAGER         DYNATEC MAING CORPORATION           MARAGA MINE         7. Mine ID         0         2         -         0         1         5         2         -         W         3         6         (contractor)         Secton 1 - Justification for Action           MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         INWARRANTABLE FAILURE.         INWARRANTABLE FAILURE.         INWARRANTABLE FAILURE.         Secton 1 - Justification for Action IS AN UNWARRANTABLE FAILURE.           INWARRANTABLE FAILURE.         INWARRANTABLE FAILURE.         Secton 1 - Subsequent Action Taken         Secton 1 - Subsequent Action Taken         Sec Continuation Form           Secton III - Subsequent Action Taken         No         Da         Yr         8. Time (24 Hr. Clock)         C. Vacated         D. Terminated         E. Modified           ection W - Inspection Data         No         Da         Yr         8. Time (24 Hr. Clock)         0         5         1         6         1         8	4. Serveu To					5. Ope	rator					
AMMORE         T. Mine ID         D         Z         -         W         J         6         (contractor)           MAGAMA MINE	JUHN MARKING	GION, V.P. / GENERAL N	ANAGER			DY	NATE	C MINING CORPORATION				
MARAA MINE       [0]2] - [0]0]1[5]2] - [W[J]6] [contractory         Better II = Justification for Action       [0]2] - [0]0]1[5]2] - [W[J]6] [contractory         MANAGEMENT ENCAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         MANAGEMENT ENCAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Failed         MARAGEMENT ENCAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.         See Continuation Failed         MARAGEMENT ENCAGED         See Continuation Failed         Edition III - Subsequent Action Taken         Extended       A. Date         Marker       1         M	6. MINE					7. Mine	Ð					
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MMAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTING MORE THAN ORDINARY NEGLIGENCE. THIS VIOLATION IS AN UNWARRANTABLE FAILURE.           UNWARRANTABLE FAILURE.           See Continuation IS AN UNWARRANTABLE FAILURE.           See Continuation IS AN UNWARRANTABLE FAILURE.           See Continuation IS AN UNWARRANTABLE FAILURE.           See Continuation Form           See Continuation Form           See Continuation Form           Section II – Subsequent Action Taken           Extended To	Sector II Justinica							·				
UNWARRANTABLE FAILURE.           UNWARRANTABLE FAILURE.           See Continuation           See Continuation Form           ieston III - Subsequent Action Taken           Extended To           A Date           Yee of Inspection           0   3   0           0   5   1   6   8           1. 3@There is a provided of the second of the se	MANAGEMENT	ENGAGED IN AGGRAV	TED CONDUCT COM	NSTIT	пт		חסבי		C THON			
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See Continuation Form          Section III - Subsequent Action Taken         Extended To       A. Date         A. Date       Mo         Da       Yr         B. Time (24 Hr. Clock)       C. Vacated         D. Terminated       E. Modified         iection IV - Inspection Data         . Type of Inspection         0       3         10. Event Number       0         0       5         11. St@naure       AR Number         12. Date       Mo         Da       Yr         13. Time (24 Hr. Clock)       0         0       0         0       0         0       0         0       0												
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See Continuation Form         C. Vacated D. Terminated E. Modified         See Continuation Form         C. Vacated D. Terminated E. Modified         Section IV Inspection Data         Type of Inspection         0       3       0       10       Event Number       0       5       1       1       6       1       8         AR Number       12       Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7         MOM COLSPAN         Mom Colspan="2">Decompone												
See Continuation Form         Section IV Inspection Data         Type of Inspection       0       3       0       5       1       6       1       8         A R Number       12       Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7         MONECUE       O       0       0       0       5 <td></td> <td>· · · · • • • • • • • • • • • • • • • •</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u>.</u></td> <td></td> <td></td>		· · · · • • • • • • • • • • • • • • • •								<u>.</u>		
See Continuation Form         C. Vacated D. Terminated E. Modified         Section Data         Type of Inspection Data         AR Number       12. Date       Mo Da Yr       13. Time (24 Hr. Clock)         1. Stignature       AR Number       12. Date       Mo Da       Yr       13. Time (24 Hr. Clock)       0       0       7				-								
See Continuation Form          Section III Subsequent Action Taken         Extended To       A. Date         A. Date       Mo         Date       B. Time (24 Hr. Clock)         C. Vacated       D. Terminated         E. Modified         iection IV Inspection Data         . Type of Inspection         0       3         1. Stignature         AR Number         12. Date         Mo       Da         Yr       13. Time (24 Hr. Clock)         O       3         AR Number       12. Date         Mo       Da         Yr       13. Time (24 Hr. Clock)         O       0         O       0         1. Stignature       AR Number         12. Date       Mo         Da       Yr         13. Time (24 Hr. Clock)       O         0       0         0       0         0       0         0       0         0       0         0       0         0       0         0       0         0       0												
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Extended To       A. Date       Mo       Da       Yr       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         i=ection IV - Inspection Data         . Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7	Section III Subsequ	ent Action Taken										
A. Date       B. Time (24 Hr. Clock)       C. Vacated       D. Terminated       E. Modified         iection IV Inspection Data         . Type of Inspection       0 3 0       10. Event Number       0 5 1 1 6 1 8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0 7 4	8. Extended To	Mo Da	Yr								<u> </u>	
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Gention IV - Inspection Data         . Type of Inspection       0       3       0       10. Event Number       0       5       1       1       6       1       8         1. Signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7												ι_
0       3       0       10. Event Number       0       5       1       1       6       1       8         1. signature       AR Number       12. Date       Mo       Da       Yr       13. Time (24 Hr. Clock)       0       7         4       0       0       3       4       1       0       5       1       0       9       4       0       7	Section IV Inspection	on Data	ant Alumber				· · · ·					
AR Number         12. Date         Mo         Da         Yr         13. Time (24 Hr. Clock)         0         7           Monse         0         3         4         1         0         5         1         9         4         0         7         4	a. Type of inspection	01310 10. EV	ent Number		1	6 1						
AR Number         12. Date         Mo         Da         Yr         13. Time (24 Hr. Clock)           MOMSCUESTSEE         0         0         3         4         1         0         5         1         0         9         4         0         7         4	Y			' '	<b>'</b>  '		2					
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	- Mhi	XX120 JUCKY	Strew 1010	3	4	1		051094			017	7 4

### U.S. Department of Labor

Mine Safety and Health Administration

Section I Violation Data	
1. Date Mo Da Yr 2. Time (24 Hr. Clock)	3 Citation/Order
0 5 1 0 9 4 0 7 4 7	
4. Served To	5. Operator
JOHN MARRINGTON, V.P. / GENERAL MANAGER	DYNATEC MINING CORPORATION
MAGMA MINE	7. Mine ID 0 2 - 0 0 1 5 2 - W J 6 (contractor)
8. Condition or Practice	8a. Written Notice (103g)
A SAFE MEANS OF ACCESS WAS NOT PROVIDED AND MAINTAINE	
THE 865 RAISE DURING THE PERIOD 8/4-10/93. THIS VIOLATION C	ONTRIBUTED TO THE SEVERITY OF THE ACCIDENT INVOLVENCE THE
FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEA	TH OF FOUR MINERS.
MANAGEMENT ENGAGED IN AGGRAVATED CONDUCT CONSTITUTION	
CONDITIONS IN THE RAISE WERE HAZARDOUS; (2)LADDERS HAD	NOT BEEN SECURED: (2) TIMPER DLOCKING AND ODISDUCTURAL
SHIFTED; (4) ARMORED CRIBBING WAS DISLODGED AND DAMAGE	D IN AT LEAST TWO AREAS BETWEEN THE ORE PASS AND MANMAN
COMPARTMENT; AND (5)ORE AND ARMORED CRIBBING PIECES H	AD FALLEN INTO THE MANWAY COMPARTMENT.
MINERS REGULARI Y TRAVELED THE MANIMAX COMPARTMENT	
FOR ACCESS TO OTHER MINE LEVELS. MANAGEMENT ALLOWED	URING THIS PERIOD TO PERFORM STRUCTURAL REPAIRS AND
CONTINUED USE OF THIS MANWAY DURING THIS PERIOD. THIS V	IOLATION IS AN UNWARRANTARI E FAILURE
	See Continuation Form (MSHA Form 7000-3a)
9. Violation A. Health	
Safety B. Section	C. Part/Section of
Section II Inspector's Evaluation	Title 30 CFR 5 7 . 1 1 0 0 1
10. Gravity:	
A. Injury or Illness (has) (is): No Likelihood 🛛 🗌 Unlikely 🔄	Reasonably Likely Occurred X
B. Injury or Illness could rea- sonably be expected to be: No Lost Workdays	
	Permanently Disabling Fatal X
11. Neoligence (check one)	D. Number of Persons Affected 0 0 4
A. None B. Low C. Moderate	D. High X E. Reckless Disregard
12. Type of Action	ype of Issuance (check one)
14 Initial Action	Order X Safeguard
A. Citation X B. Order C. Safeguard Notice	E. Citation/         F. Dated         Mo         Da         Yr           Order         4         4         1         0         4         6         6         0         5         1         0         9         4
15. Area or Equipment	Number
865 RAISE	
16 Termination Due	
A. Date B. Time (24	
Section III Termination Action	
17. Action to Terminate	
THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.	
18. Terminated Mo Da Yr	
A. Date 0 5 1 0 9 4 B. Time (24 Hr Clock) 0	7 4 8
Section IV Automated System Data	
(activity code) 0 3/00 0 5 111 6 1	21. Primary or Mill
22. Signature	10
( Umons Donkowa)	
MSHA Form 7000-3 Mar 85 (Revised)	00341

Section I – V	iolation	Data	r	· ·						
1. Date	Mo	Da	Yr	2. Time (24 Hr. Clock)		_			3. Citation/Order	
	0 5	10	94			0	7 4	8	3 Number 4 4 1 0 4 6	3 9
4. Served To	)								5. Operator	
JOHN M	ARRIN	GTON	, V.P. /	GENERAL MANAGER					DYNATEC MINING CORPORATION	
6. Mine									7. Mine ID	
MAGMA	MINE								0 2 - 0 0 1 5 2 - W J 6 (contractor)	
8. Condition	or Prac	tice							8a. Written Notice (103g)	
	MEDE									
MINERS	WERE		WED	TO WORK IN THE 865	RAISE		V "B" S	SH	HIFT, 8/6/93, EVEN THOUGH MANAGEMENT FAILED TO	
	ATELY		INE G	ROUND CONDITIONS I	ATIO		REAP		RIOR TO WORK COMMENCING, AFTER BLASTING AND AS OTHER	
			TCON	ITRIBUTED TO THE EA					OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE	
CAAMIN	ATION	SINA			ALURI			: <b>ה</b>	RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.	
		FXA			CONE	ודור		M		
THAT: (1	RAISE		BERSI	VERE SHIFTING AND	PROG	RF	SSIVE	1 1	Y DETERIORATING (2) RAISE TIMBERS WERE SEPARATING FROM	
POSTS.		RS. W	VALL F	LATES, AND CRIBBIN	G: (3)5	SUP	PORT	B	BLOCKING WAS SHEARED AND NO LONGER FUNCTIONAL	
(4)SECT	IONS C	DF AR	MORE	D CRIBBING WERE DI	SLOD	GEL		CF	HALLOWED ORE AND ARMORED CRIBBING PIECES TO FALL INTO	
THE MA	NWAY	COMF	PARTM	ENT; (5)THE RAISE S	UPPO	RT	STRU	IC.	TURE HAD BEEN SUBJECTED TO WATER INFILTRATION AND	
FREQUE	INT DE	VELO	PMEN	T AND HANGUP BLAS	TING;	(6)	NON-L	JN	NIFORM PLACEMENT OF BACKFILLING AROUND THE TIMBER	
FRAME	VORK	WAS C	CONTR	RIBUTING TO FRAMEW	VORK	SEF	PARA	ГІС	ON; AND (7) SWELLING OR SQUEEZING GROUND CONDITIONS WERE	
									See Continuation Form (MSHA Form 7000-3a)	X
9. Violation	A. Hea	alth								T
	Sa	fety		B. Section					C. Part/Section of	
	Ott	her		of Act	-   -				Title 30 CFR 5 7 . 3 4 0 1	
Section II 1	Inspect	or's Ev	aluatio	n						
A Injury o	r ilines	s (has)	(is)	No Likelihood	Lin	likal			Reasonably Likely Highly Likely Conversed	
		- (nus)	(10).				,			
B. Injury	or lline	ess cou	uld rea-	Na Lash Mariada						
SOLIS	ibly be i	expect		e. INO LOST VVORKOA	iys [		LC	ost		X
C. Signi	ficant a	nd Sul	bstantia	al (See Reverse):	Yes	X	No		D. Number of Persons Affected 0 0	) 4
11. Negligen A. None	ice (ch	eck or	ne)	B. Low		C. N	/lodera	ite	e D. High X E. Reckless Disregard	
12 Turns of	A atia		1-1-					40		
12. Type of /	Action	1						13		
		'	04				-		Citation Order X Safeguard	
14 Initial Act	tion		L					itte	ten E Citation (	v. 7
A. Citat	ion	ХВ	. Orde	C. Safeguard			No:	tice	ce Order 4 4 1 0 4 6 6 0 5 1 0 9	4
15. Area or E	Equipm	ent		-						
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	11000	011111			<u></u>	GIN				
16. Terminat	ion Due	A.	Date	Mo Da Yr	B. Tim	e (2	4			
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17 Action to	Termin	ation A	ction							
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18. Terminat	ed		M	o Da Yr						
		A. Dat	e 0	5 1 0 9 4 B. Tim	ne (24	Hr (	Ciock)		0 7 4 9	
Section IV	Automa	ated S	ystem	Data	- , .					•••
19. Type of I	nspecti	on		20. Event Number					21. Primary or Mill	
(activi	ly code	)	0 8	Q	0	5	1 1	6	5 1 8 P	
22. Signature	1		1		<u> </u>				23. AR Number	
(	1)11	nim	ns: [	Jooltrad						
MSHA Form	7000-	Mar 8	S5 (Rev	vised)	<b>~</b>					Ш
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U.S. Department of Labor Mine Safety and Health Administration

Section I Subsequent A	ction/Continuation D	ata						
1. Subsequent Action	1a. Continuation	2. Dated	Mo	Da	Yr		3 Citation/Order	
	X	(Original Issue)	0 5	10	94		Number	4410460 1
4. Served To				5. Ope	erator			
JOHN MARRINGTON	I, V.P. / GENERAL N	ANAGER		DY	'NATEC	MINING	CORPORATION	
6. Mine				7. Min	eID			
MAGMA MINE								
Section II Justification for	or Action			I		0 2 -	00152-W	J 6 (contractor)
NOT ENCOUNTERE	DURING RAISE C	ONSTRUCTION AND	JSE PR	EVEN	TING TI	E RAIS	E SUPPOPT STRUCT	
THE PROPER STRUC	CTURAL INTEGRITY	<i>I</i> .						SKE FROM DEVELOPING
ADEQUATE GROUNI	CONDITION EXAM	INATIONS OF THE R	AISE W	ERE V	VARRAI	TED TO	PROTECT MINERS R	
WORK IN THE AREA	THE ABOVE NOT	ED CONDITIONS WER	E VISIE	BLY OF	BVIOUS	AND FS	TABLISHED THAT TH	
STRUCTURE WAS F	AILING TO MAINTAI	N ITS STRUCTURAL I	NTEGR		D CAP	ABILITY	MANAGEMENT ENG	
CONDUCT CONSTIT	JTING MORE THAN	ORDINARY NEGLIGE	ENCE.	THIS V		ON IS AI		
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								See Continuation Form
Section III Subsequent Ac	tion Taken							
8. Extended To	Mo Da	Yr						
A. Date	•	B. Time (24 Hr. C	lock)			C. V	acated D. Termir	nated E. Modified
Section IV Inspection Dat	a							
9. Type of inspection	0 2 0 10. Eve	nt Number						
		0 5	1   1   6	5 1 8	5			
11. Signature	10		umbor	12 5	)ato	Ma		
$\square$	$D \cap \mathcal{C}$			- 'Z. L	Jale		ua Yr 13. 1ime (2	
1 Limons	-Depla	zy) 000	3 4 1	1		0 5	1094	0740
MSHA Form 700-3a, Mar	35 (Revised)					<u> </u>		0//4/0

MSHA Form 7009-3a, Mar 85 (Revised)

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

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1. Date N	40 Da	Yr 2. Time (2	4 Hr. Clock)	0.7	7 4 0				3. Citati	on/Order			T
4. Served To				1011	4 3	5 Operat			Num	per	4	4 1	_!
JOHN MAR		P / GENERAL	MANAGER				7 TEC MINUNI						
6. Mine			MANAGEN			7 Mino IC				1			
MAGMA MI	NF												
8. Condition or	Practice					L. Saint		001011	5 2 -	W  J   6   (c	ontract	(10	
			· · · ·							8a. Written N	otice (	103g)	)
MINERS W	ERE ALLOW	ED TO WORK I	N THE 865 BA	ISE ON	"A" SHI	ET 8/7/93			NACEME				
ADEQUATE	LY EXAMIN	E GROUND CO	NDITIONS IN	THE ARE	EA PRIC	OR TO WO	ORK COMM		AND AS C	THER GROUN			
CONDITION	IS WARRAN	ITED. THIS VIC	LATION IS PA	RT OF A	A PRAC	TICE OF A	FAILURE	TO CONE	DUCT ADE		INAT	ONS	
THAT CON	TRIBUTED 1	O THE FAILUR	E OF THE RAI	ISE ON 8	3/10/93 \	WHICH R	SULTED IN	N THE DE	ATH OF F	OUR MINERS	S.		
AN ADEQU				סודותאר				DT OTOU					
THAT: (1)R/	AISE TIMBE	RS WERE SHIF	TING AND PR	OGRESS	SIVELY		RATING (2)	NDAISE T	IMPEDS 1	VERE SERAR	DETE		IE IE
POSTS, DIV	/IDERS, WA	LL PLATES, AN	D CRIBBING	(3)SUPP	PORT BI		WAS SHEA	RED AND	NOTON	GER ELINOT		TRC	
(4)SECTION	IS OF ARMO	ORED CRIBBING	G WERE DISLO	ODGED	WHICH	ALLOWE			ED CRIPS	SER FUNCTION	TO EA		ÎΤ.
THE MANW	AY COMPA	RTMENT; (5)TH	E RAISE SUP	PORTS	TRUCT	URE HAD	BEEN SHR			R INFILTEAT			<u> </u>
FREQUENT	DEVELOP	MENT AND HAN	IGUP BLASTIN	NG; (6)N	ON-UNI	FORM PI	ACEMENT	OF BACK			TIMP	- D	·
FRAMEWO	RK WAS CO	NTRIBUTING T	O FRAMEWOP	RK SEPA	ARATIO	N; AND (7	) SWELLING	G OR SO	UEEZING	GROUND CO	NDIT	ONS	
						<u> </u>	Se	e Continu	uation Forn	n (MSHA Form	7000-	3a)	
9. Violation A.	Health		·									Ť	_
	Cofee [	1		1 1									
	Salety	B. Section				С	. Part/Sectior	n of	I				
	Other	B. Section of Act		-		С	. Part/Section Title 30 CFI	n of R	5	7.34	0 1		
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# U.S. Department of Labor Mine Safety and Health Administration

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Section I Subsequent	Action/Continuation D	ata					
1. Subsequent Action	1a. Continuation	2. Dated	Mo	Da	Yr T	3. Citation/Order	
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A Served To				+			
4. Served 10				5. Op	erator		
JOHN MARRINGTO	N, V.P. / GENERAL N	MANAGER		D	NATEC	MINING CORPORATION	
6 Mine				7. Min	e ID		
					O	2 - 0 0 1 5 2 - W	J 6 (contractor)
Section II Justification t	for Action						
WERE NOT ENCOU			····				
DEVELOPING THE F	ROPER STRUCTUR	AISE CONSTRUCTIO	N AND	USE PI	REVENT	NG THE RAISE SUPPORT ST	RUCTURE FROM
		ORE INTEGRITT.					
ADEQUATE GROUN	D CONDITION EXAM	ANATIONS OF THE F	AISE	VEREV			
WORK IN THE AREA	. THE ABOVE NOT	D CONDITIONS WE	RE VISI	BLY OF	BVIOUS	AND ESTABLISHED THAT THE	GROUND SUPPORT
STRUCTURE WAS F	AILING TO MAINTAI	N ITS STRUCTURAL	INTEGF		D CAPA	BILITY. MANAGEMENT ENGA	GED IN AGGRAVATED
CONDUCT CONSTIT	UTING MORE THAN	ORDINARY NEGLIG	ENCE.	THIS \	IOLATIC	N IS AN UNWARRANTABLE F	AILURE.
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							See Continuation Form
ection III Subsequent A	ction Taken						
Extended To	Mo Da	Yr			TTT		
A. Dat	e	B. Time (24 Hr. 0	Clock)			C. Vacated D. Termina	ated E. Modified
action IV tespection Da		I. I					
Type of Inspection		nt Number			1		
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. Signeture	Kn		lumber	12. C	ate	Mo Da Yr 13. Time (24	Hr. Clock)
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MSHA Form 7000-Ja, Mar 85 (Revised)

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## U.S. Department of Labor

Mine Safety	and H	lealth A	\dminis	tration
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1. Date															
	Mo 0 5	Da Yi 1 0 9	2. Tim	ne (24 Hr. Cloc	k)	0.7.6	5 0				3. Citation	n/Order			
4. Served T	0	1010	<u>-</u>			011	5 0 5	Operator			Numbe	er	4	4 1	0 4
JOHN N	ARRING	TON. V.	P. / GENEI	RAL MANAGE	R		ľ				DATION				
6. Mine							7	. Mine ID							
MAGMA	MINE						. 		02-	0 0 1	52-			>	
8. Condition	or Pract	ice									02	Ba. Written Not	ice (	or) 103a)	·····
									- · ·					(00g)	
MINERS	WERE	ALLOWE	D TO WOR	RK IN THE 86	5 RAISE	ON "A"	SHIF	T, 8/8/93, I	EVEN THO	DUGH MA	NAGEMEN	T FAILED TO			
ADEQU	ATELYE	XAMINE	GROUND	CONDITIONS	S IN THE	E AREA	PRIO	R TO WOL	RK COMM	ENCING	AND AS OT	HER GROUN	C		
	ONTRID		ED. THIS	VIOLATION I	S PART	OF A P	RACTI	CE OF A	FAILURE	TO CONE	UCT ADEC	UATE EXAMI	NATI	ONS	
	UNTRIB		THE FAIL	URE OF THE	RAISE	ON 8/10	0/93 W	HICH RE	SULTED II	NTHE DE	ATH OF FO	OUR MINERS.			
AN ADE	QUATE	EXAMIN							5 01/000						
THAT: (	1)RAISE	TIMBER	S WERE S	HIFTING AND	PROG	RESSIV		FTERIOR	ATING: (2	DAISET	MARE DO M	DULD HAVE D	ETE	RMINE	D
POSTS,	DIVIDE	RS, WALI	PLATES	AND CRIBBI	NG: (3)S	SUPPOR	RT BI C	CKING W					HNG	FRO	м
(4)SECT	IONS OF	- ARMOF	RED CRIBE	BING WERE	DISLODO	GED WH	HICH A	LLOWED	ORE AND	ARMOR	FD CRIBBI	NG PIECES TO	TEAL		0
THE MA	NWAY C	OMPAR	TMENT; (f	5)THE RAISE	SUPPO	RT STR	UCTU	RE HAD E	BEEN SUE	JECTED	TO WATER	INFILTRATIC			<u> </u>
FREQUE	ENT DEV	/ELOPM	ENT AND H	HANGUP BLA	STING;	(6)NON	-UNIF	ORM PLA	CEMENT	OF BACK	FILLING AF	OUND THE T	MBE	R	
FRAME	WORK W	AS CON	TRIBUTIN	G TO FRAME	WORK	SEPAR/	ATION	; AND (7)	SWELLIN	G OR SQ	UEEZING (	ROUND CON	DITIC	ONS	
	ч	r							Se	e Continu	ation Form	MSHA Form 7	000-3	Ba)	
9. Violation	A. Healt	ih												TT	TT
	Sate	ty	B. Secti	on				C. I	Part/Sectio	n of					
Section II	Inspector	's Evalua	OT Ad						Fitle 30 CF	R	5	7 . 3 4 0	1		
10. Gravity:		<u>e Eralaa</u>													· · · · · ·
A. Injury o	or Illness (	(has) (is):	No Likeli	ihood	Unli	ikelv 🗍	. ۲	Reasonal	olv Likelv		Highly Li		<u> </u>		
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sona	ably be ex	nected to	ia- hei t		<b>a</b> va [						1 _		_		
						•			Restricted		Perr	nanently Disabl	ing [		Fatal
C. Signi	ficant and	d Substar	tial (See R	everse):	Yes )	X   _ N	0				D. Number	of Persons Affe	cted		0
		sk one)		[]											
A. NONE	•		B. LC	w 🗌	C	C. Moder	rate		D. H	ligh	X	E. Reckless	Disre	gard	
12. Type of A	Action		B. L.(	w [_]	<b>c</b>	C. Moder	rate	Vpe of Issu	D. H	ligh  ck one)	X	E. Reckless	Disre	gard	
12. Type of A	Action		4 - D -		-	C. Moder	rate 13. Tr	ype of Issu Citation	D. H lance (che	ligh ck one)	Order	E. Reckless	Disre	gard ard	 
12. Type of A 14. Initial Act A. Citati	Action tion ion X	1 0 4	4 - D -	1, C. Safeguard	-	C. Moder	rate 13. Ty C	ype of Issu Citation	D. H Iance (che Citation/	ligh ck one)	Order	E. Reckless X Sa	fegua	gard ard	
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12. Type of / 14. Initial Act A. Citat 15. Area or E SPAULD 16. Terminati Section III 17. Action to THE CON 18. Terminate	Action tion ion X quipmen ING\MAS ion Due Terminati Terminati A.	A. Date Date	B. L( 4 - D - ler SON\GAR Mo L LONGER Mo Da	C. Safeguard	C 	C. Moder	rate 13. Ty ( /ritten otice GHT\M		D. H Iance (che Citation/ Order Number	ligh ck one) 4 4 1 D EXAMII	Order 0 4 6 0	E. Reckless	fegua (	gard [ Mo ] 5   1	 Da 1   0 !
<ul> <li>A. None</li> <li>12. Type of /</li> <li>14. Initial Act</li> <li>A. Citat</li> <li>15. Area or E</li> <li>SPAULD</li> <li>16. Terminati</li> <li>Section III</li> <li>17. Action to THE CON</li> <li>18. Terminate</li> <li>Section IV /</li> </ul>	Action ion X quipmen ING\MAS ion Due Terminati Terminati Automate	B. Ord t SEYIMA A. Date on Action e Date Date 0 d System	B. L( 4 - D - ler SON\GAR Mo [ LONGER Mo Da 5 1 0 Data	C. Safeguard C. Safeguard CIAIVILLAVEI Da Yr ON MINE PR	RDE\CA B. Time Hr. C OPERT	C. Moder	rate 13. Tr ( /ritten otice GHT\M	ype of Issu Citation	D. H Iance (che Citation/ Order Number	ligh ck one) 4 4 1 D EXAMII	Order	E. Reckless X Sa F. Dated	Disre fegua (	gard [ Mo ] 5	 Da 1 0 !
<ul> <li>A. None</li> <li>12. Type of /</li> <li>14. Initial Act</li> <li>A. Citat</li> <li>15. Area or E</li> <li>SPAULD</li> <li>16. Terminati</li> <li>Section III</li> <li>17. Action to THE CON</li> <li>18. Terminate</li> <li>Section IV /</li> <li>9. Type of Ir</li> </ul>	Action tion ion X Equipmen ING\MAS ion Due Terminati Terminati Terminati Automate spection	B. Ord t SEYIMA A. Date on Action e Date Date 0 d System	B. L( 4 - D - ler SON\GAR Mo [ LONGER Mo Da 5 1 0 Data 20 5	C. Safeguard C. Safeguard CIAIVILLAVEI Da Yr ON MINE PR Yr 9 4 Number	C A RDE\CA B. Time Hr. C OPERT ne (24 H	C. Moder	rate 13. Tr ( /ritten otice GHT\M	ype of Issu Ditation	D. H Iance (che Citation/ Order Number	ligh ck one) 4 4 1 D EXAMII	Order O 4 6 0	E. Reckless X Sa F. Dated	Disre fegua (	gard [ Mo [ ] 5 -	Da 1 0 !
<ul> <li>A. None</li> <li>12. Type of /</li> <li>14. Initial Act</li> <li>A. Citat</li> <li>15. Area or E</li> <li>SPAULD</li> <li>16. Terminati</li> <li>Section III</li> <li>17. Action to THE CON</li> <li>18. Terminate</li> <li>Section IV /</li> <li>9. Type of Ir</li> <li>(activitie)</li> </ul>	Action tion ion X Equipmen ING\MAS ion Due Terminati Terminati Terminati Automate spection	B. Ord t SEYIMA A. Date on Action e Date Date 0 d System	B. L( 4 - D - ler SON\GAR Mo L LONGER Mo Da 5 1 0 Data 20. Ev	C. Safeguard C. Safeguard CIAIVILLAVE Da Yr ON MINE PR ON MINE PR	RDE\CA B. Time Hr. C OPERT	C. Moder	rate 13. Tr ( /ritten otice GHT\M 0 0	ype of Issu Ditation	D. H Iance (che Citation/ Order Number - GROUN	ligh ck one) 4 4 1 D EXAMII	Order       0     4     6     6       VATIONS	E. Reckless X Sa F. Dated	Disre fegua (	gard [ Mo ] 5 /	Da 105
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### U.S. Department of Labor Mine Safety and Health Administration

Section I Subsequent	Action/Continuation	Data	·			-	
1. Subsequent Action	1a. Continuation	2. Dated	Mo	Da	V.	2 04-5-10-1-	
	X	(Original Issue)	05	10	94	3. Citation/Order Number	4 4 1 0 4 7 1 - 1
4. Served To			- <u>-</u>	5. Ope	erator		
JOHN MARRINGTO	N, V.P. / GENERAL M	MANAGER		DY	'NATE	MINING CORPORATION	
6. Mine				7. Min	e ID		
MAGMA MINE						02-00152-W	J 6 (contractor)
Section II Justification t	or Action						
WERE NOT ENCOU	TERED DURING R	AISE CONSTRUCTION					
DEVELOPING THE F	ROPER STRUCTU	RAL INTEGRITY.				TING THE RAISE SUPPORTS	RUCTURE FROM
ADEQUATE GROUN	D CONDITION EXA	MINATIONS OF THE R	AISE V	ERE V	VARRA	NTED TO PROTECT MINERS	
WORK IN THE AREA	THE ABOVE NOT	ED CONDITIONS WER	E VISI	BLY OF	IVIOUS	AND ESTABLISHED THAT TH	E GROUND SUPPORT
STRUCTURE WAS F	AILING TO MAINTA	IN ITS STRUCTURAL I	NTEGF		ND CAP	ABILITY. MANAGEMENT ENG	AGED IN AGGRAVATED
CONDUCT CONSTIT	UTING MORE THAN	N ORDINARY NEGLIGE	NCE.	THIS V	/IOLAT	ION IS AN UNWARRANTABLE	FAILURE.
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							See Continuation Form
Section III Subsequent A	ction Taken						
A. Date	Mo Da	Yr B. Time (24 Hr. C	lock)			C. Vacated D. Termi	nated E. Modified
Type of Inspection Da		nt Number		-1-1-	-T		
	0 3 0		1 1	6 1 8	3		
1. Signature	$\langle \circ \rangle$	AR N	umber	12. 0	Date	Mo Da Yr 13 Time (2	

MSHA Form 7000-3a, Mar 85 (Revised)

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Section I \	/iolatior	Data					· · · · ·		<b>.</b>			
1. Date	Mo	Da	Yr	2. Time (24 Hr. Clock)					3. Citation/Order			
A Sonrod Tr	015	10	94		0	1/5	1	F. 0	Number	4 4	10	4 7
		CTON	VD					D. Operator	DATION			
6 Mine		GION	, v.r. <i>i</i>	GENERAL MANAGER				7 Mina ID				
MAGMA									E 2 W LC (			
8. Condition	or Prac	tice								ntractor)	)	
										ace (10	(3g)	
MINERS	WERE	ALLC	WED	TO WORK IN THE 865 R	AISE O	N."A"	SH	FT 8/9/93 EVEN THOUGH MAI				
ADEQU/	TELY	EXAM	INE G	ROUND CONDITIONS IN	N THE A		RI	OR TO WORK COMMENCING A	ND AS OTHER GROUN	D		
CONDIT	IONS V	VARR	ANTE	D. THIS VIOLATION IS P	PART OF	- A PR	AC	TICE OF A FAILURE TO COND	UCT ADEQUATE EXAM		NS	
THAT CO	ONTRI	BUTE	тот	HE FAILURE OF THE R	AISE OF	N 8/10/	93	WHICH RESULTED IN THE DE	ATH OF FOUR MINERS			• • • • •
AN ADE	QUATE	EXA	MINAT	ION OF THE GROUND C	CONDIT	IONS	AN	D THE RAISE SUPPORT STRU	CTURE WOULD HAVE I	DETERN	VINED	)
	)RAIS	ETIME	BERS	WERE SHIFTING AND P	ROGRE	SSIVE	ELY	DETERIORATING; (2)RAISE TI	IMBERS WERE SEPARA	ATING F	ROM	
	DIVIDE	ERS, M		PLATES, AND CRIBBING	6; (3)SUI	PPOR	TB	LOCKING WAS SHEARED AND	NO LONGER FUNCTIO	NAL;		
			NORE		LUDGE			ALLOWED ORE AND ARMORE	ED CRIBBING PIECES T	OFALL		
FREQUE				T AND HANGUE BLAST		NON		ORE HAD BEEN SUBJECTED	TO WATER INFILIRATI		<u>,</u>	
FRAME	VORK	WASC	CONTR	RIBUTING TO FRAMEWO	ORK SE	PARA		N. AND (7) SWELLING OR SOL	LIEEZING GROUND THE			
								See Continu	ation Form (MSHA Form	7000-3=	<u>40</u>	
9. Violation	A. He	alth	<u>т –</u>		1.1.	<u> </u>	T			1000-5a	$\frac{n}{1-1}$	
	Sa	fety	H	B. Section				C. Part/Section of				
	Ot	her	<u> </u>	of Act	-			Title 30 CFR	57,340			
Section II	nspect	or's Ev	aluatio	n		/ <u></u>	<b>_</b>			·	· I	•h
10. Gravity:							7					
A. Injury o	r ilines	s (has)	(IS):	No Likelihood	Unlike	ly	J	Reasonably Likely	Highly Likely	Occi	urred	X
B. Injury	or Illne	ess col	uld rea-									
sona	ibly be	expect	ed to b	e: No Lost Workday	s	L	ost	Workdays or Restricted Duty	Permanently Disa	bling	F	atai
C. Signi	ficant a	nd Sul	ostantia	al (See Reverse): Y	es X	No	,		D Number of Persons Af	fected		00
11. Negligen	ce (ch	eck on	ie)							leolea		10.10
A. None	н. Н			B. Low	<b>C</b> .	Modera	ate	D. High	X E. Reckles	s Disreq	ard	$\square$
12 Type of /	Action		11				112			Ŭ		
12. Type of 7		1	04				13	Citation				n i
		1	0 4			-				ateguar		
14. Initial Act	tion		I			D. Wi	i ritte	n E Citation/	E Dated	N	Ao r	
A. Citat	ion	Хв	. Order	C. Safeguard		No	tice	Order 4 4 1	0466	0	5 1	
15 Area ar 5								Number				
15. Area or E	quipm	ent										
SPAULD	INGUI						i Th	ASON CROUND EXAMINATI				
				COMMINICITELEIGANOIA		ALIGI	114	ASON - GROUND EXAMINATI	UNS			
16. Terminat	ion Due	2		Mo Da Yr		•						
		A. 1	Date	B	. Time (2	24						
Section III	Termin	ation A	ction		Hr. Cic	ock)				*		
17. Action to	Termir	ate										
THE CON	VTRAC	TOR	SNOL	LONGER ON MINE PRO	PERTY.						·	
								· · · · · · · · · · · · · · · · · · ·				
18. Terminat	ed		M	o Da Yr								
		A. Dat	e 💧	5 1 0 0 4 B. Time	e (24 Hr	Clock)	ł					
Section IV	Autom	ated Sv	/stem [	Data				0 7 5 2				
19. Type of l	nspecti	on		20 Event Number				21 Primary or Mill		•		
(politik	v code	,	02			1 1	e	1 0				
22 Signed	y cuae	<i>!</i>	<b>К</b> В		05	111	Ø	1 [0]	<b>H</b>		4 1	1 1
	1 200	-	n	$\Omega = \Omega$					23 AR Numb	or I		
<u> </u>	MI	VYI	5	DEUXATESN							00	3 4
MSHA Form	7000-3	8 Mar 8	5 (Rev	vised)			_				L	

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

Section I Subsequent Action/Continuatio	n Data			
1. Subsequent Action 1a. Continuation	n 2. Dated N (Original Issue) 0	<i>l</i> o Da Yr 51094	3. Citation/Order Number	4 4 1 0 4 7 2 - 1
I. Served To	han	5. Operator		┈╴╸└╶┷╴┷╌┵╶┙╌╴╴╴╴
JOHN MARRINGTON, V.P. / GENERA	L MANAGER	DYNATEC	MINING CORPORATION	
5. Mine		7. Mine ID		
MAGMA MINE			02-00152-	W J 6 (contractor)
Section II Justification for Action				
WEDE NOT ENOLUNITEDED AUTOM				
DEVELOPING THE PROPER STRUCT	3 RAISE CONSTRUCTION AN	ID USE PREVENT	TING THE RAISE SUPPOR	STRUCTURE FROM
	TORAL INTEGRITT.			
WORK IN THE GROUND CONDITION E STRUCTURE WAS FAILING TO MAIN CONDUCT CONSTITUTING MORE TH	CAMINATIONS OF THE RAIS OTED CONDITIONS WERE V TAIN ITS STRUCTURAL INTE IAN ORDINARY NEGLIGENC	E WERE WARRAN ISIBLY OBVIOUS GRITY AND CAP E. THIS VIOLATI	NTED TO PROTECT MINER AND ESTABLISHED THAT ABILITY. MANAGEMENT E ON IS AN UNWARRANTAB	IS REGULARLY REQUIRED TO THE GROUND SUPPORT NGAGED IN AGGRAVATED LE FAILURE.
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· · · · · · · · · · · · · · · · · · ·				and a second of the second of
				See Continuation Form
action III Subsequent Action Taken				
Extended To Mo Da A. Date	B. Time (24 Hr. Clock	k)	C. Vacated D. Te	minated E. Modified
Type of Inspection Data	Event Number			
	051	1018		

MSHA Form 7000-3a, Mar 85 (Revised)

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1. Date       Mo       Da       Yr       2. Time (24 Hr. Clock)       0       7       5       2       Number       4       4       1       0       4       7       3         4. Served To       JOHN MARRINGTON, V.P. / GENERAL MANAGER       5. Operator       DYNATEC MINING CORPORATION       0       2       -       0       1       5       2       -       W       J       6       (contractor)         6. Mine       7. Mine ID       0       2       -       0       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       7. Mine ID       0       2       -       0       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       7. Mine ID       0       2       -       0       1       5       2       -       W       J       6       (contractor)       8a. Written Notice (103g)       -
Image: Construction of the served to serve to served to serve to served to serve to s
JOHN MARRINGTON, V.P. / GENERAL MANAGER       5. Operator         JOHN MARRINGTON, V.P. / GENERAL MANAGER       DYNATEC MINING CORPORATION         6. Mine       7. Mine ID       0       2       -       W       J       6 (contractor)         8. Condition or Practice       8. Condition or Practice       8a. Written Notice (103g)       Ba. Written Notice (103g)         MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH MANAGEMENT FAILED TO       ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND         CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS       THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.         AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE PAISE SUPPORT OTOUCTURE WORK OF THE PAISE SUPPORT OT
6. Mine       7. Mine ID       0       2       -       W       J       6       (contractor)         8. Condition or Practice       8. Condition or Practice       8. Written Notice (103g)       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8. Written Notice (103g)       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8. Written Notice (103g)       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8. Written Notice (103g)       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8       8       Written Notice (103g)       1<
MAGMA MINE       0       2       -       0       0       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8a. Written Notice       (103g)       1       5       2       -       W       J       6       (contractor)         8. Condition or Practice       8a. Written Notice       (103g)       1       5       2       -       W       J       6       (contractor)         MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH MANAGEMENT FAILED TO       ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND       CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS         THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.       AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE PAISE SUBPORT ATOUCTURE WORK OF THE WORK OF THE CONDUCTIONS AND THE PAISE SUBPORT ATOUCTURE WORK OF THE SUBPO
8. Condition or Practice     8a. Written Notice (103g)     MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH MANAGEMENT FAILED TO     ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND     CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS     THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.     AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE PAISE SUBPORT STOLETURE WORK OF THE GROUND CONDITIONS AND THE PAISE SUBPORT STOLETUR
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH MANAGEMENT FAILED TO ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.
MINERS WERE ALLOWED TO WORK IN THE 865 RAISE ON "B" SHIFT, 8/9/93, EVEN THOUGH MANAGEMENT FAILED TO ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.
ADEQUATELY EXAMINE GROUND CONDITIONS IN THE AREA PRIOR TO WORK COMMENCING AND AS OTHER GROUND CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.
CONDITIONS WARRANTED. THIS VIOLATION IS PART OF A PRACTICE OF A FAILURE TO CONDUCT ADEQUATE EXAMINATIONS THAT CONTRIBUTED TO THE FAILURE OF THE RAISE ON 8/10/93 WHICH RESULTED IN THE DEATH OF FOUR MINERS.
AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE PAISE SUBBORT STOLIOTUSE WORK SUBSET
AN ADEQUATE EXAMINATION OF THE GROUND CONDITIONS AND THE PAISE SUPPORT STOLIGTURE WOULD SHORE
AN ADEQUATE EXAMINATION OF THE GROUND CUNDITIONS AND THE DATES STOLATED TO DATE WATER STOLATED TO THE STOLET OF STOLATED TO THE STOLATED TO THE STOLATED TO THE STOLATED TO THE STOLET OF STOLATED TO THE STOL
THAT (1) RAISE TIMBERS WERE SHIETING AND PROCRESSINGLY DETERMINED
POSTS, DIVIDERS, WALL PLATES, AND CRIBBING (3)SUBBORT PLOCING WAS SUSTADED AND REPARATING FROM
(4) SECTIONS OF ARMORED CRIBBING WERE DISLODGED WHICH ALLOWED ORE AND ADMOUST COMPANY OF THE ADMOUST COMPANY.
THE MANWAY COMPARTMENT: (5)THE RAISE SUPPORT STRUCTURE HAD BEEN SUPPORT TO WATER WERE TO FALL INTO
FREQUENT DEVELOPMENT AND HANGUP BLASTING: (6)NON-UNIFORM PLACEMENT OF PACKETUNIC ABOUND THE THOSE
FRAMEWORK WAS CONTRIBUTING TO FRAMEWORK SEPARATION: AND (7) SWELLING OR SOLIFEZING GROUND THE TIMBER
See Continuation Form (MSHA Form 7000.3a)
9. Violation A. Health
Safety B. Section C. Part/Section of
Other of Act - Title 30 CFR 5 7 3 4 0 1
Section II Inspector's Evaluation
A Injury or Illness (has) (is): No Likelihood
Contraction of the second seco
B. Injury of liness could rea-
Schably be expected to be. No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal X
C. Significant and Substantial (See Reverse): Yes X No D. Number of Persons Affected 0.0.4
11. Negligence (check one)
A. None B. Low C. Moderate D. High X E. Reckless Disregard
12. Type of Action 13. Type of Issuance (check one)
1 0 4 - D - 1 ,   Citation Order X Safeguard
14. Initial Action D. Written E. Citation/ F. Dated Mo Da Yr
A. Citation X B. Order C. Safeguard Notice Order 4 4 1 0 4 6 6 0 5 1 0 9 4
15. Area or Equipment
WILSON\YBERRA\VILLAVERDE\DONELIN\SPRY - GROUND EXAMINATIONS
16 Termination Due
A. Date       B. Time /24
Hr. Clock
Section III Termination Action
17. Action to Terminate
17. Action to Terminate THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.
17. Action to Terminate THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.
17. Action to Terminate       THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.       18. Terminated       Mo     Da       Yr       A. Date       J       B. Time (24 Hr Clock)
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       Mo       Da       Yr         B. Time (24 Hr Clock)       0       7       5       3
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       Mo       Da       Yr         B. Time (24 Hr Clock)       0       7       5         Section IV Automated System Data       0       7       5
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       Mo       Da       Yr         18. Terminated       A. Date       0       5       1       0       9       4         Section IV Automated System Data         19. Type of Inspection       20. Event Number       21. Primary or Mill
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       5         Section IV - Automated System Data       1       0       9       4       B. Time (24 Hr Clock)       0       7       5       3         19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       5       3         Section IV - Automated System Data       9       4       B. Time (24 Hr Clock)       0       7       5       3         19. Type of Inspection       20. Event Number       0       5       1       1       6       1       8       P         22. Signature       23. AR Number       0       5       1       1       6       1       8       P
17. Action to Terminate         THE CONTRACTOR IS NO LONGER ON MINE PROPERTY.         18. Terminated       A. Date       Mo       Da       Yr       B. Time (24 Hr Clock)       0       7       5       3         Section IV Automated System Data       0       5       1       0       9       4       0       7       5       3         Section IV Automated System Data       0       5       1       1       6       1       8       P         22. Signature       0       3       0       0       5       1       1       6       1       8       P         22. Signature       0       0       5       1       1       6       1       8       P       23. AR Number       1

## U.S. Department of Labor

Mine Safety and Health Administration

Soction E. Subsequent Action/Continuation Data

1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da Yr 1 0 9	3. Citation/Order Number	4 4 1 0 4 7 3 - 1
4. Served To				5. Operator		
JOHN MARRINGTO	N, V.P. / GENERAL N	ANAGER		DYNAT	EC MINING CORPORATION	
6. Mine				7. Mine ID		
MAGMA MINE					02-00152	W I G
Section II Justification	for Action					
WERE NOT ENCOU	NTERED DURING RA	AISE CONSTRUCTION		ISE PREVE	NTING THE PAISE SUPPORT	
DEVELOPING THE F	PROPER STRUCTUR	AL INTEGRITY.				STRUCTURE FROM
ADEQUATE GROUN	D CONDITION EXAM	INATIONS OF THE R	AISE W	ERE WARF	ANTED TO PROTECT MINERS	REGULARLY REQUIRED TO
STRUCTURE WAS F	AILING TO MAINTAI	N ITS STRUCTURAL II ORDINARY NEGLIGE	e visie Ntegr Nce.	ITY AND CA	JS AND ESTABLISHED THAT APABILITY, MANAGEMENT EN TION IS AN UNWARRANTABL	HE GROUND SUPPORT IGAGED IN AGGRAVATED E FAILURE.
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						See Continuation Form
Section III Subsequent Au	ction Taken					
A. Date		B. Time (24 Hr. Cl	ock)		C. Vacated D. Terr	ninated E. Modified
9. Type of Inspection	0 3 0 10. Even	t Number 0 5	1 1 6	18		
11. Signature			umber	12. Date	Mo Da Yr 13. Time	(24 Hr. Clock)
Junonetto	133 gellon		3 4 1		051094	0 7 5 2

MSHA Form 7000-3a, Mar 85 (Revised)

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Section I – Violation Data		
1. Date Mo Da Yr 2. Time (24 Hr. Clock)		3 Citation/Order
0 5 1 0 9 4	0 7 5 3	
4. Served To	5. Operator	
JOHN MARRINGTON, V.P. / GENERAL MANAGER	DYNATEC MINING CORPOR	RATION
6. Mine	7. Mine ID	
AGMA MINE 8 Condition or Practice	02-001	5 2 - W J 6 (contractor)
		8a. Written Notice (103g)
MINERS WERE ALLOWED TO WORK IN THE 865 RAIS	E ON "B" SHIFT, 8/10/93, EVEN THOUGH MAI	
ADEQUATELY EXAMINE GROUND CONDITIONS IN TH	E AREA PRIOR TO WORK COMMENCING, A	FTER BLASTING AND AS OTHER
GROUND CONDITIONS WARRANTED. THIS VIOLATIC	N IS PART OF A PRACTICE OF A FAILURE T	O CONDUCT ADEQUATE
	E OF THE RAISE ON 8/10/93 WHICH RESUL	TED IN THE DEATH OF FOUR MINERS
AN ADEQUATE EXAMINATION OF THE GROUND CON	DITIONS AND THE RAISE SUPPORT STRUC	TURE WOULD HAVE DETERMINED
THAT: (1)RAISE TIMBERS WERE SHIFTING AND PROC	BRESSIVELY DETERIORATING; (2)RAISE TIN	MBERS WERE SEPARATING FROM
(4) SECTIONS OF APPROPER OF PROVIDERS, WALL PLATES, AND CRIBBING; (3)	SUPPORT BLOCKING WAS SHEARED AND	NO LONGER FUNCTIONAL;
THE MANWAY COMPARTMENT: (5)THE BAISE SUPPO	GED WHICH ALLOWED ORE AND ARMORE	D CRIBBING PIECES TO FALL INTO
FREQUENT DEVELOPMENT AND HANGUP BLASTING	(6)NON-UNIFORM PLACEMENT OF BACKER	
FRAMEWORK WAS CONTRIBUTING TO FRAMEWORK	SEPARATION: AND (7) SWELLING OR SQU	EEZING GROUND CONDITIONS
	See Continua	tion Form (MSHA Form 7000-3a) X
9. Violation A. Health		
Safety B. Section	C. Part/Section of	
Section II Inspector's Evaluation		57.3401.5
10. Gravity:		
A. injury or liness (nas) (is): No Likelihood	likely Reasonably Likely	Highly Likely Occurred X
B. Injury or Illness could rea-		
Soliably be expected to be. No Lost Workdays	Lost Workdays or Restricted Duty	Permanently Disabling   Fatal  X
C. Significant and Substantial (See Reverse): Yes	X No D	Number of Persons Affected 0 0 4
A. None B. Low	C. Moderate D. High	E. Reckless Disregard
12. Type of Action	13. Type of Issuance (check one)	
1 0 4 - D - 1 ,     -	- Citation	Order X Safeguard
14. Initial Action	D Written E Citation(	E Dated Ma Da Va
A. Citation 🛛 B. Order 🗌 C. Safeguard 🦳	Notice Order 4 4 1	
15. Area or Equipment	Number	
WILSON/VILLAVERDE/SPRY/CASTANEDA - GROUND E	XAMINATIONS	
16. Termination Due		
A. Date     B. Tim	e (24	
Section III Termination Action	Clock)	
17. Action to Terminate	· · · · · ·	
THE CONTRACTOR IS NO LONGER ON MINE PROPER	TY	
A. Date A. Date B. Time (24	Hr Clock)	
Section IV Automated System Data	U[/[3]4]	
	21 Primary or Mill	
19. Type of Inspection 20. Event Number		
19. Type of Inspection     20. Event Number       Cactivity code     0       3     0	5 1 1 6 1 8	Р
19. Type of Inspection     20. Event Number       (activity code)     0       22. signature     0	5 1 1 6 1 8	P 23. AR Number

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

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Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Мо 0 5	Da 1 0	Yr 9 4	3. Citation/Order Number	4 4 1 0 4 7 4 - 1
Served To				5. Oper	ator		
JOHN MARRINGTON	N, V.P. / GENERAL I	MANAGER		DYN			
Mine				7. Mine			
MAGMA MINE						2 0 0 1 5 2 1	
ection II Justification for	or Action			J			V J O (contractor)
WERE NOT ENCOUN							
DEVELOPING THE P	ROPER STRUCTU	AISE CONSTRUCTION	AND	USE PR	EVENTING	G THE RAISE SUPPORT S	STRUCTURE FROM
		VAL INTEGRITT.					
ADEQUATE GROUN	D CONDITION EXA	MINATIONS OF THE R	AISE V	ERE W	RRANTE	D TO PROTECT MINERS	
WORK IN THE AREA	THE ABOVE NOT	ED CONDITIONS WER	E VISI	SLY OB	IOUS AN	D ESTABLISHED THAT TH	E GROUND SUPPORT
STRUCTURE WAS F	AILING TO MAINTA	IN ITS STRUCTURAL I	NTEGF	ITY AND	CAPABI	LITY. MANAGEMENT ENG	GAGED IN AGGRAVATED
CONDUCT CONSTIT	UTING MORE THAI	NORDINARY NEGLIGE	ENCE.	THIS VI	DLATION	IS AN UNWARRANTABLE	FAILURE.
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					<b>.</b> -		
						· · · · · · · · · · · · · · · · · · ·	
· · · · · · · · · · · · · · · · · · ·							
							See Continuation Form
	tion Taken						
tion III - Subsequent Ac		Yr		_			
tion III Subsequent Activities		B. Time (24 Hr. C	lock)			C. Vacaled   D. Term	inated E. Modified
tion III Subsequent Activities		B. Time (24 Hr. C	lock)				inated E. Modified
tion III Subsequent Ac Extended To A. Date Stion IV Inspection Dat ype of Inspection	a 10. Eve	B. Time (24 Hr. C	lock)				inated E. Modified
tion III Subsequent Active Extended To A. Date tion IV Inspection Dat ype of Inspection	a 0 3 0 10. Eve	B. Time (24 Hr. C	lock) 1 1 (	5 1 8			inated E. Modified

MSHA Form 7000-3a, Mar 85 (Revised)

1 Data	N		0 <b>T</b>				T					T	T T	-1-
I. Date		a   Yr 	2. Time (24	Hr. Clock)						3. Citatio	n/Order			
<u> </u>	0 5 1	0 9 4	·		0	7 5 4	ļ		<u></u>	Numb	er	4	4 1	
4. Served To							5. Operator							
JOHN M	AKKINGT	JN, V.P.	/ GENERAL I	MANAGER	<u>-</u>	······	DYNAT	EC MININ	G CORPC	RATION	· · · · · ·		•	
							7. Mine ID					_		_
8. Condition	or Practice						<u> </u>	02-	0 0 1	52-	W J 6	(contrac	tor)	
											8a. Writter	Notice	(103g)	)
ADEQUA		PLACE	EXAMINATIO	ONS WERE N	OT CO	NDUCT	D IN THE 8	65 RAISE	ON "8" SI			COND	TION	_
WHICH /	ADVERSE	Y AFFE	CTED THE H	EALTH AND	SAFET	Y OF TH	E MINERS	WERE NO	DT DETEC	TFD OR (	CORRECTI		S VIO	5
PART O	F A PRACI	ICE OF	A FAILURE 1	TO CONDUCT	ADEQ	UATE E	XAMINATIO	NS THAT	CONTRIE	UTED TO	THE FAIL	URE OF	THE	RA
8/10/93 V	WHICH RE	SULTED	IN THE DEA	TH OF FOUR	MINE	RS.								
		A & 41 & 1 A +		005 DA105 1	00.00								·	
(1)STRU	CTURAL			BAISE WEDE		LACES /	AND SUPPO	RT STRU	CTURE W	OULD HA	VE DETER	RMINED	THAT	:
CRIBBIN	IG HAD SH	IFTED (		CRIBRING W	האבאו עמפ חיים	SI ODO		ACED IN	UI BEEN	SECURE	D; (3)TIMBE	ER, BLO	CKINC	3, .
AND MA	NWAY CO	MPART	MENT; AND (	5)ORE AND A	RMOR		BING PIEC				KEAS BET	WEEN T	HE OF	₹E
				,					ALLEIN IN	IUINEN	MAINWAT	UNIPAR	IMEN	11
DURING	THIS PER	IOD MIN	IERS WERE	REGULARLY	REQUI	RED TO	TRAVEL TO	O WORK	PLACES II		NWAY CO	MPART	MENT	F
STRUCT	URAL REP	AIRS A	ND FOR ACC	ESS TO OTH	ER LE	VELS. N	ANAGEME	NT ENGA	GED IN A	GRAVAT	ED COND	UCT CO	NSTI	ru
	<del></del>							Se	e Continu	ation Form	(MSHA Fo	orm 7000	-3a)	
9. Violation	A. Health													Τ
	Safety		B. Section				C. I	Part/Sectio	n of					
Section II I	nspector's	U I	or Act		-		1	Itle 30 CF	R	5	7 . 1 8	8 0 0	2 a	L
10. Gravity:				· · · · · · · · ·										
									L 1			0	COULTE	
	or Illnoon	and days												u
B. Injury	or illness of	ould rea-	e' Nola		 []									
B. Injury sona	or Illness of bly be expe	ould rea- cted to b	e: No Lo	ost Workdays		Lost	Workdays or	Restricted	Duty	Per	manently D	isabling (		 F
B. Injury sona C. Signif	or Illness of bly be expe ficant and S	ould rea- cted to b	e: No Lo al (See Revers	ost Workdays se): Yes	x	Lost	Workdays or	Restricted	Duty	Per D. Number	manently D	isabling (		 F
B. Injury sona C. Signif 11. Negligeno A. None	or Illness of bly be expe ficant and S ce (check	ould rea- cted to b ubstantia one)	e: No Lo al (See Revers	ost Workdays se): Yes		Lost No	Workdays or	Restricted	Duty	Per D. Number	manently D	isabling ( Affected	1	
B. Injury sona C. Signif 11. Negligend A. None	or Illness c bly be expe ficant and S ce (check	ould rea- cted to b ubstantia one)	e: No Lo al (See Revers B. Low	ost Workdays se): Yes	С. М	Lost No	Workdays or	Restricted D. H	i Duty	Per D. Number	manently D of Persons E. Reck	isabling ( Affectec	d egard	
B. Injury sona C. Signif 11. Negligend A. None 12. Type of A	or Illness of bly be expe ficant and S ce (check	ould rea- cted to b ubstantia one)	e: No Lo al (See Revers B. Low	ost Workdays se): Yes	С. М	Lost No	Workdays or	Restricted D. H Jance (che	I Duty	Per D. Number X	manently D of Persons E. Reck	isabling ( Affected	egard	
B. Injury sona C. Signif 11. Negligend A. None 12. Type of A	or Illness c bly be expe ficant and S ce (check	ould rea- cted to b ubstantia one) 1 0 4	e: No Lo al (See Revers B. Low	ost Workdays se): Yes	С. М -	Lost No oderate	Workdays or	Restricted D. H Jance (che	l Duty	Per D. Number X] Order	manently D of Persons E. Reck	Safegu	egard uard	
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# U.S. Department of Labor Mine Safety and Health Administration

1. Subsequent Action	1a. Continuation	2. Dated (Original Issue)	Mo 0 5	Da 1 C	Yr 94		3. Citation/Order	44104751
4. Served To				5.05				
JOHN MARRINGTO	N, V.P. / GENERAL M	MANAGER				FC MINING		
6. Mine				7. Mi	ne ID			
MAGMA MINE						02-	00152-W	.I 6 (contractor)
Section II Justification	for Action							
MORE THAN ORDIN	ARY NEGLIGENCE	IN FAILING TO DETE		CODD	FOTT			
UNWARRANTABLE	FAILURE.					IL ABOV	E STATED HAZARDS.	THIS VIOLATION IS AN
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				·····				
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								See Continuation Form
ection III Subsequent /	Action Taken							
	Mo Da	Yr						
Extended To	te i i i	B. Time (24 Hr.	Clock)			C. V	/acated D. Termin	ated E. Modified
Extended To A. Da					<del></del>			
Extended To A. Da ection IV Inspection D	ata							
Extended To A. Da ection IV Inspection D. Type of Inspection	ata	ent Number						
Extended To A. Da ection IV Inspection D Type of Inspection	ata 0 3 0 10. Eve	ent Number 0 5	1 1	6 1	8			1
Extended To A. Da ection IV Inspection D. Type of Inspection	ata 0 3 0	ent Number 0 5	1 1	6 1	8	Mo	Da Vr 12 Time (2)	
Extended To A. Da ection IV – Inspection D. Type of Inspection	ata 0 3 0 0 3 0	ent Number 0 5	1 1 Number	6 1 12.	8 Date	Mo	Da Yr 13. Time (24	i I Hr. Clock)

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	and nould	17101111110	uauon

Section I V	iolation Data									• • •	
1. Date	Mo Da	Yr	2. Time (24 Hr. Clock					2 011			
	0 5 1 0	94			7 6 5			J. Citati	on/Order		
4. Served To			L		1 5 5	5 Operato	r	Numi	er	4 4 1	0476
JOHN MA	RRINGTON	, V.P. /	GENERAL MANAGER	ર		DYNA	FEC MINING COR	PORATION			
6. Mine				*** * * *		7. Mine ID					
MAGMA M	MINE						02-00	152-	W J 6 (cor	ntractor)	
									8a. Written No	tice (103g	)
ADEQUA	TE WORKPL	ACE E	XAMINATIONS WERE								
WHICH A	DVERSELY	AFFEC	TED THE HEALTH A	ND SAFET	Y OF TI	HE MINERS	WERE NOT DET	ECTED OR	3, IN THAT CO	NDITION	S
PART OF	A PRACTIC	EOFA	FAILURE TO CONDU	JCT ADEQ	UATE E	XAMINATI	ONS THAT CONT	RIBUTED TO	THE FAILURE	OF THE	RAISE ON
		LIED	IN THE DEATH OF FO	UR MINEF	RS						
AN ADEQ		INATI	ON OF THE 865 RAIS	E WORKPI	ACES	AND SUPP	ORT STRUCTUR				<u> </u>
(1)STRUC	CTURAL CO	NDITIO	NS IN THE RAISE WE	RE HAZA	RDOUS	; (2)LADDE	RS HAD NOT BEE	E WOULD HA			
	HAD SHIF	TED; (4	ARMORED CRIBBIN	G WAS DIS	SLODGE	ED AND DA	MAGED IN AT LE	AST TWO A	REAS BETWEE	N THE O	REPASS
AND MAN	WAT COMP	ARIM	ENT; AND (5)ORE AN	DARMORI	ED CRI	BBING PIEC	ES HAD FALLEN	INTO THE N	ANWAY COM	PARTMEN	NT.
DURING 1	THIS PERIO		RS WERE REGULAR	LY REQUI	RED TO	TRAVELT				OTHEN	
STRUCTL	JRAL REPAI	RS AN	D FOR ACCESS TO C	THER LEV	/ELS. N	ANAGEME	NT ENGAGED IN	AGGRAVAT	ED CONDUCT	CONSTI	
0 Malatian 1	• •• •• I	1					See Conti	inuation Form	(MSHA Form 7	000-3a)	X
9. Violation	4. Health Safety		R. Soction								11111
	Other	- '	of Act			C.	Part/Section of	_	-		
Section II In:	spector's Eva	luation						5	7.180	0 2 a	
A. Injury or I	lliness (has) (	(is) <sup>.</sup> N	la Likelihood	1 Inditate	[]						
B Injuny c	T Illooss coul	d rop				Reasona		Highly L	kely	Occurre	d X
sonabl	ly be expecte	d to be:	No Lost Workday	/s	l ost l	Morkdave o	Postricted Duty				
C. Signific	ant and Sub	stantial						Per	nanently Disabl		Fatal X
11. Negligence	e (check one	e)	(bee Neverse).	es A	NO			D. Number	of Persons Affe	cted	0 0 4
A. None			B. Low	C. Mo	oderate		D. High	X	F Reckless	Disregard	
12. Type of Ac	tion				13.	Type of Iss	Jance (check one)				
	1	0 4 -	- D - 1 ,	-   -		Citation		Order	X Sa	feguard	[-]
14 Initial Action										leguard	J
A. Citation	יי א (X B.)	Order	C. Safequard	D.	. Writter	י ריין י	E. Citation/		F. Dated	Мо	Da Yr
15 Area or Equ	lipment			·····	TAOLICE		Number 4 4	1046	Ď	0 5	1 0 9 4
SPAULDIN	GIMASSEY	MASO	NWILSON YBERRAM	ITCHELL	VILLAVE	RDE\CAR	WRIGHT - WORK	KPLACE EXA	MINATIONS		
16. Termination	Due		Mo Da Vr		 т		T				
	A. D	ate	B	. Time (24							
Section III Te	rmination Act	tion		Hr. Clock	)						
17. Action to Te	erminate			<u> </u>							
IHE CONTI	RACTOR IS	NOLO	NGER ON MINE PRO	PERTY.							
18. Terminated		Mo	DalYr		1		1				
	A. Date		B. Time	(24 Hr Clo	ock)						
Section IV Au	tomated Syst	tem Dat	1 0 9 4  ta	······································	(	0 7 5 6					
19. Type of Insp	ection	TT	20. Event Number			21	Primary or Mill				
(activity c	ode) 0	30		0 5 1	1 6 1	8		Ь			
22. Signature		/		$\overline{)}$	$\sim$			L <sup></sup> ;	3. AR Number	·· · · · ·	
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MSHA Form 700	00-8 Mar 85	Revise	ed)	78						010	159/
	$\smile$	9	$\subseteq$								

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

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Section I Subsequent	Action/Continuation D	ata						
1. Subsequent Action	1a. Continuation	2. Dated	Mo	Da	Yr		3 Citation/Order	
	x	(Original Issue)	0 5	10	94		Number	4 4 1 0 4 7 6 - 1
4. Served To			· • • • • • •	5. Ope	erator	J	L	
JOHN MARRINGTO	N, V.P. / GENERAL M	IANAGER		DY	NATE			
6 Mine ·				7. Mine	e ID			
MAGMA MINE						02	0 0 1 5 2 14	
Soction II — Jundification (	for Action		I				000115121-14	J O ((contractor)
MORE THAN ORDIN	ARY NEGLIGENCE I	N FAILING TO DETE	CT OR C	ORRE	CT TI	IE ABOVE	STATED HAZARDS.	THIS VIOLATION IS AN
UNWARRANTABLE	FAILURE.							
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			<b>-</b>					
								See Continuation Form
ection III Subsequent A	ction Taken							
A. Dat	e Da	Yr     B. Time (24 Hr. 0	Clock)			C. V	acated 🔲 D. Termi	nated E. Modified
ection IV Inspection Da	ita							
Type of Inspection	0 3 0 10. Ever	nt Number 0 5	1 1 6	5 1 8	3			
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Appendix III

Photographs



Photograph 1, Ring 34 - Blocking behind a corner. Three 12 by 12 inch blocks are placed with the grain perpendicular to the load. Note the split center block, the crushed wedge, and the excavation overbreak.



Photograph 2, Ring 34 - Assorted blocking with wedges, a crossblock, and excavation overbreak.



Photograph 3, Ring 39 - Note the "bunched" blocking against the vertical brace.



Photograph 4, Ring 41 - Hanging wall blocking. A small amount of plate movement will allow the left hand block to be released.



Photograph 5, Ring 41 - Footwall blocking. Note the entire load is transferred through a single 4 inch wedge.



Photograph 6 - Note that blocking is needed behind the long bridge.

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Photograph 7, Ring 37 - Note muck piled on top of block and the large void below.



Photgraph 8, Ring 33 - Blocking with an extensive void between the footwall and the structure.



Photograph 9, Ring 37 - Split post at hanging wall/end wall corner. Fresh split measured about 3 inches deep.



Photograph 10, Ring 24 - Note the cracks in both plates and the separation of the post from the plates.

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Photograph 11, Ring 19 - Hanging wall/divider post. Note cracking in the plates, a 1 inch separation of plates from the post, and the 3 7/16 inch per foot divider settlement.



Photograph 12, Ring 18 - Note cribbing across Ring 17. Broken debris and muck obscured further observations.

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# Internal Review of MSHA's Actions at the Magma Mine, Magma Copper Company, Superior, Pinal County, Arizona



U.S. Department of Labor Robert B. Reich, Secretary

Mine Safety and Health Administration J. Davitt McAteer, Assistant Secretary

Office of Program Policy Evaluation

August 10, 1994

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# Background

The Federal Mine Safety and Health Act of 1977 (Mine Act) states that mine operators, with the assistance of the miners, have the primary responsibility to prevent unsafe and unhealthful conditions and practices in the nation's mines. The Mine Safety and Health Administration (MSHA) has the responsibility to develop and promulgate mandatory safety and health standards, to inspect mines to determine whether there is compliance with these standards, and to investigate accidents to determine their causes.

On August 10, 1993, a fall of materials accident occurred at the Superior Mining Division, Magma Copper Company, Magma Mine in Pinal County, Arizona, resulting in the deaths of four miners. The accident occurred at the 865 Raise when the miners climbed in the manway compartment to free a hangup of material in the ore pass side of the structure. Cribbing material, dividing the manway and the adjoining ore pass compartment, dislodged and allowed ore, cribbing, and timber to fall into the manway striking the four miners. The Magma Mine is within the inspection authority of MSHA's Metal and Nonmetal Mine Safety and Health (Metal) Rocky Mountain District Office in Denver, Colorado. The Magma Mine is inspected by personnel from the Phoenix North field office in Mesa, Arizona.

Immediately after the accident, Metal began an investigation into its causes. In accordance with MSHA procedures, the investigation was conducted by a team of technical specialists and managers assigned by the Administrator for Metal and Nonmetal Mine Safety and Health (Administrator). The investigation included a physical examination of the accident site, a review of pertinent documents, and interviews of persons having relevant information.

MSHA's accident investigators concluded that the following five conditions and practices contributed to the accident and constituted violations of mandatory safety standards contained in 30 CFR Parts 48 and 57:

- 1. Magma Copper Company (Magma) failed to utilize prudent engineering practices in the design of the 865 Raise.
- 2. Both Magma and Dynatec Mining Corporation (Dynatec), an independent contractor, failed to utilize prudent engineering practices in the installation and maintenance of the support structure of the 865 Raise.
- 3. Both Magma and Dynatec failed to make adequate workplace and ground control examinations of the 865 Raise.
- 4. Magma failed to provide the required training for the inexperienced miners who worked in the raise.
- 5. Magma improperly used explosives in the 865 Raise, which damaged the ground support structure and accelerated the collapse of the Raise.

The investigators also cited 22 violations of eight standards related to the use of explosives. Although these violations did not contribute directly to the cause of the accident, they were indicative of the operator's general failure to comply with the requirements of these standards.

MSHA's official <u>Report of Investigation, Underground Metal Mine, Fatal Fall of Materials</u> <u>Accident, Magma Mine, I.D. No. 02-00152, Superior Mining Division, Magma Copper</u> <u>Company, Superior, Pinal County, Arizona, August 10, 1993</u>, was made available to the public on May 10, 1994.

# Purpose, Scope, and Methodology

The purpose of this review was to evaluate MSHA's actions at the Magma Mine and to make recommendations for improvements where appropriate.

This review compared MSHA's actions with the requirements of the Mine Act, its standards and implementing regulations, and Agency policies and procedures. The review team examined inspection records for fiscal years 1991, 1992, and 1993; mine maps and plans; the accident investigation report; and pertinent data from MSHA's Management Information System (MIS). The review team also interviewed MSHA employees with knowledge of relevant events. All persons cooperated fully with the review team during these interviews. All but one of the Rocky Mountain District bargaining unit employees exercised their rights to have a union representative present during their interviews. A list of persons interviewed is included as appendix A.

In addition to the issues addressed in this report, the review team conducted an in-depth review of several other subjects to determine whether there were further issues that needed to be addressed. These subjects included conflict of interest, demeanor of Magma Copper Company employees toward MSHA inspectors, employee conduct, special investigations, and closeout conferences. This review indicated that these subject areas did not affect, influence, or otherwise have a bearing on the effectiveness of MSHA's activities at the Magma Mine. These subject areas are, therefore, not discussed in this report.

## **Report Organization**

The evaluation section of this report is organized into three categories: Enforcement Activities, Enforcement of Specific Safety Standards, and Management. Each of these categories focuses on one or more issues identified by the review team. These issues were developed from information gathered during the review team's evaluation of relevant documents and interviews of MSHA employees.

The discussion of each issue included in this report is divided into several sections: "Requirement," "Statement of Facts," "Conclusion," and where appropriate, "Corrective Action Taken" and "Recommendation." The "Requirement" section describes the relevant provisions of the Mine Act, its standards and implementing regulations, and MSHA policies and procedures. The "Statement of Facts" section presents the facts found by the review team. The review team's analysis of the facts and the resulting conclusion are stated in the "Conclusion" section. The "Corrective Action Taken" section describes any corrective action MSHA took after the accident to address the identified issue. Recommendations to MSHA are included where appropriate.

After the Assistant Secretary approved this report, he forwarded it to the Administrator for Metal and Nonmetal Mine Safety and Health and directed that he respond to the report's recommendations. The Administrator's response is included as appendix E to this report.

# **General Conclusions**

The failure of Magma and Dynatec to follow mandatory safety standards resulted in the August 10, 1993, fall of material accident. Magma did not properly design the ground support structure in the 865 Raise, and Magma along with Dynatec, did not install and maintain the support structure in accordance with prudent engineering practices. Both Magma and Dynatec conducted inadequate examinations of the 865 Raise and allowed the miners to perform work in areas that were unsafe. Other factors contributing to the accident included unsafe blasting practices and Magma's failure to provide required training for the miners. Although the internal review team identified several areas where MSHA's performance can be improved, the review team did not find any evidence that MSHA's actions either caused or contributed to the fatal accident.

## **Enforcement Activities**

This section addresses completion of mandatory inspections, the use of sections 104(a) and 104(d) of the Mine Act, the assessment and collection of civil penalties, safety and health conferences, vacated citations and orders, and mine emergency response procedures.

#### Section 103(a) Mandatory Inspections

**Requirement:** Section 103(a) of the Mine Act provides, in relevant part, that authorized representatives of the Secretary shall inspect each underground mine in its entirety at least four times each year for the purpose of determining whether an imminent danger exists and whether there is compliance with the mandatory health or safety standards or with any citation, order, or decision issued under the Mine Act.

Metal and Nonmetal Mine Safety and Health's General Inspection Procedures Handbook (89-IV-02, p. 22) specifies that the inspector shall make sufficient inspections in multi-shift operations to determine that safe conditions exist and that proper work procedures and practices are followed on all shifts.

In addition, the accountability program's Quality Control Review Report form refers to the inspectors' review of the office mine file prior to inspections.

30 CFR section 45.4 requires, in relevant part, that each operator maintain a register of independent contractors working on mine property. The operator must make this information available to inspectors upon request.

The MSHA Program Policy Manual (vol. IV, G-4, pp. 3-5) requires the Agency to conduct an annual review of the health sample results at each mine for the previous 5 years. Based on these reviews, each mine is required to be ranked. The health ranking (A, B, C, or D) determines the frequency and types of personal exposure samples enforcement personnel need to take at each operation. At a minimum, a representative number of miners must be sampled for each contaminant or physical agent to which they are potentially overexposed every 5 years. Additionally, a representative number of miners must be sampled in each high-risk occupation and area. The health ranking of mines is defined as follows:

A Rank	-	Mines <u>producing</u> silica flour, cristobalite, industrial sand, asbestos, mercury, or other contaminants requiring constant adherence to proper work practices and maintenance of controls to ensure compliance.
	-	Mines using chemicals in their ore processing, such as cyanide, ammonia, or acids that may present an acute hazard if improperly used or released.
	-	Mines with a history of overexposure.
	-	Mines where personal protective equipment is required.
	-	Mines with other significant health concerns.
B Rank	-	Mines that have had a cited overexposure in the past 5 years but the problem has been corrected and the potential for future overexposure is minimal.
	-	Mines where the highest exposure measured over the past 5 years fell between the permissible exposure limit (PEL) and the PEL times the error factor for the sampling method used.
C Rank	-	Mines in which no sample result exceeded the PEL in the past 5 years, and the potential for overexposure is remote.

D Rank

Mines that were not sampled in the past 5 years.

Mines that were inadequately sampled in the past 5 years (i.e., sampled only for dust or noise, or a representative number of high-risk occupations and areas were not sampled).

MSHA's Health Inspection Procedures Handbook (PH90-IV-4, Chapter I, p. I-1) stipulates that the Agency sample underground metal mines for radon gas annually. The handbook states that radon samples should be taken in return airways and poorly ventilated areas.

Statement of Facts: It is MSHA's practice to conduct one complete inspection each quarter at every underground mine. During fiscal year 1993, Rocky Mountain District enforcement personnel conducted a mandatory regular inspection of the Magma Mine each quarter. The review team examined and evaluated the inspection notes, citations and orders, and all subsequent actions and paperwork associated with the first three inspections and the fourth inspection up to August 10, 1993.

The Magma Mine is normally assigned to one primary inspector who is responsible for scheduling and conducting regular inspections of the mine. It is standard practice for the primary inspector to obtain the assistance of another inspector to conduct the regular inspections. This second inspector usually conducts the inspection of the adjacent Magma Mill before assisting the primary inspector at the Magma Mine.

One of the critical elements in the performance standards for each inspector in Metal requires the inspectors to review the office mine file prior to conducting an inspection. The accountability program also references review of the mine file by the inspectors prior to conducting an inspection. In a memorandum dated May 2, 1988, the then Rocky Mountain District Manager, re-emphasized the need for enforcement personnel to review the mine file prior to conducting an inspection. The District Manager stated that the reviews of the previous inspection report and mine correspondence was required to be documented on the General Inspection Note Summary form, a form used by District enforcement personnel which lists items required to be reviewed for each inspection. The inspectors who had primary responsibility for the Magma Mine inspections in fiscal year 1993 stated they reviewed the field office mine file in preparation for each inspection. These preparations included reviews of accident reports, inspection notes, and citations and orders from previous inspections. Prior to the inspections, the inspectors also determined the number and types of health samples they should take. The inspectors who assisted in the Magma Mine's third and fourth quarter inspections stated they reviewed the office file for the Magma Mill but did not review the file for the Magma Mine.

Inspectors stated that, when applicable, they examine the register of independent contractors that mine operators are required to maintain under 30 CFR Part 45. The primary inspector for the fourth regular inspection of the Magma Mine in fiscal year 1993 stated that he asked the safety director for the register of independent contractors. The safety director told the

inspector that a review of the register was unnecessary because only one contractor was on mine property. The inspector later encountered another contractor performing work at the mine during this inspection. The internal review team determined a third contractor was also working at the mine at this time. The inspector did not cite the mine operator for failure to make the register available, nor did he cite the operator for failure to maintain an updated register.

Using their inspection notes and mine maps, the inspectors identified areas they examined during each regular inspection. The review team noted on the mine maps any areas the inspectors stated they examined, including those areas they did not document in the inspection notes. The following paragraphs discuss quarterly inspections conducted during fiscal year 1993 through August 10. Appendix C contains a list of the violations cited and attributed to Magma during these inspections.

The first regular inspection for fiscal year 1993--The first regular inspection began on October 5, 1992, and was completed on October 22, 1992. This inspection was conducted by a primary inspector (57 on-site hours) and another inspector (31 on-site hours). The inspectors issued 15 section 104(a) citations to the mine operator, one of which was designated as significant and substantial (S&S). There was no documentation in the inspection notes to indicate that the following areas of the mine had been inspected:

500 Level	Sand Plant, No. 7 Belt Conveyor, Never Sweat Tunnel, Dry House/Change Room;
3000 Level	No. 6 Shaft Station;
3200 Level	Area between No. 9 Shaft Station and concrete dam;
3400 Level	No. 9 Shaft Station;
3500 Level	79 FWD between 81 Winze and 3460-5C Stope;
3600 Level	3633 Stope; 6XCE between 81 Winze and 250 HP exhaust fan;
3700 Level	83 Ore Pass Manway, Drift opening between 3720-C Stope and 83 Ore Pass/Manway;
3900 Level	No. 9 Shaft Station;
4000 Level	Refuge Chamber; and
Shafts	No. 9 Shaft.

The review team provided a list of the areas not documented as examined to the Rocky Mountain District Manager, requesting any additional information that would indicate these areas were inspected. The inspectors who conducted the inspection verified that their inspection notes do not reference the inspections of these areas, but stated that they inspected these areas. The inspector who examined the 4000 Level during the inspection stated that the refuge chamber on that level did not exist at the time of the inspection. However, in the body of citation No. 3907477 issued on April 16, 1992, the issuing inspector states in part "the 4000 Level, No. 9 Shaft, has a refuge chamber that meets the construction requirements." Also in a subsequent action to this citation, dated May 28, 1992, the supervisor vacated this citation with a justification that states in part "this area is not a working level and is a work station, the skip tenders and pump repairmen have been provided with a refuge chamber."

<u>The second regular inspection for fiscal year 1993</u>--The second regular inspection commenced on January 25, 1993, and ended on February 11, 1993. This inspection was conducted by one inspector (86 on-site hours). The inspector issued 19 section 104(a) citations to the mine operator, one of which was designated as S&S. There was no documentation in the inspection notes to indicate that the following areas of the mine had been inspected:

3200 Level	Area between No. 9 Shaft Station and concrete dam;
3900 Level	No. 9 Shaft Station;
4000 Level	Refuge Chamber;
4100 Level	Pump Station; and
Shafts	No. 3 Shaft; No. 5 Shaft; and No. 9 Shaft.

The review team provided a list of the areas not documented as examined to the Rocky Mountain District Manager, requesting any additional information that would indicate these areas were inspected. The inspector who conducted the inspection verified that his inspection notes do not reference the inspections of these areas, but stated that with the exception of the No. 9 Shaft Station he inspected these areas. The inspector stated he did not examine the No. 9 Shaft Station on the 3900 Level because of a water problem in the shaft. The inspector stated that the refuge chamber on the 4000 Level did not exist at the time of the inspection<sup>1</sup>. However, as stated above, a citation issued on April 16, 1992, indicates the existence of this refuge chamber.

<sup>&</sup>lt;sup>1</sup>The inspector that examined the 4000 Level during the first regular inspection of fiscal year 1993 also examined the 4000 Level during the second and third regular inspections in fiscal year 1993.

The third regular inspection for fiscal year 1993--The third regular inspection was started on April 6, 1993, and ended on April 21, 1993. This inspection was conducted by a primary inspector (82 on-site hours) and another inspector (45 on-site hours). The inspection supervisor attended the closeout conference at the end of this inspection. The inspectors issued seven section 104(a) citations to the mine operator, two of which were designated S&S. The inspectors also issued two section 104(a) citations to an independent contractor, one of which was designated S&S.

The second inspector conducted an inspection of the Magma Mill prior to joining the primary inspector on the remainder of the inspection of the Magma Mine. A review of the inspection notes indicated that, after the second inspector joined the primary inspector, the two travelled together a majority of the time, inspecting the same areas of the mine. The inspectors confirmed this during the interviews.

There was no documentation in the inspection notes to indicate that the following areas of the mine had been inspected:

3200 Level	Area between No. 9 Shaft Station and concrete dam;
3400 Level	81 Winze Station, 3420-6C Stope, Drift opening between No. 9 Shaft Station and 3490-2C Stope;
3600 Level	81 Winze Station, 6XCE between 81 Winze and 250 HP exhaust fan;
3700 Level	83 Manway;
4000 Level	Refuge Chamber;
4100 Level	Pump Station; and

Shafts/Hoists 81 Winze Hoist and Shaft.

The review team provided a list of the areas not documented as examined to the Rocky Mountain District Manager, requesting any additional information that would indicate these areas were inspected. The primary inspector verified that his notes do not reference these areas but stated that, with the exception of the 83 Manway, he inspected these areas. The inspector stated that the refuge chamber on the 4000 Level did not exist at the time of the inspection. However, as noted above, a citation issued on April 16, 1992, contradicts this statement.

The fourth regular inspection for fiscal year 1993--The fourth regular inspection was started on August 2, 1993, by a primary inspector and was in progress on August 10, the date of the

accident<sup>2</sup>. From August 5 to August 10 the primary inspector was assisted by another inspector, who had completed the inspection of the Magma Mill. Between August 2 and August 10, 1993, the inspectors issued one section 104(a) non-S&S citation to the mine operator, and two section 104(a) non-S&S citations to an independent contractor. A chronology of the inspectors' activities from August 2-10, 1993, is included as appendix B.

A complete mining cycle at the Magma Mine includes drilling, blasting, mucking, and supporting the ground. All of the inspectors interviewed were familiar with the components of Magma's mining cycle. Metal inspection procedures do not address how enforcement personnel should determine whether safe work procedures are being followed during each portion of a mining cycle. Enforcement personnel indicated during their interviews that some portions of the mining cycles were not always observed as a normal part of the regular inspections at the Magma Mine. For example, inspectors stated they did not always observe blasting operations or ground support activities at the Magma Mine. Inspectors stated they normally spent an average of 15-30 minutes in each active mining stope during regular inspections. They also stated that the miners normally ceased operations while they were present in a production stope.

There are numerous other activities associated with transferring the ore from the working face to the surface. At Magma, the ore is moved to transfer ore passes, loaded into cars, and transported to dumping stations from where it is moved to the surface. Magma was experiencing difficulty with blockages in ore passes and frequently used explosives to remove these blockages or "hangups." All inspectors interviewed stated they did not observe any blasting of hangups during their inspections of the mine in fiscal year 1993.

All of the inspectors interviewed stated they were familiar with the MSHA policy requiring off-shift inspections to be conducted in multi-shift operations. Reviews of Weekly Activity Reports and inspection notes indicated that no off-shift inspections were made at the Magma Mine during regular inspections in fiscal year 1993 through August 10.

MSHA has no written policies or procedures which address the briefing of inspectors when metal or nonmetal mine assignments are rotated. All Phoenix field office mine assignments were rotated in April 1993, after completion of the third regular inspection of the Magma Mine. The inspector assigned to the Magma Mine after April 1993 had not conducted a regular inspection of the mine after it reopened in 1990. The inspectors who exchanged inspection responsibility for the Magma Mine stated the only information exchanged was mention of a long raise being developed. They differed in their recollection of when they discussed the raise. One inspector recalls discussing the Raise when mine assignments were rotated in April. The other inspector did not recall discussing the Raise until after the

<sup>&</sup>lt;sup>2</sup>Regular inspection activity was discontinued on August 10, resumed on September 8, and completed on September 30, 1993.

accident. The inspectors had no other discussions concerning the mining conditions or activities at the mine. Additionally, there were no such discussions between the newlyassigned inspector and his inspection supervisor. Inspectors indicated in their interviews that, in general, there was little communication among inspectors regarding mining conditions and activities when mine assignments were rotated.

During their interviews some inspectors stated that, for health sampling purposes, the Magma Mine was ranked as an "A" mine; others stated it was a "B" mine; and others stated the Magma Mine was ranked as a "C" mine. There was no documentation in the mine file which identified the health ranking of the Magma Mine. The review team discussed the health ranking of the Magma Mine. The review team discussed the health ranking of the Magma Mine. The review team discussed the health ranking of the Magma Mine with Metal's Health Division Chief. She stated that the Magma Mine should have been ranked a "D" mine because of inadequate health sampling in the previous 5 years. MSHA policy requires that a "D" ranked mine be sampled during the next regular inspection, then appropriately ranked according to the sample results.

Copper, the Magma Mine's primary commodity, and silver, its principal by-product, are the contaminants or physical agents to which the miners are potentially overexposed. At the time of the accident, enforcement personnel had not sampled for possible overexposure to copper or silver dust since the mine resumed production in 1990. According to policy, the mine should have been ranked "D" until sampled for copper and silver dust.

MSHA policy does not prescribe the number or percentage of miners who must be sampled for each contaminant or physical agent. The policy states that a "representative number" of miners must be sampled. Enforcement personnel collected no personal exposure samples at the Magma Mine in fiscal year 1991. In fiscal year 1992, inspectors took three respirable dust (quartz) samples and one noise reading. In fiscal year 1993, inspectors took 14 personal exposure samples, six for respirable dust (quartz) and eight for noise. None of the samples collected in fiscal year 1992 and fiscal year 1993 indicated over-exposures.

Enforcement personnel from the Phoenix field office took two radon gas samples, one in fiscal year 1991 and one in fiscal year 1993. The samples indicated no working levels of radon daughters. The radon sample taken in 1993 was taken at the No. 9 Shaft which is one of the intake airways for the mine.

#### MSHA's Knowledge of the 865 Raise

**Statement of Facts:** MSHA accident investigators determined Magma Mine officials failed to make a structural analysis of the 865 Raise design and that fundamental design failures contributed to the collapse of the Raise. The construction of the 865 Raise at the Magma Mine was a major project. The 865 Raise was a 364-ft. high, two-compartment, framed timber raise consisting of an ore pass and a manway with a timber slide. The cross-sectional dimensions of the raise measured 10' by 20'. The inside dimensions of the manway measured 6' by 6'; the timber slide 4' by 6'; and the ore pass 6' by 8'. Other raises at the mine do not exceed a height of 200' or cross-sectional dimensions of 10' by 10'. The raise

was designed by Magma and constructed by Dynatec Mining Corporation. Construction commenced on March 31, 1993. Lower portions of the raise were first used as an ore pass on June 28, 1993. Magma encountered problems with blockages in the ore pass which they attempted to remove with explosives. The ore pass was structurally damaged from the repeated blasting. Magma subsequently contracted with Dynatec to repair the damaged raise, while the company continued to use the ore pass.

The mine operator was not required to notify MSHA that the 865 Raise was being developed. MSHA first became aware of the development of the 865 Raise when an inspector examined the 4000 Level on April 8 and travelled to the area where construction of the initial stages of the raise was underway. The raise had been developed approximately 10 feet above the roof line. The inspector cited Dynatec when he encountered an employee without adequate eye protection using a pneumatic chain saw, a violation of §57.15004. The inspector observed no other violations at this location. The inspector briefly examined some blueprints of the 865 ore pass.

After the April inspection, the inspector briefly discussed the development of the 865 Raise with his inspection supervisor. This discussion did not include details on the size or design of the raise.

All Phoenix field office mine assignments were rotated in April 1993, after completion of the April inspection at the Magma Mine. Inspection responsibility for the Magma Mine was assigned to another inspector, who stated during his interview that the previous inspector mentioned a long raise being developed on the 4000 Level. The previous inspector stated during his interview that he does not recall discussing the raise with the other inspector until after the accident. Otherwise, there was no further discussion among enforcement personnel regarding the 865 Raise. MSHA has no written policies or procedures which address the exchange of information between inspectors when metal or nonmetal mine assignments are rotated.

The inspector assigned to the Magma Mine after April 1993 conducted two accident investigations at the mine. One of the accidents resulted in injuries to two Dynatec employees who fell when a work platform collapsed in the 1-C Ore Pass on May 19, 1993. The other was a non-injury, fall of ground accident on June 26, 1993, in the experimental stope on the 3720 Level. The inspector stated that he had no reason to travel to the area of the 865 Raise during these accident investigations.

The next regular inspection of the Magma Mine commenced on August 2, 1993. This was the newly assigned inspector's first regular inspection of the mine. On the first day of this inspection, the inspector asked the Magma Mine safety director about the status of the 865 Raise. The safety director informed him that Dynatec had completed the Raise and that it was now in use. The inspector stated that Magma personnel did not inform him of any problems with the raise. A second inspector joined the primary inspector on the underground inspection on August 5. While inspecting the 4000 Level on August 10, the second inspector encountered two Dynatec employees who informed him that Dynatec had recently completed construction of an ore pass raise between the 4000 and 3636 Levels. Prior to this time, the second inspector had no knowledge of the 865 Raise. The two Dynatec employees, and the Magma representative with whom the inspector was travelling, told the inspector that no work was being performed in the Raise at that time.

On the evening of August 10, the two inspectors discussed their plans for inspecting the mine the next day. In particular, the second inspector asked the primary inspector if he was aware of the existence of the 865 Raise. The primary inspector responded that during the course of the inspection he had examined dump stations that might be associated with the raise. They agreed that the second inspector would inspect the 865 Raise the next day, but the accident occurred before they returned.

**Conclusion:** Although the primary inspector reviewed the office file prior to each regular inspection, other inspectors involved with the inspections did not always review the file. The review team identified no specific problems as a result of some inspectors not reviewing the mine file. However, each inspector conducting an inspection at a mine needs to be familiar with the information maintained in the mine file, such as outstanding citations and orders, previous inspection reports, petitions for modification, and legal identity reports.

Enforcement personnel did not cite Magma for failure to present a register of independent contractors, nor did they cite Magma for failure to maintain an updated register.

There were numerous areas of the mine that were not documented as being inspected during the regular inspections at the Magma Mine in fiscal year 1993. The review team initially determined from this information that these areas of the mine had not been inspected during each regular inspection. The inspectors subsequently indicated that, with the exception of the 83 ore pass/manway during the third regular inspection of fiscal year 1993, these areas were inspected, but not documented. The review team determined that the refuge chamber on the 4000 Level was not examined during the first three inspections of fiscal year 1993.

MSHA inspection procedures for metal and nonmetal mines do not address how enforcement personnel should determine whether safe work procedures are being followed during each portion of the mining cycle. Each phase of the mining cycle was not always observed during the normal course of regular inspections of the Magma Mine. Additionally, enforcement personnel did not observe any blasting to dislodge hangups. The inspectors' ability to evaluate whether miners were following safe work practices would have been enhanced had they observed these activities.

Off-shift inspections were not conducted at the Magma Mine during fiscal year 1993 through August 10.

MSHA has no written policies or procedures which address the briefing of inspectors when metal or nonmetal mine assignments are rotated. There was little, if any, exchange of information between the inspectors concerning the development of the 865 Raise or existing conditions or practices at the Magma Mine when inspection responsibilities were rotated in April 1993.

Enforcement personnel did not always efficiently utilize on-site inspection time. When conducting a joint inspection in fiscal year 1993, enforcement personnel travelled together a portion of the time, inspecting the same areas of the mine. However, MSHA does not have any specific policy which prohibits this practice during inspections of metal or nonmetal mines.

The mine was not appropriately ranked for health sampling purposes. The Magma Mine was not sampled for copper or silver dust after it resumed production in 1990. Enforcement personnel did not collect the required number of radon samples, and the radon sample taken in fiscal year 1993 was not taken in a return airway or poorly ventilated area as required by MSHA policy. Metal's policy that enforcement personnel collect a "representative number of samples" does not provide sufficient guidance to determine the minimum number of samples required.

Because the 865 Raise was developed between two regular inspections, MSHA's only inspection of the Raise prior to the August 1993 accident was in April 1993, during the very early stages of development. MSHA policies and procedures do not address enhanced Agency scrutiny of major construction projects at metal or nonmetal mines.

There is no regulatory requirement for metal or nonmetal mine operators to notify MSHA prior to the development of major construction projects. MSHA regulations do not require mine operators to obtain certifications by registered engineers for construction plans for major projects.

**Corrective Action Taken:** All Phoenix field office enforcement personnel received training in inspection procedures on November 9, 1993. This training provided instruction on a number of topics including basic inspection procedures; proper documentation; mine file review; off-shift inspection requirements; and health sampling requirements.

The Rocky Mountain District Manager held a meeting with all inspection supervisors on March 29-31, 1994, at which he discussed a number of issues related to inspections at the Magma Mine. At this meeting the District Manager issued verbal instructions concerning a number of issues. These instructions are also contained in a follow-up memorandum dated March 31, 1994. The following instructions were discussed at both the meeting and in the follow-up memorandum:

The District Manager instructed the supervisors to ensure that inspectors are reviewing the list of independent contractors during each inspection and that appropriate enforcement action is taken when the operators fail to make this information available.

The District Manager instructed the inspection supervisors to thoroughly review the documentation for each inspection to determine that each mine is inspected in its entirety and to take corrective action when it is determined that a mine is not inspected in its entirety.

The District Manager instructed the inspection supervisors to review inspector field notes to determine that all portions of the mining cycle, including blasting practices, are observed during each regular inspection.

The District Manager emphasized MSHA's policy for conducting off-shift inspections at multi-shift mines. The District Manager instructed the supervisors to ensure that required off-shift inspections are conducted and to discuss this policy with all inspectors.

The District Manager emphasized that when mine assignments change each inspector needs to discuss major work activities with both the supervisor and the newly assigned inspector. The District Manager pointed out that well-documented notes need to be provided to the newly assigned inspector.

The District Manager instructed the supervisors to discuss with the inspectors that health inspections and sampling must be conducted in accordance with MSHA policy.

Also during the March supervisors meeting, the District Manager re-instructed enforcement personnel to evaluate blasting practices at each mine that uses explosives in the District. The District Manager originally instructed the inspection supervisors to evaluate blasting practices in each mine during a meeting in September 1993.

The District Manager assigned the assistant district manager the responsibility of establishing a system to track the exchange of information among enforcement personnel when mine assignments are rotated.

In the March 31, 1994, memorandum, the District Manager informed the inspection supervisors that the health ranking for all Rocky Mountain District mines was determined by the District health specialist. The District Manager also informed the supervisors that enforcement personnel were not using the health information properly and not following MSHA policy related to health sampling. He instructed the supervisors to review the health sampling procedures with all inspectors. The inspection supervisor and the District health specialist are developing a health sampling strategy for the Magma Mine. In addition, the District health specialist is providing guidance to Phoenix field office enforcement personnel to ensure that samples are collected for all possible contaminants. Enforcement personnel completed sampling the Magma Mine for radon gas as well as copper and silver dust in July 1994. The sample results revealed no overexposures.

Metal is currently revising the policy regarding health inspections, mine ranking and sampling. The draft revisions clarify the minimum number of samples enforcement personnel are required to collect. This minimum number will be based on the number of miners employed at each operation. Metal anticipates the issuance of this policy in October 1994.

In a September 1993 meeting with all Rocky Mountain District supervisors, the District Manager instructed the inspection supervisors to notify the district when major construction activity is encountered. This information is to be used to determine whether additional enforcement activity is necessary.

**Recommendation:** The Administrator for Metal should reinforce the need for all enforcement personnel to review mine files prior to conducting inspections.

The Administrator should establish procedures which address how enforcement personnel conducting regular inspections should determine whether safe work procedures are being followed during each portion of the mining cycle. These procedures should also address activities associated with transferring ore from a working face to the surface, including as blasting hangups.

The Administrator for Metal should take steps to require that when mine assignments are rotated, enforcement personnel exchange relevant information on the mines assigned to them.

In order to make the most efficient use of personnel resources, the District Manager should instruct enforcement personnel that journeyman inspectors should not concurrently inspect the same areas of a mine.

The Administrator for Metal should take the action necessary to finalize the policy regarding health sampling procedures and train enforcement personnel in the new procedures.

The Administrator for Metal should consider the need for requiring metal and nonmetal mine operators to obtain certifications by registered engineers of plans for major construction projects. He should also consider the need for mine operators to submit these plans to the appropriate district manager so a determination can be made as to whether additional inspection activity is necessary.

#### Use of Sections 104(a) and 104(d)

**Requirement:** Section 104 of the Mine Act provides MSHA inspectors with a method of progressively stronger enforcement actions to obtain compliance with mandatory safety and health standards. Section 104(a) requires an inspector to issue a citation if the inspector believes that an operator has violated the Mine Act, or any mandatory safety or health standard, rule, order, or regulation promulgated pursuant to the Mine Act. The inspector is also required to specify a reasonable time for the operator to abate the violation.

The inspector must determine whether each violation is of such a nature as could significantly and substantially (S&S) contribute to the cause and effect of a mine safety or health hazard. If, based upon the particular facts surrounding that violation, there exists a reasonable likelihood that the hazard contributed to will result in an injury or illness of a reasonably serious nature, the inspector must designate the violation as S&S.

The Program Policy Manual (vol. I, p. 17) contains the general guidelines used when evaluating whether a violation is S&S. In determining whether a violation could "significantly and substantially contribute to the cause and effect of a mine safety or health hazard," inspectors must first find that an injury or illness would be reasonably likely to occur if the violation were not corrected and, if the injury or illness were to occur, it would be reasonably serious.

Section 104(b) provides that if, upon a follow-up inspection, an inspector finds that the violation described in a citation has not been totally abated within the time specified and that the abatement time should not be further extended, the inspector shall issue an order of withdrawal.

Section 104(d)(1) requires an inspector to issue a citation if a violation could significantly and substantially contribute to the cause and effect of a mine safety or health hazard and if the inspector finds such violation to be caused by an unwarrantable failure of the operator to comply. The inspector shall also specify a reasonable time for abatement of the cited violation. Section 104(d)(1) further requires that a withdrawal order be issued if another violation is found which is due to an unwarrantable failure to comply within 90 days of the issuance of a section 104(d)(1) citation. Section 104(d)(2) provides that the inspector shall issue a withdrawal order if another unwarrantable failure violation is found during a subsequent inspection.

Section 104(b) and 104(d) withdrawal orders require the operator to cause all persons in the area affected by such violation, except those necessary to correct the condition, to be withdrawn from and prohibited from entering such area until the inspector determines that the violation has been abated.

MSHA's Program Policy Manual (vol. I, p. 17d) states that section 104(d)(2) of the Act requires that an inspection with no violations due to an unwarrantable failure (clean
inspection) be conducted before the section 104(d)(2) order sequence is terminated. This "clean inspection" may be accomplished within the framework of a regular inspection of the mine in its entirety, or within the framework of a series of spot inspections covering the entire mine. MSHA, rather than the operator, carries the burden of showing that no "intervening clean inspection" has occurred when a section 104(d)(2) order is issued.

Statement of Facts: Table A shows the number of citations issued to the operator in fiscal year 1991. The table does not include three non-S&S section 104(a) citations and one section 104(g)(1) order issued to contractors at the mine. None of the citations issued to Magma in fiscal year 1991 were vacated.

Table A - Magma Mine Violations Cited - Fiscal Year 1991					
	Type Action				
	104(a)	Total	Percent		
S&S Citations	5	5	15%		
Non-S&S Citations	28	28	85%		
Total	33	33	· · · · · · · · · · · · · · · · · · ·		

Table B lists the number of citations and orders issued to the operator in fiscal year 1992. The table does not include six section 104(a) citations issued in fiscal year 1992 that were vacated. The table does not include sixteen section 104(a) citations issued to contractors at the mine, four of which were S&S.

Table B - Magma Mine Violations CitedFiscal Year 1992							
Type Action							
104(a) 104(b) 104(d)(1) Total Perce					Percent		
S&S Citations	5	0	1	6	13%		
Non-S&S Citations	41	0	0	41	87%		
Non-S&S Orders	0	1	0	1	NA <sup>3</sup>		
Total	46	1	1	48			

<sup>&</sup>lt;sup>3</sup>An S&S determination is not made when a section 104(b) order is issued. This determination was made when the initiating citation was issued.

Table C lists the number of citations and orders issued to the operator in fiscal year 1993, through August 10. The table does not include five section 104(a) citations and a section 104(b) order issued in fiscal year 1993 that were vacated after they were conferenced. A section 104(g)(1) order was vacated but not conferenced. The table does not include five section 104(a) citations, two of which were S&S, issued to contractors at the mine.

Table C - Magma Mine Violations Cited Fiscal Year 1993 (through August 10, 1993)					
Type Action					
	104(a)	Total	Percent		
S&S Citations	4	4	10%		
Non-S&S Citations 38 38 90					
Total	42	42			

Table D shows, for fiscal years 1991-1993, the percentage of citations and orders issued as S&S at the Magma Mine compared to the percentage issued as S&S by the Phoenix field office, the Rocky Mountain District, and all of Metal.

Table D - Percentage of S&S Citations and Orders Fiscal Years 1991-1993							
1991 1992 1993 Average							
Magma Mine	15.6	12.8	9.5	12.3			
Phoenix North	18.5	21.6	23.9	21.4			
Rocky Mountain	28.9	29.7	27.4	28.7			
Total Metal and Nonmetal	34.2	32.5	30.5	32.4			

Several inspectors included the statement "... this violation is not considered S&S due to low exposure" in the body of non-S&S citations. Some of these inspectors indicated that "low exposure" referred to a small number of miners exposed to a particular hazard, reducing the likelihood of injury.

During interviews with the review team, some inspectors indicated they evaluate a violation as non-S&S if a person is not physically present at the time the violation is observed, and there is no evidence to indicate that someone was previously in the area where the violation exists. Other inspectors believed that the possibility of future exposure should be considered when determining whether a violation is S&S. In July 1984, the Federal Mine Safety and Health Review Commission (Commission)<sup>4</sup> decided that the evaluation of a reasonable likelihood of injury should be made "in terms of continued normal mining operations." <u>U.S. Steel Mining Company, Inc.</u>, 6 FMSHRC 1573, 1574. The Commission has used this test in deciding similar S&S cases since that time. The MSHA Program Policy Manual states that in making an S&S determination, an inspector must determine whether an injury would be reasonably likely to occur if the violation were not corrected. However, the manual does not provide specific guidance related to evaluating the reasonable likelihood of illness or injury in terms of continued normal mining operations.

During fiscal years 1991 to 1993, prior to the accident, MSHA inspectors issued 121 section 104(a) citations and 1 section 104(d)(1) citation at the Magma Mine that were not subsequently vacated. Of these 122 citations, 15 were designated as S&S.

A review of the violation history for the Magma Mine from October 1, 1990, through August 10, 1993, indicated that the three most frequently cited sections of 30 CFR were: §57.20003(a) (Housekeeping - 16 violations, 1 S&S); §57.11012 (Protection for openings around travelways - 11 violations, 1 S&S); and §57.04201(a)(1) (Inspection of fire extinguishers - 6 violations, none S&S). The only section 104(d)(1) citation that was issued during fiscal years 1991 through 1993 was for a violation of §57.18002(c), Withdrawal of miners from affected area.

The accident investigation team issued a total of 59 citations and orders - 45 to Magma Mining Company and 14 to Dynatec. Of the 45 citations and orders issued to Magma, nine were section 104(a) citations, one was a section 104(d)(1) citation, and 35 were section 104(d)(1) orders. With the exception of four section 104(a) citations, all were designated S&S.

Enforcement personnel indicated during their interviews with the review team that they were familiar with the criteria for issuing section 104(d)(1) citations and orders. However, some inspectors indicated they were not familiar with the requirements for terminating the section 104(d) sequence following the issuance of a section 104(d)(1) order. These inspectors stated that following the issuance of a section 104(d)(1) order, if 90 days elapsed without the issuance of another unwarrantable failure order, the sequence would be terminated. The inspectors indicated that this interpretation was based on information received during an MSHA training course at the Mine Health and Safety Academy (Academy).

The review team obtained a copy of the course material distributed to inspector trainees during Metal entry-level training at the Academy. The course material erroneously stated

<sup>&</sup>lt;sup>4</sup>The Federal Mine Safety and Health Review Commission is an independent agency established by the Mine Act to provide administrative review of citations and orders issued by MSHA inspectors.

"After a section 104(d)(1) order (or orders) is issued, any <u>unwarrantable</u> violations observed on a <u>subsequent</u> inspection, made within 90 days, will be 104(d)(2) orders." The 90-day time frame is not applicable following the issuance of a section 104(d)(1) order and should not have been referenced in this context. Discussions with representatives from the Academy indicated that this handbook was received at the Academy in April 1991 in draft form and was periodically updated by personnel in Metal's headquarters office in Arlington.

**Conclusion:** The number of S&S citations and orders issued at the Magma Mine was small. During fiscal years 1991-1993, the percentage of S&S citations and orders issued to the mine was less than half the District and national S&S rates.

Enforcement personnel did not always properly evaluate the likelihood of injury when making S&S determinations. Some inspectors believed that exposure to a hazard must have already occurred in order to designate a violation as S&S. They did not consider future exposure to the hazard if normal mining operations continued. Some inspectors equated likelihood of injury to the number of miners exposed to a hazard. MSHA's policy regarding S&S determinations does not provide specific guidance on the consideration of continued normal mining operations when evaluating the reasonable likelihood of illness or injury.

Enforcement personnel received incorrect information regarding the termination of the section 104(d) sequence during an entry-level training course at the Academy.

Prior to the accident, the primary means of enforcement at the Magma Mine was the issuance of section 104(a) non-S&S citations. Based on the small percentage of S&S violations and the absence of any section 104(d)(1) citations and orders, the review team concluded that the level of enforcement prior to the accident was not appropriate at the Magma Mine.

**Corrective Action Taken:** All Phoenix field office enforcement personnel received training on inspection procedures on November 9, 1993. This training provided instruction on a number of topics including S&S determinations, unwarrantable failure violations, and the section 104(d) sequence.

In February 1994, personnel from the regional Solicitor's Office provided training on the proper evaluation of S&S criteria to all enforcement personnel in both of the Phoenix field offices. Field office personnel indicated to the District Manager that this training provided them with a better understanding of S&S evaluations.

In July 1993, the incorrect information regarding the termination of the 104(d) sequence contained in Academy course material was replaced with the correct information. The District Manager clarified the section 104(d) sequence in a January 27, 1994, memorandum to all inspection supervisors. All enforcement personnel in both Phoenix field offices received training on termination of the section 104(d) sequence on March 7, 1994.

**Recommendation:** The Administrator for Metal should take measures to underscore the importance of exerting appropriate levels of enforcement at all mining operations, with emphasis on the proper evaluation of S&S and the appropriate use of section 104(d) enforcement actions.

The Administrator for Metal should consider providing specific guidance to enforcement personnel on the consideration of continued normal mining operations when evaluating the likelihood of illness or injury.

## **Assessment and Collection of Civil Penalties**

**Requirement:** Section 110(a) of the Mine Act states that civil penalties shall be assessed in amounts up to \$50,000 for each violation of a mandatory standard or of any other provision of the Mine Act. MSHA has implemented this section of the Mine Act in 30 CFR Part 100 and supplemental policy. Part 100 provides for single penalty assessments, regular assessments, and special assessments.

Under the single penalty assessment provisions of Part 100, MSHA may assess a penalty of \$50 when a violation not reasonably likely to result in a reasonably serious injury or illness (not Significant and Substantial) is abated within the time set by the inspector, and does not occur at a mine with an excessive history of violations.

Under Part 100 regular assessment provisions, MSHA determines the amount of penalty assessment by applying a formula to the circumstances surrounding the violation. This formula is based on the general criteria described in sections 105(b) and 110(i) of the Mine Act.

The special assessment provisions of Part 100 allow MSHA to waive the regular assessment formula or the single penalty assessment provisions if MSHA determines that a violation is of such a nature or seriousness that it is not possible to determine an appropriate penalty using the single penalty or regular assessment procedures.

Under 30 CFR §100.5, MSHA is required to review the following categories of violations to determine whether a special assessment is appropriate:

Violations involving fatalities and serious injuries.

Unwarrantable failure to comply with mandatory health and safety standards.

Operation of a mine in violation of a closure order.

Failure to permit an authorized representative of the Secretary to perform an inspection or investigation.

Violations for which individuals are personally liable under section 110(c) of the Mine Act.

Violations involving an imminent danger.

Discrimination violations under section 105(c) of the Mine Act.

Violations involving an extraordinarily high degree of negligence or gravity or other unique aggravating circumstances.

The MSHA Program Policy Manual (vol. III, p. 38) also requires that all citations issued for violations of the reporting requirements of 30 CFR Part 50 be reviewed to determine if a special assessment is warranted.

The MSHA Program Policy Manual (vol. III, p. 41) gives the District Manager the discretion to request a special assessment based upon an evaluation of the particular circumstances surrounding a violation.

Statement of Facts: During fiscal year 1992, enforcement personnel issued 48 citations and orders at the Magma Mine. Of these 48 citations and orders, 47 were subject to civil penalty assessments. MSHA assessed civil penalties for these violations as follows:

Table E - Assessment Data Fiscal Year 1992						
Method of Assessment	Number of Violations	Total Proposed Assessment (Current)	Amount Paid			
Single Penalty	38	\$1,660	\$1,660			
Regular Formula	6	\$736	\$736			
Special	3	\$1,350	\$1,350			
Totals	47	\$3,746	\$3,746			

Of the 47 assessable citations and orders issued in fiscal year 1992, four were required to be reviewed for special assessment. Enforcement personnel reviewed the four violations and recommended three of them be specially assessed. The fourth was not recommended for special assessment because the degree of operator negligence did not warrant a special assessment.

During fiscal year 1993, through August 10, 1993, MSHA enforcement personnel issued 42 citations and orders at the Magma Mine. MSHA assessed civil penalties for these violations as follows:

Table F - Assessment Data Fiscal Year 1993*						
Method of Assessment	Number of Violations	Total Proposed Assessment (Current)	Amount Paid			
Single Penalty	38	\$1,900	\$1,900			
Regular Formula	4	\$608	\$461			
Totals	42	\$2,508	\$2,361			
* Citations issued through August 10, 1993.						

**Conclusion:** The civil penalties assessed for violations at the Magma Mine were appropriate for the types of citations and orders issued.

# Safety and Health Conferences - Vacated Citations and Orders

**Requirement:** 30 CFR 100.6 provides that MSHA shall afford all parties (mine operators and miners' representatives) the opportunity to review with MSHA each citation and order issued during an inspection, and grants the parties the right to request a safety and health conference with the District Manager or his designee. Parties may submit additional relevant information relating to the violation for consideration by MSHA. When the facts warrant a finding that a violation did not occur, the citation or order will be vacated.

The MSHA Program Policy Manual (vol. I, p. 18) states, in relevant part, that when vacating a citation or order, a Citation/Order Continuation form (MSHA Form 7000-3a) must be completed, stating the reason for vacating the enforcement action. If possible, the authorized representative who issued the citation or order should also issue the subsequent corrective action. Both the inspector and the supervisor must file, with the inspection report, notes which describe in detail the reasons and circumstances involved in the vacation. Copies of the citation or order, along with the subsequent corrective action and notes, shall be sent to the appropriate district manager.

The MSHA Program Policy Manual (vol. III, p. 45) states, in relevant part, that the conference manager shall record his or her findings on the Safety and Health Conference Worksheet (MSHA Form 7000-12). The worksheet should contain sufficient information to support the conclusions reached. This form should also fully document the position of all involved parties and MSHA's disposition of the matter. If the issuing inspector was not present during the conference, the manual requires that he or she be notified of the results of the conference.

Statement of Facts: Table G shows the results of safety and health conferences conducted by Metal during fiscal years 1992 and 1993.

Table G - Results of Safety and Health ConferencesFiscal Year 1992-1993							
Field Office	Number	Citations/	Perc	Percent Changed or Vacated			
Tield Office	Confs.	Discussed	Grav.	Negl.	S&S	Vac.	
Magma Mine	3	17	6%	6%	0%	35%	
Phoenix - North	17	75	23%	4%	21%	27%	
Phoenix - South	18	56	16%	13%	14%	14%	
Grand Junction	14	47	4%	9%	4%	9%	
Rapid City	29	101	12%	4%	13%	6%	
Denver	62	227	9%	8%	9%	4%	
Topeka	35	99	9%	13%	11%	12%	
Helena	46	286	9%	5%	5%	10%	
Green River	26	74	3%	3%	11%	5%	
Salt Lake	38	72	14%	17%	13%	10%	
District Total	285	1,037	10%	8%	10%	9%	
National Total	1,289	4,794	13%	8%	11%	8%	

During fiscal years 1992 and 1993, 13 citations and orders issued to the Magma Mine were vacated. A review of Safety and Health Conference Worksheets indicated that six of these citations and orders were vacated at a safety and health conference while seven were vacated without being conferenced. Two of the citations that were vacated without a conference were vacated by the issuing inspectors and five were vacated by the inspection supervisor. The inspection supervisor stated that a safety and health conference was conducted on May 28, 1992, for the five citations he vacated, and that he completed a conference worksheet. However, there were no conference worksheets on file, and the conference results were not entered in the Management Information System (MIS). On October 13, 1993, an additional citation was vacated without a conference by the inspection supervisor.

In order to ensure that all safety and health conferences are conducted, with the appropriate information entered into the MIS, on December 23, 1991, the District Manager implemented a system to track the information associated with each safety and health conference conducted.

The inspectors and the supervisor did not file notes with the inspection report which described the reasons and circumstances for vacating the citations and orders. The review team did not locate any notes filed with the Magma Mine inspection reports referencing the reasons for vacating the seven citations and one order vacated outside of conferences in fiscal years 1992 and 1993. The Rocky Mountain District Manager stated he did not receive

copies of the citations, subsequent actions, and notes for the citations vacated at the Magma Mine.

On October 6, 1992, an inspector issued a section 104(g)(1) order (Order No. 3926753), requiring the withdrawal of the general manager of the Magma Mine because there were no records indicating that the general manager had received new underground miner training as required under §48.5(a). The inspector did not observe the general manager underground. However, the general manager had been employed at the mine for at least 6 months when the citation was issued and the issuing inspector stated that there were no training records to indicate that the general manager had received any type of training, surface or underground. The issuing inspector terminated the order on October 8, 1992, when Magma provided a certificate of training, dated October 7, 1992, indicating the general manager had received the appropriate training at another mine. The issuing inspector stated that in a subsequent telephone conversation, a Rocky Mountain District employee directed him to vacate the order. The justification for vacating the order was Magma's allegation that the general manager did not travel underground and, therefore, did not require new underground miner training. Although the inspector disagreed with this decision, he vacated the order on October 26, 1992. This order was not discussed during a safety and health conference and the review team was unable to determine who instructed the inspector to vacate this order.

On September 20, 1993, an inspector determined that an examination for misfires had not been made after blasting, as required by §57.6311(a). The inspector issued Citation No. 3934791 for a violation of §57.6311(a) for failure to examine for misfires. Section 57.6311(b) states, in part, that only work necessary to remove a misfire shall be permitted in the affected area until the misfire is disposed of in a safe manner. When the examination was made, a misfire was found and the inspector also issued Citation No. 3934792 for a violation of §57.6311(b) because, prior to examining for misfires, work other than that necessary to remove the misfire was being performed in the affected area. On October 13, 1993, Citation 3934792 was reviewed and vacated by the inspector's supervisor. The supervisor's justification for vacating this citation was that the mine operator had not conducted an examination for misfires and was not aware that a misfire existed in the work area. The review team could not find any requirement or MSHA policy that stated an operator must have prior knowledge of a violation before MSHA enforcement personnel could cite a violation.

**Conclusion:** The review team recognizes that MSHA management is obligated to vacate inappropriately issued citations or orders. However, the frequency with which citations and orders were vacated during safety and health conferences in the Phoenix field office, and at the Magma Mine in particular, was significantly higher than the Rocky Mountain District or National averages.

The District was unable to provide a conference worksheet for a safety and health conference conducted on May 28, 1992. Also, the results of the conference were not entered in the MIS.

When citations and orders were vacated, detailed notes were not filed with the inspection report or forwarded to the District Manager as required by MSHA policy.

After a review of the citations and orders vacated at the Magma Mine, the review team concluded that the interpretation of the standards cited was, in some instances, more permissive than the inspectors' interpretation. For example, the review team believes that the citation issued for performing work other than that necessary to remove a misfire, was valid and should not have been vacated. The section 104(g)(1) order, issued on October 6, 1992, for failure of the general manager of the Magma Mine to receive new underground miner training, should not have been vacated. If the general manager was not required to receive underground training because he did not travel underground, the order should have been modified to the appropriate section under Part 48 Subpart B (Training and Retraining of Miners Working at Surface Mines and Surface Areas of Underground Mines).

**Corrective Action Taken:** The District Manager has taken action to ensure that vacated citations and orders are appropriately documented. In a January 10, 1994, memorandum, the District Manager instructed all inspection supervisors to ensure that notes describing the reasons for which each citation or order is vacated are filed with the inspection report, with copies of this documentation forwarded to the District office. He further directed the supervisors to review these procedures with the inspectors, documenting the dates on which these discussions occurred. Additionally, the District has implemented a system to track these documentation procedures.

In January 1994, the District Manager conducted a District-wide study to determine if citations and orders vacated between March 1983 and January 1994 were vacated under appropriate circumstances. The study indicated that, with the exception of some of the citations and orders vacated by the Phoenix North Field Office, all citations and orders were appropriately vacated. The study revealed that the Phoenix North Field Office supervisor had improperly vacated several citations and orders. The District Manager discussed these vacated citations and orders with the Phoenix North Field Office supervisor.

## Mine Emergency Response Procedures

**Requirement:** On December 21, 1990, the Administrators for Coal and Metal and Nonmetal Mine Safety and Health issued a joint memorandum to all District Managers requiring the development and implementation of District Mine Emergency Response Plans (MERP). These District MERPs are subject to approval by the appropriate Administrator and must contain the responsibilities of District personnel when responding to mine emergencies. The plans must be reviewed and updated at least once each year, with substantive revisions approved by the Administrators.

Each district manager is required to provide all appropriate personnel with a copy of the plan. In addition, key District personnel should be briefed on the content and organization of the plan, as well as with their responsibilities in responding to an emergency.

Statement of Facts: On January 30, 1991, the Rocky Mountain District MERP was submitted to the Administrator for Metal and Nonmetal for his approval. Appropriate District personnel received training on the draft MERP at a District-wide meeting on February 20-21, 1991. The plan was approved by the Administrator on March 21, 1991, and distributed to all appropriate District enforcement personnel on May 9, 1991.

Training on the MERP was again conducted at a District-wide meeting on February 19-20, 1992. Some of the inspectors assigned to the Phoenix field office after February 1992 stated they received copies of the plan but have not received training. The plan was last revised in January 1993, at which time it was distributed to all field office supervisors.

Upon notification of the accident at the Magma Mine, the Phoenix field office supervisor immediately contacted the two MSHA inspectors who had started a regular inspection of the mine on August 2, 1993. The inspection supervisor dispatched the inspectors to the mine at 2:10 a.m. and they arrived on site at 2:55 a.m.

The inspectors travelled underground, arriving at the 4000 Level at 3:15 a.m. The inspectors verbally issued a section 103(k) order at 3:20 a.m. and arrived at the accident location at 3:25 a.m. Both inspectors remained at the accident location until 4:30 a.m. when the primary inspector travelled to the surface to contact MSHA officials to report the status of the recovery operations. At this time, the primary inspector also issued the written section 103(k) order to the operator. The last accident victims were recovered at 10:20 a.m. and transported to the surface at approximately 10:30 a.m.

**Conclusion:** MSHA personnel took appropriate actions while performing their duties and responsibilities during the recovery operations.

Enforcement personnel assigned to the Phoenix field offices after February 1992 did not receive training in the District's MERP.

**Corrective Action Taken:** Enforcement personnel in the Rocky Mountain District were trained in the District's revised MERP between January 28, 1994 and April 13, 1994. All enforcement personnel in both Phoenix field offices were trained in the District's MERP on March 7, 1994.

Recommendation: None.

## **Enforcement of Specific Standards**

This section addresses the enforcement of the standards cited by the accident investigation team. The accident investigation team issued a total of 59 citations and orders - 45 to Magma and 14 to Dynatec. Of the 59 citations and orders issued, the investigation team issued 35 section 104(d)(1) orders and 2 section 104(d)(1) citations for violations that contributed to the cause of the accident. Included in the 59 citations and orders issued are 13

section 104(d)(1) orders and 9 section 104(a) citations for unsafe blasting practices that, although not directly contributing to the cause of the accident, were part of Magma's general failure to follow MSHA requirements for use of explosives. Table H provides a detailed listing of citations and orders issued by the accident investigation team to Magma and Dynatec by type of action.

Table H - Citations and Orders Issued by the Accident Investigation Team						
Issued toIssued toType of ActionMagmaDynatec						
104(d)(1) Contributory Citations	1	• 1	2			
104(d)(1) Contributory Orders	22	13	35			
104(d)(1) Non-contributory Orders	13	0	13			
104(a) Non-contributory Citations	9	0	9			
Total	45	14	59			

The 37 contributory citations and orders were issued for violations of 7 different standards. Table I shows the frequency with which these standards were cited by all Metal offices, the Rocky Mountain District, and the Phoenix field office in fiscal years 1991-1993. The table also includes the number of violations of these standards cited at the Magma Mine.

Table I - Contributory Standards CitedFY 1991-1993						
Standard	Magma Mine*	Phoenix F.O.	Rocky Mountain District	Metal & Nonmetal Total		
57.3360	5	5	19	49		
57.11001	2	5	74	367		
57.3401	0	0	7	45		
57.6300	0	0	0	0		
57.6375	0	0	1	1		
57.18002(a)	1	2 ·	5	13		
48.7	0	1	~ 6	11		
Data include citations and orders subsequently vacated.						
* Includes cit	ations issued to	contractors at	the Magma Mine			

### Enforcement of Section 57.3360 (Ground Support).

**Requirement:** Section 57.3360 states, in relevant part, that ground support shall be used where ground conditions, or mining experience in similar ground conditions in the mine, indicate it is necessary. When ground support is necessary, the support system shall be designed, installed, and maintained to control the ground in places where persons work or travel in performing their assigned tasks.

**Statement of Facts:** MSHA's accident investigators determined that ground support in the area of the 865 Raise was not designed, installed, or maintained to control the ground in places where miners worked or travelled. The investigators found that the Raise design was inadequate for the use for which it was intended. The accident investigators also determined that both Magma and Dynatec failed to recognize that the structural support was deficient after the Raise was installed. Both Magma management and Dynatec failed to properly repair or replace components of the Raise when the components were structurally damaged.

MSHA investigators issued one section 104(d)(1) citation to Magma, and four section 104(d)(1) orders, two to Magma and two to Dynatec, for violations of §57.3360. Of these citations and orders, one was issued to Magma for the inadequate design of the 865 Raise, one was issued to Magma and one to Dynatec for the improper installation of the raise, and one was issued to Magma and one to Dynatec for inadequate maintenance of the raise.

During fiscal years 1991-1993, Metal cited 49 violations of §57.3360, 19 of which were cited by the Rocky Mountain District. Prior to the accident, inspectors issued four section 104(a) citations for violations of §57.3360 at the Magma Mine in fiscal years 1991-1993, three were issued to Magma and one was issued to Dynatec. One of the citations was issued to Magma for failure to provide ground control, one was issued to Magma for inadequately designed ground support, one was issued to Magma for inadequate installation, and one was issued to Dynatec for improper maintenance of ground support.

MSHA inspectors would normally evaluate the design and installation of a raise, prior to or during its development, only if a regular inspection coincides with a raise's development. An MSHA evaluation of the design of the 865 Raise would be limited to a visual examination of the condition of the exposed structural components. In April 1993, an inspector visited the area where development of the 865 Raise had just commenced. MSHA inspectors conducted no other inspections of the 865 Raise prior to the accident.

During interviews with the internal review team, inspection personnel displayed awareness of the requirements of §57.3360 and knowledge about the enforcement of this standard. Inspectors stated that when inspecting any raise they would examine the condition of the timber, the blocking, and side lagging. The inspectors stated that it is difficult to evaluate the design of a raise after installation through visual observation because the area behind the lagging is inaccessible.

**Conclusion:** Inspection personnel were familiar with the requirements of §57.3360 and appropriately cited this standard on four occasions at the Magma Mine from 1991 to 1993. The internal review team believes the inspectors possess the necessary knowledge and background to identify the installation and maintenance deficiencies cited by the accident investigation team. However, an engineering background in various disciplines is necessary to perform a comprehensive evaluation of the design of structures similar to the 865 Raise. The review team believes this concern would be addressed through the recommendation that the Administrator for Metal consider the need for requiring metal and nonmetal mine operators to obtain certifications by registered engineers of plans for major construction projects as recommended earlier in this report in the section "Section 103 (a) Mandatory Inspection."

#### Recommendation: None.

## Enforcement of Section 57.11001 (Unsafe access).

**Requirement:** Section 57.11001 requires that a safe means of access be provided and maintained to all working places.

Statement of Facts: The accident investigators determined that, from August 3 to August 10, 1993, a safe means of access was not provided and maintained to working places in the 865 Raise between the 3763 elevation and the 4000 Level. Miners were regularly required to travel the 865 Raise manway compartment between these two levels. MSHA investigators issued two section 104(d)(1) orders, one to Magma and one to Dynatec for these violations of §57.11001. Conditions cited included: hazardous structural conditions; unsecured ladders; shifted timbers; dislodged cribbing; and debris in the manway.

During fiscal years 1991-1993, enforcement personnel cited 367 violations of §57.11001, 74 of which were cited by the Rocky Mountain District, five by the Phoenix field office. The inspectors previously issued two section 104(a) citations to Magma for violations of §57.11001, one in fiscal year 1991 and one in fiscal year 1992. Conditions cited in these citations were similar to those cited by the accident investigation team.

During interviews with the internal review team, inspection personnel displayed awareness of the requirements of §57.11001 and knowledge in the enforcement of this standard. They also stated they would examine all manways associated with raises, observing the condition of ladders, landings, and general housekeeping. The inspectors indicated that dislodged timbers would be a violation of this standard. Additionally, inspection notes frequently contain references to the condition of travelled areas.

**Conclusion:** Inspection personnel were familiar with the requirements of §57.11001 and appropriately cited violations of this standard on two occasions at the Magma Mine from 1991 to 1993.

#### Recommendation: None.

## Enforcement of Section 57.3401 (Examination of ground conditions).

**Requirement:** Section 57.3401 states, in relevant part, that appropriate supervisors or other designated persons shall examine and, where applicable, test ground conditions in areas where work is to be performed, prior to work commencing, after blasting, and as ground conditions warrant during the work shift.

MSHA's Program Policy Manual (vol. IV p.14) states that under this standard the mine operator must designate persons experienced in ground control to examine and test the ground. These persons may be supervisors or miners. Mine management retains the responsibility for examining and testing ground conditions.

Statement of Facts: The accident investigators determined that Magma and Dynatec failed to adequately examine ground conditions in the 865 Raise. The investigators established that during ten working shifts between August 3 and August 10, 1993, miners were allowed to work in the Raise without management ensuring that adequate examinations of ground conditions were conducted prior to the commencement of work, after blasting, or as ground conditions warranted. MSHA investigators issued seven section 104(d)(1) orders to Magma and six section 104(d)(1) orders to Dynatec for these violations of §57.3401. During fiscal years 1991-1993, enforcement personnel cited 45 violations of §57.3401, seven of which were cited by the Rocky Mountain District. None were cited by the Phoenix field office.

During interviews with the internal review team, inspection personnel displayed comprehension of the requirements of §57.3401. The inspectors were aware that an experienced person, designated by the operator, must perform examinations of ground conditions. Inspectors stated they evaluate ground conditions during inspections by examining ground support components and looking for changes in ground conditions. The inspectors cited Magma for failure to correct hazardous ground conditions and inadequate ground support, (§57.3200 and §57.3360), but did not cite the operator for failure to conduct required ground control examinations. The review team evaluated the conditions cited in the five citations issued for violations of §57.3401 may also have been appropriate in some instances.

**Conclusion:** Inspection personnel were aware that operators are required to examine ground conditions. However, inspectors did not cite violations of the examination requirements when issuing citations for inadequate ground support or hazardous ground conditions. This standard was not cited by Phoenix field office inspectors during fiscal years 1991-1993.

**Recommendation:** The Administrator for Metal should instruct enforcement personnel to determine compliance with §57.3401 when they encounter inadequate ground control.

# Enforcement of Section 57.6300 (Control of blasting operations).

**Requirement:** Section 57.6300 states that only persons trained and experienced in the handling and use of explosive material shall direct blasting operations and related activities. Trainees and inexperienced persons shall work only in the immediate presence of persons trained and experienced in the handling and use of explosive material.

Statement of Facts: The accident investigators determined that inexperienced miners were blasting hangups in the 865 Raise. This occurred on two shifts, one shift on August 3, 1993, and the shift during which the accident occurred on August 10, 1993. On both occasions, the two inexperienced miners blasted hangups in the absence of persons trained and experienced in this task. MSHA investigators issued two section 104(d)(1) orders to Magma for violations of §57.6300. This standard was not cited by Metal during fiscal years 1991-1993.

During interviews with the internal review team, inspection personnel displayed knowledge of the requirements of §57.6300. The inspectors were aware that miners assigned to perform blasting operations are required to be trained and experienced in the handling and use of explosives and, prior to blasting hangups, should receive training for that specific task. In enforcing this standard, inspectors stated they questioned miners performing blasting operations to determine the adequacy of their training and experience. One inspector stated he observed blasting operations at the mine on one occasion. The inspectors did not cite violations of §57.6300 at the Magma Mine prior to the accident.

**Conclusion:** MSHA inspectors were aware of the requirements of §57.6300. In determining compliance with this standard, the inspectors relied almost exclusively on discussions with miners to determine the adequacy of their training in the use of explosives. Enforcement personnel did not always observe blasting operations which reduced their ability to determine whether miners assigned blasting responsibilities possessed the requisite experience and training.

#### **Recommendation:** None<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup>This concern is addressed by the recommendation that the Administrator establish procedures which address how enforcement personnel conducting regular inspections should determine whether safe work procedures are being followed during each portion of the mining cycle. These procedures should also address activities associated with transferring ore from a working face to the surface, such as blasting hangups. This subject is discussed in more detail in this report under the section entitled "Section 103(a) Mandatory Inspections."

# Enforcement of Section 57.6375 (Loading and blast site restrictions).

**Requirement:** Section 57.6375 requires that ample warning be given before blasts are fired. All persons shall be cleared and removed from areas endangered by the blast. Clear access to exits shall be provided for personnel firing the rounds.

Statement of Facts: The accident investigators identified four occasions when all persons were not cleared from endangered areas prior to blasting hangups in the 865 Raise. These violations occurred on August 2, 3, and 10, 1993. MSHA investigators issued four section 104(d)(1) orders to Magma for violations of §57.6375. This standard was cited one time in Metal and Nonmetal Mine Safety and Health during fiscal years 1991-1993. The Rocky Mountain District cited this violation. The Phoenix field office did not cite any violations of this standard during this period.

During interviews with the internal review team, inspection personnel displayed knowledge of the requirements of §57.6375. The inspectors were aware that ample warning is required and all persons must be cleared from the affected area prior to initiating a blast. The inspectors stated that they did not observe hangups being blasted at the Magma Mine in fiscal year 1993, and, except on one occasion, had not observed a complete cycle of blasting operations. The inspectors stated they did not observe violations of this standard at the Mine during fiscal years 1991-1993.

**Conclusion:** Inspectors were aware of the requirements of §57.6375. Enforcement personnel did not always observe blasting operations. This reduced the inspectors' ability to evaluate whether miners were following safe blasting practices.

Recommendation: None<sup>6</sup>.

# Enforcement of Section 57.18002(a) (Workplace examinations)

**Requirement:** Section 57.18002(a) specifies that a competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such adverse conditions. Paragraph (b) of this section requires operators to keep a record of each examination for a period of one year. Prior to February 1983, operators were required to maintain records of each workplace examination for one year. A policy

<sup>&</sup>lt;sup>6</sup>This concern is addressed by the recommendation that the Administrator establish procedures which address how enforcement personnel conducting regular inspections should determine whether safe work procedures are being followed during each portion of the mining cycle. These procedures should also address activities associated with transferring ore from a working face to the surface, such as blasting hangups. This subject is discussed in more detail in this report under the section entitled "Section 103(a) Mandatory Inspections."

memorandum issued by the then Administrator for Metal on February 10, 1983, allows mine operators to certify that the examinations required by §57.18002(a) have been made during the preceding 12 months.

Section 57.2 defines "Competent person" as a person having abilities and experience that fully qualify him to perform the duty to which he is assigned. The Program Policy Manual (vol. IV, pp. 61-62) also states, in relevant part, that this definition includes any person who, in the judgment of the operator, is fully qualified to perform the assigned task. Therefore, it is not required that the person necessarily be a mine foreman, mine superintendent, or other person associated with mine management. A miner may be qualified to perform the task after having been trained in the recognition of hazards in the working place.

Statement of Facts: The accident investigators determined that adequate workplace examinations were not conducted in the 865 Raise during the week prior to the accident. Magma failed to detect and correct hazardous structural deficiencies, unsecured ladders, and dislodged timber, blocking, and cribbing. Dynatec, while performing work in the 865 Raise, also failed to detect and correct these hazardous conditions. MSHA investigators also determined that an imminent danger existed in the 865 Raise from at least August 3, 1993, to the time of the accident.

The accident investigation team also noted in its report that, during the six weeks prior to the accident, those responsible for conducting workplace examinations of the 865 Raise were among the least experienced miners employed at the Magma Mine, having little or no raise inspection or construction experience. The workplace examination records for this period contained no information regarding ground conditions, blocking, backfill or the raise's structural stability.

MSHA investigators issued four section 104(d)(1) orders to Magma, and five section 104(d)(1) orders to Dynatec, for these violations of §57.18002(a).

During fiscal years 1991-1993, Metal enforcement personnel cited 13 violations of §57.18002(a), five of which were cited by the Rocky Mountain District. Two were cited by Phoenix field office enforcement personnel. Inspectors cited a contractor at the Magma Mine for one violation of §57.18002(a) during an accident investigation in May 1993.

The purpose of the Paperwork Reduction Act, in part, is to minimize and control burdens associated with the collection of information by Federal agencies from individuals, businesses and other private institutions, as well as State and local governments. The provisions of the Paperwork Reduction Act are implemented in Title 5 CFR. Section 1320.7(j) of Title 5 identifies, in part, the items that are not considered information and therefore are not subject to the Paperwork Reduction Act. One of the items excluded from the Paperwork Reduction Act is a "certification" provided that it entails no burden other than that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument.

MSHA's 1983 review of the recordkeeping requirement in §57.18002(b) determined that the information required by this standard met the parameters of a "certification" as defined in Title 5 CFR. As a result, on February 10, 1983, Metal issued a policy memorandum stating in part, "Effective immediately, the recordkeeping requirements for the above standards (which included §57.18002(b)) may be satisfied by an operator's written statement that the inspections, repairs and examinations have been made in accordance with the incorporated codes. MSHA will accept such certification annually, without regard to format, if it is made available at the time of inspection." Therefore, the operator can certify once each year that the required examinations have been made for the preceding 12 months. The current policy was incorporated in MSHA's Program Policy Manual (vol. IV p.62) in July 1988.

Following is a chronology of the circumstances which led MSHA to revise the recordkeeping requirements in 1983:

November 1981 -- Pursuant to the Paperwork Reduction Act of 1980 (44 USC Sec. 3501), the Office of Management and Budget (OMB) recommended that MSHA review certain recordkeeping requirements and consider allowing operators to certify, rather than record, that required examinations were made. Section 57.18002 was one of the standards identified by OMB at this time.

March 1982 -- In a memorandum on the subject of reducing paperwork burden, MSHA's Chief of the Branch of Records Management listed all recordkeeping standards under review at that time. The memorandum also indicated recommended changes to the recordkeeping requirements for each of the listed standards. One of the recommended actions was to change the recordkeeping requirements of §57.18002, allowing operator certification of workplace examinations.

**April 1982** -- OMB renewed the approval of the control number for §57.18002 contingent upon MSHA revising the recordkeeping requirement of the standard to allow operator certification of workplace examinations.

**February 1983** -- Metal issued the new policy regarding recordkeeping requirements on February 10, 1983. This policy has been periodically reissued since 1983 with no substantive changes. The policy does not require a separate certification for each workplace examination. Under this policy, MSHA will accept one certification that required workplace examinations have been conducted during the preceding year. Section 57.18002(b) requires that a record of workplace examinations be kept for each shift.

Representatives for MSHA's Office of Standards, Regulations, and Variances stated that since the information required by §57.18002(b) is the same information that can be required by a certification, changing the record to a certification can be done by policy. However, they stated that the certifications should be made with the same frequency that the records were required to be kept. They further stated that changing the frequency from one record per examination to one certification per year would require a regulatory revision to the standard.

During the interviews with the internal review team, enforcement personnel demonstrated they were aware of the requirements of §57.18002(a). However, the inspectors expressed concerns that MSHA policy allows the operator to certify once each year that all examinations required during the preceding twelve months have been conducted, without maintaining detailed records of each examination. They believe this policy makes it very difficult to enforce this standard. They also believe that detailed workplace examination records were a valuable enforcement tool that indicated problem areas on which to focus during inspections. They indicated they no longer closely scrutinize the certifications or records of workplace examinations during regular inspections.

Workplace examinations at the Magma Mine, however, were documented for each shift on a "Daily Safety Check" form. This form had seven items for which the examiner checked either the "yes" or "no" block. The inspectors responsible for the regular inspections of the Magma Mine in fiscal year 1993 stated they did not review the operator's workplace examination records during their regular inspections.

Workplace examinations at the Magma Mine were normally conducted by a miner assigned to work in the area required to be examined. At the completion of each shift, the miners who conducted these workplace examinations completed a Magma Daily Safety Check form.

A review of the daily safety check reports for August 2-9, 1993, indicated that five miners assigned to work at the 865 Raise conducted the required workplace examinations of the raise. These five miners were relatively inexperienced. Two of these miners were victims of the August 10 accident - one was 21 years old with 16 months mining experience, the other was 19 years old with 14 months mining experience.

The accident investigation team found that the majority of workplace examinations of the 865 Raise were conducted by persons without the requisite training and experience necessary to properly evaluate and correct safety hazards. Although §57.18002 requires that the operator designate a competent person to make these examinations, the designated person is not required to be a management official. MSHA's policy is to accept the operator's judgement as to who is a "competent person." Inspectors stated that this prohibits them from challenging the competency of any person designated by the operator to perform workplace examinations.

**Conclusion:** MSHA's policy regarding annual certification of workplace examination records at metal or nonmetal mines is inconsistent with §57.18002(b). The policy allows an annual certification for workplace examinations rather than a certification for each examination.

Enforcement personnel were familiar with the requirements of §57.18002 but considered the standard ineffective and difficult to enforce. The inspectors did not review any workplace examination records during the regular inspections conducted in fiscal year 1993.

Section 57.2 does not require demonstration of a minimum level of knowledge or expertise for an operator to designate a "competent person." Current MSHA policy is unduly restrictive in that it impedes the inspectors' ability to question the operators' judgement when designating competent persons.

**Recommendation:** The Administrator for Metal should revoke the policy which allows operators to make annual certifications that workplace examinations have been conducted and inform enforcement personnel that a certification is required for each examination. The Administrator also should emphasize that enforcement personnel shall review certifications of workplace examinations during each regular inspection.

The Administrator for Metal should consider revising the policy which prohibits enforcement personnel from challenging the operators' judgement when designating "competent persons." Furthermore, the Administrator for Metal should consider requiring that only certified persons perform workplace examinations.

## Enforcement of Section 48.7 (Task training of miners).

**Requirement:** Section 48.7 requires that miners assigned to new work tasks, including blasting operations, receive training on the safe performance of these tasks prior to performing these tasks. Such training must be provided by a qualified instructor and include safe operating procedures, supervised practice during nonproduction, and supervised operation during production.

Statement of Facts: MSHA's accident investigators determined that on August 10, 1993, two miners who had not been trained for the task were engaged in blasting a hangup in the 865 Raise. MSHA's investigators issued two section 104(d)(1) orders to Magma for these violations of §48.7. In the accident investigation report, the investigators noted that these same miners were not trained, as specified in Magma's approved training plan, in several other tasks to which they were assigned. Specifically, they were not trained in: loading and dumping procedures; 865 Raise Syntron operating procedures; blasting orders; and guarding requirements for blasting operations.

Metal enforcement personnel cited 11 violations of this standard in fiscal years 1991-1993, six of which were cited by the Rocky Mountain District. The Phoenix field office cited one violation of §48.7 in fiscal years 1991-1993. No violations of this standard were cited at the Magma Mine.

The training plan in effect at the Magma Mine at the time of the accident was approved by MSHA on May 17, 1991. During fiscal years 1991 and 1992, the field office training

specialist monitored two eight-hour refresher training courses at the Magma Mine. He stated the training was provided by MSHA-approved instructors and, in his opinion, the training was adequate.

At the review team's request, MSHA's Office of Educational Policy and Development (EPD) reviewed the Magma Mine's approved training plan to determine compliance with the provisions of 30 CFR Part 48. EPD determined the training plan was in conformance with MSHA regulations.

During interviews with the internal review team, enforcement personnel demonstrated they were aware of the requirements of §48.7 and knowledgeable in the enforcement of this standard. They stated they reviewed a representative sample of training records during each regular inspection and discussed the frequency and quality of training with the miners as they travelled through the mine.

**Conclusion:** Inspectors were aware of the requirements of §48.7 and determined compliance with this standard by reviewing training records and discussing training with miners. Each phase of the mining cycle was not always observed during the course of regular inspections of the Magma Mine. This reduced the inspectors' ability to evaluate whether miners were following safe work practices.

Recommendation: None<sup>7</sup>.

#### **Enforcement of Explosives Standards**

**Requirement:** Section 57.6502(h) requires, in relevant part, that at least two persons be present when lighting a safety fuse, and that no one shall light more that 15 individual fuses.

Section 57.6205 requires that closed, nonconductive containers be used to carry explosives and detonators to and from blast sites. Separate containers shall be used for explosives and detonators.

Section 57.6302(b) states, in relevant part, that explosive material shall be protected from impact when taken to the blast site.

<sup>&</sup>lt;sup>7</sup>This concern is addressed by the recommendation that the Administrator establish procedures which address how enforcement personnel conducting regular inspections should determine whether safe work procedures are being followed during each portion of the mining cycle. These procedures should also address activities associated with transferring ore from a working face to the surface, such as blasting hangups. This subject is discussed in more detail in this report under the section entitled "Section 103(a) Mandatory Inspections."

Section 57.6161(a) requires that auxiliary facilities used to store explosive material near work places either be: wooden, box-type containers equipped with covers or doors; or facilities constructed or mined-out to provide equivalent impact resistance.

Section 57.6161(b)(7) specifies that auxiliary explosive material storage facilities shall be filled with no more than a one-week supply of explosive material.

Section 57.6102(a)(1) requires that explosive material be stored in a manner that facilitates use of the oldest stock first.

Section 57.6102(b) specifies, in relevant part, that explosives and detonators shall be stored in closed nonconductive containers.

Section 57.6305 requires that unused explosives material be moved to a protected location as soon as practical after loading operations are completed.

Statement of Facts: The accident investigators concluded that there was a general failure to comply with federal requirements for the use, handling, and storage of explosives at the Magma Mine. Table J shows the frequency with which these standards were cited by all Metal offices, the Rocky Mountain District, and the Phoenix field office in fiscal years 1991-1993. The table also includes the number of violations of these standards cited at the Magma Mine.

Table J - Non-Contributory Standards Cited Fiscal Years 1991-1993						
Standard	Magma Mine	Phoenix F.O.	Rocky Mountain District	Metal & Nonmetal Total		
57.6502(h)	0	0	0	1		
57.6205	0	0	2	3		
57.6302(b)	0	0	1	2		
57.6161(a)	0	0	1	8		
57.6161(b)(7)	0	0	0	0		
57.6102(a)(1)	0	0	0	2		
57.6102(b)	0	0	2	18		
57.6305	0	0	2	13		

Following is a summary of the explosives violations the accident investigators cited as noncontributory.

Section 57.6502(h) (Safety fuse) - only one miner was present when a safety fuse was initiated in the 865 Raise on the "B" shift of August 10, 1993. Additionally, there was only

one miner present when a safety fuse was initiated in the 865 Raise on two separate occasions on the "A" shift of July 31, 1993. MSHA's investigators issued a section 104(d)(1) order and two section 104(a) citations for these violations of §57.6502(h). One violation of this standard was cited by Metal in fiscal years 1991-1993. This violation was not cited by the Rocky Mountain District.

Section 57.6205 (Conveying explosives by hand) - on two occasions closed, non-conductive containers were not used to transport explosives (fused caps and cap-sensitive emulsion). Both violations occurred on August 10, 1993, one at 6:30 p.m., the other at 7:30 p.m., when explosives were transported from the 4000 Level storage area to the 865 Raise. MSHA's investigators issued two section 104(d)(1) orders for these violations of §57.6205. Metal cited three violations of this standard in fiscal years 1991-1993. Two of these were cited by the Rocky Mountain District and none were cited by the Phoenix field office.

Section 57.6302(b) (Explosives material protection) - there were 12 violations of this standard between July 30 and August 10, 1993. Eleven of the violations occurred when explosive materials (fused caps and cap-sensitive emulsion) were exposed to impact when they were used to blast hangups. The other violation occurred when explosive materials (fused caps and cap sensitive emulsion) were exposed to impact when they fell to the bottom of the 865 Raise into an idle vibrating feeder. Miners energized the feeder to retrieve the explosives. MSHA's investigators issued ten section 104(d)(1) orders and two section 104(a) citations for these violations of §57.6302(b). Metal cited two violations of this standard in fiscal years 1991-1993. The Rocky Mountain District cited one violation and the Phoenix field office cited none.

Section 57.6161(a) (Auxiliary facilities) - 36 capped safety fuses were improperly stored in a foil barrier bag about 25 feet from the explosives magazine. The bag was approximately 3 yards from the drift at the 4000 Level auxiliary explosives area and was used to store safety fuses for blasting hangups at the 865 Raise. MSHA's investigators issued a section 104(a) citation for this violation of §57.6161(a). Metal cited eight violations of this standard in fiscal years 1991-1993. The Rocky Mountain District cited one of the eight violations and the Phoenix field office cited none.

Section 57.6161(b)(7) (Auxiliary facilities) - 16 boxes of explosives were stored in the 4000 Level storage facility. The normal amount of explosives used from the storage area was one to two sticks per blast for hangups in the 865 raise. The investigators determined that the hangups in this Raise were blasted several times a week. The amount stored would accommodate 1000 to 2000 blasts, significantly more than a one-week supply. MSHA's investigators issued a section 104(a) citation for this violation of §57.6161(b)(7). This standard was not cited by Metal during fiscal years 1991-1993.

Section 57.6102(a)(1) (Explosive material storage practices) - 16 boxes of explosives were stored in the 4000 Level auxiliary storage facility. The oldest products were stored at the bottom of each stack which did not facilitate the use of the oldest stock first. These

explosives were to be used to blast hangups in the 865 raise. MSHA's investigators issued a section 104(a) citation for this violation of §57.6102(a)(1). Two violations of this standard were cited by Metal in fiscal years 1991-1993. These violations were not cited by the Rocky Mountain District.

Section 57.6102(b) (Explosive material storage practices) - explosives were not stored in a closed container in that the cover was off on one partial container of explosives stored at the 4000 Level magazine. Fifteen other boxes of explosives were also stored at this auxiliary facility and were to be used to blast hangups in the 865 raise. MSHA's investigators issued a section 104(a) citation for this violation of §57.6102(b). During fiscal years 1991-1993, Metal cited 18 violations of §57.6102(b), two of which were cited by the Rocky Mountain District. The Phoenix North field office did not cite any violations of this standard.

Section 57.6305 (Unused explosive material) - on August 11, 1993, an unused explosive cartridge was found on a steel beam at the 865 Raise near the Syntron feeder, an unprotected location. MSHA's investigators issued a section 104(a) citation for this violation of \$57.6305. Enforcement personnel cited 13 violations of this standard in fiscal years 1991-1993, two of which were cited by the Rocky Mountain District. The Phoenix field office did not cite any violations of \$57.6305 in fiscal years 1991-1993.

During interviews with the internal review team, enforcement personnel demonstrated they were aware of the requirements of the blasting standards cited by the accident investigators. They indicated that during each regular inspection they determine compliance with these standards. However, with regard to \$57.6302(b), some of the enforcement personnel stated this standard did not apply to blasting hangups. They indicated that since this standard states that explosive material shall be protected from impact "when taken to the blast site," it is applicable only when explosives are being transported. This regulation, which became effective in 1991, is contained in Subpart E - Explosives; Use - Surface and Underground rather than Transportation - Surface and Underground and is applicable whenever explosives are used.

The review team found no indications that these violations existed when the relevant areas were inspected by MSHA in April of 1993. The areas in which these violations occurred had not been inspected during the regular inspection on-going at the time of the accident. During interviews with the internal review team, enforcement personnel stated they had not observed any violations of these standards during their inspections of the Magma Mine. Phoenix field office inspectors did not issue any citations or orders for these eight explosives standards during fiscal years 1991-1993.

**Conclusion:** The Phoenix North field office enforcement personnel were generally familiar with the requirements of the eight explosives standards cited by the accident investigators as non-contributory. However, some enforcement personnel were not aware that §57.6302(b) requires explosives to be protected from impact when used to blast hangups in an ore pass.

The review team concludes that the phrase "when taken to the blast site" is the cause of the confusion exhibited by some of the inspectors interviewed.

**Recommendation:** The Administrator for Metal should clarify the scope of the application of §57.6302(b).

## Management

This section addresses Metal's accountability program reviews in the Rocky Mountain District, and inspector notekeeping.

#### **Accountability Program**

**Requirement:** The MSHA Administrative Policy and Procedures Manual (vol. III, Chapter 900) sets forth requirements for the Agency's accountability program. The program is designed to identify and correct potential problems in program management and control. The requirements for the Metal accountability program at the time of the accident were contained in MSHA Accountability Program Handbook (No. AH92-III-1), issued in September 1992<sup>8</sup>. This handbook provided procedures and guidance for the implementation of the program.

The accountability program specified that Metal headquarters shall review at least two Metal districts each operating year (OY)<sup>9</sup>. It also required district managers to conduct an annual accountability review of the district offices, and annual reviews of at least one-third of the field offices in each district.

The accountability program required the supervisor to conduct a quality control review (QCR) of each inspector and specialist at least once during each 6-month period. The supervisor was required to complete a Quality Control Review Report (MSHA Form CG 10,000-8) for each QCR. A copy of this form is included as appendix D. According to the Accountability Handbook, the purpose of a QCR was to: evaluate the quality of enforcement activities; determine whether the level of enforcement was appropriate for the compliance behavior of the operator; and determine whether the activities were conducted and documented in accordance with the applicable provisions of the Mine Act, its implementing regulations, and MSHA policies and procedures. When conducting a QCR, the supervisor was required to review a mandatory regular inspection of a mine. In the case of a specialist, the supervisor was required to review an inspection or technical investigation that included a mine visit. In addition, the supervisor was required to accompany each inspector or

<sup>&</sup>lt;sup>8</sup>Metal and Nonmetal Mine Safety and Health revised the accountability program in July 1993 (AH92-III-1 (2)). The requirements described in this report are those in effect prior to July 1993.

<sup>&</sup>lt;sup>9</sup>The accountability program's operating year extends from July 1 to June 30.

specialist during an inspection or investigation on at least one of the QCRs conducted each year. During these accompanied activities, the supervisor was required to travel to a mine with the employee for a minimum of 2 days. In the case of an accompanied activity at an underground mine, the supervisor was required to spend sufficient time in the active underground working areas of the mine to become familiar with the condition of the mine.

Metal's accountability program required the rotation of mine assignments among inspectors at least every three years. The supervisors were required to maintain a list of mines assigned to each field office, identifying the inspectors assigned to each mine. The list was required to cover a period of time sufficient to indicate whether inspectors were rotated as required.

Statement of Facts: On October 1, 1987, Metal implemented a three-tiered accountability program designed to identify and correct potential problems in program management and control by determining whether policies and procedures were implemented and followed. The three levels of review included: (1) supervisory level; (2) district level; and (3) headquarters level.

In OY 1992, Metal's headquarters office conducted a review of the Rocky Mountain District Office from September 9 through September 20, 1991. This headquarters review identified 12 issues in three program areas: Inspections (9 issues); Special Investigations (1); and Records Management (2). None of these issues was considered significant and all were corrected. Metal headquarters did not conduct a review of the Rocky Mountain District Office during OY 1993.

In OY 1992, the Rocky Mountain District conducted accountability reviews of the Green River, Salt Lake City, and Phoenix field offices<sup>10</sup> and the District office in Denver. The reviews identified 29 issues in five program areas: Supervisory Evaluations (5 issues); Health and Safety Conferences (11); Education and Training (5); Accident Investigations and Chargeability (4); and Part 50 Audits (4). None of these issues was considered significant and all issues were reported as resolved.

The District review of the Phoenix field office for OY 1992 was conducted from October 21 through October 24, 1991. Fourteen of the 29 issues identified during the District reviews,

<sup>&</sup>lt;sup>10</sup>Prior to August 1992, there were two Metal field offices in Arizona, one in Tucson and one in Mesa. In August 1992, the Tucson field office was closed and the employees were transferred to the Mesa Field Office. In April 1993, the Mesa Office was divided into two field offices, designated Phoenix North and Phoenix South. The mines previously assigned to the Tucson office were assigned to the Phoenix South Field Office and the mines previously assigned to the Mesa Field Office were assigned to the Phoenix North Field Office. From March 1990 to April 1993, the Phoenix North field office supervisor was responsible for supervising the employees in both field offices.

were found in the Phoenix field office. Issues were identified in three program areas: Supervisory Evaluations (4 issues); Health and Safety Conferences (7); and Education and Training (3). The Accountability Program Issue Sheets (MSHA Form CG 10,000-1) listed proposed completion dates for seven of the issues. The dates on which these seven issues were actually corrected were not recorded. Six of the 14 issues were shown as being corrected on the date the issue sheets were signed by the supervisor. At that time, corrective actions had not been taken but the issues were deemed corrected based on commitments by the supervisor that he would ensure that applicable policies and procedures would be followed in the future. The one remaining issue indicated that corrective action was implemented prior to the date the issue sheet was signed by the reviewer and the supervisor.

In OY 1993, the Rocky Mountain District conducted accountability reviews of the Rapid City, Topeka, Helena, Green River, Salt Lake City, and Phoenix field offices and the District office. The reviews identified 40 issues in five program areas: Inspections (22 issues); Special Investigations (6); Mine File (1); Inspection of Mine Rescue Stations (7); and Internal Safety (4). All issues were reported as resolved. None of the identified issues was considered significant.

The District review of the Phoenix field office was conducted from December 7 through December 11, 1992. Of the 40 issues identified during the District reviews, 11 were found in the Phoenix field office. Each of the 11 issues identified in the Phoenix field office were in the Metal Inspections program area. The Accountability Program Issue Sheets for each of the 11 issues indicated that all 11 issues were resolved on December 10, 1992, the same date that the issue sheets were signed by the reviewer and the inspection supervisor. These issues were deemed to have been corrected based on statements by the supervisor that he would take future corrective actions. The supervisor stated that he followed the recommended corrective actions identified on each issue sheet, but did not document these actions. He stated that the issues were resolved through verbal instructions to the inspectors. On one issue sheet the supervisor indicated that, to correct the identified deficiency, he would implement a computer program to track the required information. During his interview with the internal review team, he stated that this tracking system had not been implemented at the field office nor did he recall any agreement to implement such a system.

The internal review team identified deficiencies in inspection notes<sup>11</sup>. The inspection supervisor's quality control review reports for OY 1992 previously identified similar deficiencies. In addition, comparable notekeeping deficiencies were identified during the District review of the Phoenix field office in December 1992.

The inspection supervisor for the Phoenix North field office stated that when conducting a QCR he independently reviewed the inspection report, including inspection notes and

<sup>&</sup>lt;sup>11</sup>This subject is discussed in detail in the section of this report entitled "Inspector Notekeeping."

citations and orders, and verbally informed the inspector of any deficiencies. The supervisor stated that he did not discuss the various aspects of the inspection with each inspector. The supervisor also stated that he did not always provide the inspectors with a copy of the QCR report. Some of the inspectors interviewed by the internal review team were not familiar with the term "Quality Control Review."

In his OY 1992 QCR reports, the Phoenix field office supervisor indicated that, in all instances, the mines were inspected in their entirety. The supervisor stated that he makes this determination based on a review of the inspection notes and his personal knowledge of the mine. He also stated that he does not normally use any type of mine map when making these determinations. Prior to the accident, he had not traveled underground at the Magma Mine since it was assigned to him in 1990. Some inspectors stated that prior to examining each level of the Magma Mine they reviewed the evacuation and escapeway maps which are required to be posted in various locations at each underground mine. The mine evacuation and escapeway maps do not include all areas of the mine required to be inspected. Consequently, the inspectors stated that during inspections of the Magma Mine, they compared the areas they inspected to updated maps kept in the mine office to ensure that all areas were inspected on each level. These maps show all active and projected mining areas.

The internal review team was unable to determine if the Magma Mine was inspected in its entirety by using inspection notes and evacuation maps exclusively. It was necessary for the review team to compare inspection notes with both evacuation maps and company production maps to determine the areas of the Magma Mine inspected.

In OY 1992, there were nine inspectors and one training specialist under the supervision of the Phoenix field office supervisor. One of the inspectors was fatally injured in January 1992. At the beginning of OY 1993, there were nine inspectors, one training specialist, two inspector trainees, and one clerical employee under the supervision of the Phoenix supervisor. Four inspectors retired early that year, after which one inspector transferred into the field office and three additional inspector trainees were hired. When the field office was split into two offices in April 1993, there were six inspectors, one training specialist, two clerical employees and five inspector trainees.

In the first half of OY 1992, the inspection supervisor conducted seven of the ten required QCRs. The supervisor did not conduct QCRs for two of the inspectors and the training specialist. In the second half of OY 1992, the supervisor conducted seven of the nine required QCRs. The supervisor did not conduct QCRs for one inspector and the training specialist. During OY 1992, the inspection supervisor travelled with six of the nine employees with whom he was required to travel. He did not accompany two of the inspectors during regular inspections nor did he accompany the training specialist on any activities.

In the first half of OY 1993, the Phoenix inspection supervisor was required to conduct QCRs for five inspectors and one training specialist. A second inspection supervisor was

assigned to the Phoenix field office, Phoenix South, when the office was divided in April 1993. Consequently, in the second half of OY 1993, the Phoenix North field office supervisor was required to conduct QCRs for three inspectors and one training specialist. The Phoenix North field office supervisor did not conduct any QCRs in OY 1993.

The inspection supervisor accompanied four of the five inspectors on regular inspections in OY 1993. He did not accompany the training specialist during any activities. The supervisor spent 1 day or less on-site with three of the four inspectors with whom he travelled. Two of these accompanied activities were at the Magma Mine and the Magma Mill. These two accompanied activities occurred on April 21, 1993, when the supervisor attended the regular inspection closeout conferences. The supervisor spent 2 on-site hours at each closeout conference. The supervisor did not travel underground during the accompanied activity at the Magma Mine.

The supervisor stated that the number of employees he supervised made it difficult for him to conduct the required number of QCRs and travel with each inspector or specialist a minimum of two days each year.

The supervisor stated he had not maintained a list of the mine assignments to indicate that the inspectors were rotated at the required intervals. However, he stated that he tried to rotate 50 percent of the mine assignments each year. A review of the mine assignments at the Magma Mine for FY 1991 through 1993 revealed that the inspectors were rotated as required.

**Conclusion:** The following deficiencies were identified in the District's accountability program:

1. Some of the issues identified during the District accountability reviews were shown as being resolved prior to corrective actions being taken.

2. There was no documentation to show the actions taken to correct some deficiencies identified during District accountability reviews.

3. The agreement to develop an automated tracking system to resolve an issue identified during a District accountability review was not implemented.

4. The supervisor did not always discuss the QCRs he conducted with the inspector and he did not always provide a copy of the QCR report to the inspectors.

5. The manner in which the supervisor conducted QCRs did not enable him to ascertain whether mines were inspected in their entirety.

6. The inspection supervisor did not conduct the required number of QCRs during OY 1992 and 1993.

7. The supervisor did not accompany each inspector or the training specialist the required minimum of 2 days each year and did not travel underground during his accompanied visit to the Magma Mine.

8. The inspection supervisor did not maintain a list of mine assignments to indicate when inspectors were rotated.

**Corrective Action Taken:** In a memorandum to the supervisor of the Phoenix North field office, dated January 3, 1994, the Rocky Mountain District Manager instructed the supervisor to address the status of each issue raised during the District's accountability review of the Phoenix field office in operating year 1993. The supervisor informed the District Manager, in a memorandum dated January 10, 1994, that each issue identified during the 1993 accountability review had been corrected. The memorandum documented the actions taken to correct each issue.

In a January 19, 1994, memorandum to all district managers, assistant district managers and field office supervisors, the Administrator reminded field office supervisors of the requirement and importance of conducting quality control reviews of a major field activity. The Administrator directed attention to the requirements for: the major field activity to be a regular inspection; a QCR of every inspector each 6-month period; a QCR of an accompanied activity each 12-month period; and the importance of the documentation for each QCR. The Administrator also cited the requirement that supervisors submit annual QCR summary reports to the assistant district managers. He also reminded the district and assistant district managers of their responsibly to ensure that QCRs are conducted as described in the QCR procedures handbook.

The Rocky Mountain District Manager held a meeting with all inspection supervisors in March 1994 at which he discussed a number of issues related to the accountability program. Instructions regarding the accountability program are also contained in a follow-up memorandum dated March 31, 1994 in which the District Manager:

instructed the inspection supervisors to thoroughly review the documentation for every inspection to determine that each mine is inspected in its entirety and to take corrective action when it is determined that a mine is not inspected in its entirety;

reminded the field office supervisors of their responsibilities regarding QCRs;

instructed appropriate personnel that issues identified during District accountability reviews are not to be resolved until the accepted corrective actions have been completed and documented; and

instructed the supervisors to discuss all identified accomplishments and deficiencies with the inspectors during each QCR.

On July 1, 1994, the assistant district manager issued a memorandum to all Rocky Mountain District field office supervisors re-emphasizing existing MSHA policy that supervisors must maintain a list of mines and the names of the persons assigned to conduct inspections at each mine. The assistant district manager stated that the list must cover a sufficient period of time to show that mine assignments are rotated at least every 3 years. The assistant district manager directed that each supervisor submit to the District office the method by which the mine assignments will be tracked.

**Recommendation:** The District Manager should follow-up on the effectiveness of the actions taken to address the deficiencies identified in the District's accountability program.

## **Inspector Notekeeping**

**Requirements:** The MSHA General Inspection Procedures Handbook, No. 89-IV-2, (Chapter III, p. 22), requires that inspectors keep clear, concise, and factual notes during an inspection or investigation. While the Inspection Procedures Handbook does not set forth specific notekeeping requirements, the accountability program's Quality Control Review Report lists specific items that must be recorded to document inspection activities. The accountability program specified, in part, that the following information be recorded in the inspection notes for each regular inspection.

The notes are to document all areas of the mine that are inspected.

The notes must document the inspector's review of company records at the mine, as well as the number or percentage of each type of record reviewed.

Pre-inspection conference discussions are to be summarized.

The notes are to document the inspector's reasons for evaluation of gravity and negligence for each citation or order issued.

The MSHA General Inspection Procedures Handbook (p. 21) also specifies that during each regular inspection the inspector shall check records that the company is required to maintain.

The Program Policy Manual (vol. I p. 17) requires that the inspectors' notes contain all facts relevant to the inspectors' "Significant and Substantial" (S&S) evaluations. Statement of Fact: With the exception of references to notekeeping in Metal's accountability program, at the time of the accident Metal had no written policies or procedures specific to notekeeping. Enforcement personnel exhibited familiarity with the accountability program requirements for documenting inspection activities.

The review team examined the inspectors' notes taken during the first three regular inspections in fiscal year 1993 and portions of the fourth inspection that occurred through August 10, 1993. This review disclosed the following deficiencies.

1. Some of the inspectors indicated during the internal review that they inspected numerous areas of the Magma Mine that were not documented in the inspection notes<sup>12</sup>.

2. The inspectors did not always document the factors considered in evaluating the degree of negligence associated with each violation. Factors such as how long the violation had existed and management's knowledge of the condition were not always documented.

3. Notes did not always specify the factors considered when making an S&S determination.

4. A summary of the discussions held during the pre-inspection conferences was not always included in the inspection notes.

5. Inspection notes did not reference the citation/order numbers for several violations cited during the second regular inspection in fiscal year 1993.

6. Inspectors did not always document their review of the records the mine operator is required to maintain. The inspection notes did not always specify the number or percentage of records reviewed.

During interviews, the inspectors stated they normally document in the inspection notes their review of the records operators are required to maintain. They further stated they identify the records they reviewed on the General Inspection Note Summary form. This form lists sixteen types of records the company is required to maintain and the inspectors submit these forms with each regular inspection report. The General Inspection Note Summary forms for the first three inspections of the Magma Mine in fiscal year 1993 indicated that the inspectors reviewed all sixteen records at the Magma Mine. A majority of the time, the inspectors did not document these reviews in the inspection notes. Additionally, inspectors stated they did not review workplace examination records in FY 1993 even though they indicated they conducted these reviews on the summary forms.

Table K shows the records the inspectors are required to review at the Magma Mine during each regular inspection and indicates whether these reviews were documented in the inspection notes.

<sup>&</sup>lt;sup>12</sup>This subject is discussed in more detail in this report under the section entitled "103(a) Mandatory Inspections."

Table K - Record Review Documentation   Magma Mine - First Three Regular Inspections - Fiscal Year 1993					
Yes signifies reviews documented in notes. No signifies the reviews were not documented.					
Company Records	1st Qtr	2nd Qtr	3rd Qtr		
Accident and Employment (Part 50)	No	No	Yes		
Training (Part 48)	Yes	Yes	Yes		
Electrical Resistance (§57.12028)	No	No	Yes		
Workplace Examinations (§57.18002)	No	No	No		
Equipment Defects (§57.14100)	No	Yes	Yes		
Emergency Medical Arrangements (§57.18014)	No	No	No		
Rock Bolt Tests (§57.3203)	No	Yes	No		
Escape and Evacuation plans/maps (§57.11053)	Yes	Yes	Yes		
Self-rescuer/Mine Emergency Training (§57.18028)	No	No	Yes		
Self-rescuer maintenance records (§57.15030)	No	No	Yes		
Mine Rescue (Part 49)	Yes	Yes	Yes		
Fan Maintenance (§57.8525)	No	No	No		
Wire Rope Examinations (§57.19023)	Yes	Yes	Yes		
Hoist Operator Physicals (§57.19057)	Yes	No	Yes		
Shaft Inspections (§57.19120)	No	No	No		
Hoist Equipment Maintenance (§57.19121)	Yes	Yes	Yes		

Although the inspectors did not document the review of all records in their inspection notes, they indicated that, with the exception of workplace examination records, all required records were reviewed.

In October 1992, MSHA established a task force comprised of representatives from both labor and management to develop improved inspection notetaking procedures. The task force developed revised notetaking procedures as well as new forms for documenting inspections and investigations. On November 17, 1993 the Administrator implemented the new inspection notetaking procedures and forms.

**Conclusion:** MSHA's notetaking procedures for Metal and Nonmetal enforcement personnel were too general and did not provide specific guidance as to what should be documented in inspection notes. There were many instances where the inspection notes did not contain all of the information required by MSHA policy and procedures.

There were discrepancies between inspection notes and the General Inspection Note Summary forms completed for inspections of the Magma Mine. The inspectors did not review the Magma Mine's workplace examination records in fiscal year 1993, while the General Inspection Note Summary forms for these inspections indicate the inspectors reviewed the workplace examination records.

**Corrective Action Taken:** The current notetaking procedures provide more specificity regarding the items to document in field notes. All Metal and Nonmetal enforcement personnel have been trained in these new notetaking procedures. The Phoenix field office inspectors received this training on October 4, 1993.

The District's General Inspection Note Summary form was replaced by an MSHA form (4000-49B) which is part of the new notetaking format. During refresher training on notetaking procedures in January 1994, the importance of accurate notetaking was stressed to enforcement personnel in the Phoenix field offices.

Recommendation: None.

# **Signature Page**

The Office of Program Policy Evaluation has completed its review of MSHA's actions at the Magma Mine and the findings of the review are included in this report.

**Teaste** 

Senior Program Analyst

Mattos Ja

Assistant District Manager

Program Analyst

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Michael E. Turner Mine Safety and Health Specialist

Sandra M. Wesdock Attorney Advisor

George M. Fesak

George M. Fesak Director, Office of Program Policy Evaluation

Approved by:

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J. Davitt McAteer Assistant Secretary for Mine Safety and Health

Date: <u>Ung. 10 1994</u>
## Appendices

#### **Appendix A - Persons Interviewed**

#### Rocky Mountain District Personnel<sup>13</sup>

Rodric M. Breland, District Manager

Jake H. DeHerrera, Assistant District Manager

Lawrence E. Nelson, Supervisory Mine Safety and Health Inspector

Clarence E. Ellis, Mine Safety and Health Inspector

David D. Estrada, Mine Safety and Health Inspector

James E. Eubanks, Mine Safety and Health Inspector

Pete P. Herrera, Mine Safety and Health Inspector

Andrew E. Lowe, Mine Safety and Health Inspector

Hilario Palacios, Mine Safety and Health Inspector

Juaquin G. Sepulveda, Mine Safety and Health Inspector

Stanley A. Waggoner, Education and Training Specialist

Robert Koenig, Mine Safety and Health Specialist

#### Other Metal District Personnel

Michael Music, Supervisory Mine Safety and Health Inspector

#### Headquarters Personnel

Patricia Silvey, Director, Office of Standards, Regulations and Variances

Richard Zeutenhorst, Deputy Director, Office of Standards, Regulations and Variances

Helen Caraway, Regulations, Policy and Review Specialist

<sup>&</sup>lt;sup>13</sup>The review team did not interview one of the Phoenix North inspectors. Mr. Benito Orozco was unavailable due to medical problems. Mr. Orozco conducted a portion of the first quarterly inspection of the Magma Mine in fiscal year 1993.

Douglas Altizer, Chief, Division of Policy and Program Coordination

Thomas MacLeod, Training Specialist, Office of Educational Policy and Development David Park, Chief, Safety Division, Metal and Nonmetal Mine Safety and Health

Margie Zalesak, Chief, Health Division, Metal and Nonmetal Mine Safety and Health

#### Appendix B - Chronology of August 1993 Inspection

A regular inspection of the Magma Mine was ongoing at the time of the accident. The following chronology, based on a review of inspection notes and interviews with the inspectors, covers the inspectors' activities at the mine between August 2 and August 10.

#### Monday, August 2

The primary inspector conducted a pre-inspection conference with mine management and reviewed various records the operator is required to maintain. The inspector asked to examine the register of independent contractors. The operator informed him that there was no register as there was only one contractor, Dynatec on mine property. The inspector issued a section 104(a) citation to the mine operator for failure to make a copy of an accident report available to MSHA, a violation of §50.40.

#### Tuesday, August 3

The primary inspector started the underground inspection while the other inspector started the inspection of the Magma Mill. The primary inspector examined portions of the surface areas and facilities then proceeded underground. The inspector travelled to the 2550 elevation and examined No. 3 Shaft and No. 5 Shaft then travelled to the 81 Winze on the 3000 Level. He returned to the 500 Level where he encountered an independent contractor, CDK Contracting Co. The inspector did not cite the operator for failure to maintain the register of independent contractors. The inspector issued two section 104(a) non-S&S citations to CDK Contracting Co. -- one for failure to ground a portable generator (§56.12025), the second for failure to provide a cover for a 110 volt receptacle (§56.12032).

#### Wednesday, August 4

The inspector examined production areas off the 3400 Level including the 3420 Stope, the Nos. 1 and 3 crosscuts and the associated ore passes (1-C and 6-C). He inspected the 3200 Level shaft station and hoist room and, on the 3500 Level, the No. 9 Shaft Station, battery charging station, electrical substation and the north country exploration drift. The inspector observed no violations that day. The second inspector completed his inspection of the mill on August 4.

#### Thursday, August 5

The second inspector joined the primary inspector in the underground inspection. The primary inspector examined the 3700 Level east and west belt conveyors, the battery charging station, load haul dump (LHD) repair shop, and diesel storage area. He examined the ramp between the 3700 Level and 3690 elevation and, on the 3690 elevation, the 7C ore pass, and all production stopes. He examined the ramp between the 3700 Level and 3733

elevation and the stopes at the 3733 elevation. He travelled the ramp from the 3733 elevation to the 3763 Level, where he examined the grizzly and dump station for the 865 ore pass. This was the inspector's first observation of the 865 raise.

The second inspector examined the 81 Winze ore pass and travelled to the 3465-C stope. He then continued to the 3600 Level loadout, inspecting the loadout area, the electrical substation, and the 3590-south crosscut. He examined the 3572-C stope after which he inspected the 3600 Level storage area, No. 2 crosscut, and the 3633 stope. He travelled the ramp from the 3600 Level to the 3700 Level and inspected the electrical substation, then rode the No. 9 Shaft cage to the 3600 Level, inspecting the No. 9 Shaft Station. Neither inspector observed any violations that day.

Friday August 6 - Sunday, August 8

No inspection activity.

Monday, August 9

The inspectors conducted a closeout conference for the Magma Mill inspection then continued the inspection of the Magma Mine by examining the hoisting facilities at the No. 3 shaft. There were no violations observed that day.

Tuesday, August 10

The primary inspector examined the 81 Winze hoisting facilities on the 3000 Level. He then returned to the surface and examined the muck and service hoist facilities at No. 9 Shaft. The second inspector examined the No. 9 Shaft stations on the 3900, 4000, and 4100 Levels. While examining the shaft station on the 3900 Level he also inspected the refuge chamber. The inspectors observed no violations. The inspectors left mine property at approximately 3:30 p.m. The accident occurred at 9:45 p.m. that night and the inspectors returned to the mine at 2:55 a.m.

## Appendix C - Magma Violations Cited - Regular Inspections

First Quarter Fiscal Year 1993

Section of 30 CFR	Remarks
41.13	Magma officials failed to notify MSHA of changes that had occurred in the Legal Identity Report within the required time.
57.4201(a)(1)	The tag on the fire extinguisher located at the No. 9 Shaft Syntron conveyor, 4100 Level, did not reflect a monthly inspection.
48.5(a) (vacated)	The General Manager had been employed at the Magma Mine for at least 6 months and had not received the required underground training.
57.6160(b)(3)	Deteriorated explosives were observed at the 4000 Level No. 9 entry drift.
57.4101	The portable diesel fuel and oil storage truck parked at the No. 9 Shaft, 3800 Level was not provided with a sign prohibiting smoking or open flames.
57.3200	Loose ground was observed at the air lock turn-out drift on the 3800 Level.
57.4104(a)	Hydraulic oil was permitted to accumulate on the floor of the tool room and outer area of the muck hoist.
57.11012	Openings on both sides of the shaker feeder for the west side Syntron belt conveyor located on the 3700 Level were not covered or provided with barriers to prevent a person from falling through the openings.
57.14107(a)	The V-belt drive and solid drive wheels of the west side Syntron belt conveyor on the 3700 Level were not guarded.
57.11012	Openings on both sides of the shaker feeder for the east side Syntron belt conveyor on the 3700 Level were not provided with covers or barriers to prevent a person from falling through openings.
57.14107(a)	The V-belt drive for the feeder shaker for the east side Syntron belt conveyor on the 3700 Level was not guarded.
57.16001	Timbers were stacked too high and too close to the track at the #8 crosscut on the 3500 Level.

57.4201(a)(1)	There was no record of monthly inspection for the fire extinguisher on
	the front end loader #6 observed operating on the 3000 Level.

- 57.20011 Signs prohibiting smoking and open flames were not posted at the 500 locomotive service shop where batteries were being stored.
- 57.14107(a) The chain and sprocket for the #3 hoist headframe was not guarded.
- 57.4100(b) A sign was not posted to warn persons that combustibles were stored in the No. 9 warehouse.

#### Second Quarter Fiscal Year 1993

#### Section of 30 CFR

Remarks

- 57.12032 (vacated) The cover for the 480-volt electrical box could not be kept in place. The box was located at the electrical panel on the 3000 Level substation by No. 9 Shaft.
- 57.12004 The insulation was broken on the power conductor providing power to the portable fan used in cooling the drive motor of the booster pump at #3 shaft on the 2800 Level.
- 57.12008 The 110-volt electrical conductor for the signal system on the 500 Level at the #5 shaft was pulled loose from the restraining clamp and bushing.
- 57.13021 A safety device (chain) was not provided to prevent whipping action in the event that the high pressure hose on the air saw that was being used on 3633 4 C stope was accidently uncoupled.
- 57.11012(vacated)<sup>14</sup> An opening on the Northeast side of the ore loading platform above the 500 Level was not provided with a barrier to prevent a person from falling through.
- 57.14107(a) The shaft coupling on the drive motor for the portable cement (vacated) hopper was not guarded. The hopper was observed at the portal entrance of the #5 shaft.

<sup>&</sup>lt;sup>14</sup>A section 104(b) order that was issued subsequently to the section 104(a) citation was also vacated.

56.14101(a)(3)	The parking brake on the 6000 series Chevrolet flat bed truck used for transporting explosives was not being maintained in a functional condition.
57.12025	A ground was not provided on the 110-volt electrical outlet for the toilet facility at the portal entrance to #5 shaft.
57.4201(a)(1)	There was no record of inspection for the fire extinguisher that was provided outside the old paint and oil storage building.
57.12025	A ground was not provided on the 110-volt electrical outlet located by the grease pit at the welding and repair shop.
57.16005	Several unsecured acetylene cylinders were observed at the warehouse storage area.
57.4201(a)(1)	There was no record of inspection for the fire extinguisher provided for the load, haul, dump, loader #511, parked by No. 9 Shaft.
56.14107	The V-belt drive and wheels of the transfer unit pump on the #2 air compressor were not guarded.
57.4201(a)(1)	The fire extinguisher located at the 3500 Level battery charging station had no record of inspection.
57.3203(a)(1) (vacated)	Tests were not conducted to show that rock bolting was effective in supporting ground at the second south vein, east and west headings.
57.16005	The acetylene and oxygen compressed gas cylinders in the underground shop lunch room on the 3700 Level were not secured.
57.4101	The portable diesel fuel and oil storage truck parked on the 3800 Level at No. 9 Shaft was not provided with a sign prohibiting smoking or open flames.
57.16005	The compressed gas cylinders at the No. 9 Shaft hoist station on the 4100 Level were not secured.
57.12032 (vacated)	The cover on the 110 volt junction box behind the hoist shaft on the 4100 Level was unsecured.
57.12032	The 110-volt electrical circuit at the terminal strip on the telephone signal horn had exposed conductors. The horn was located at the No. 9 Shaft sub-station on the 500 Level.

57.13021	Safety chains or whipchecks were not being used by employees operating a pneumatic drill at No. 9 Shaft Station on the 500 Level.	
57.13021	Safety chains or whipchecks were not being used by employees while operating a pneumatic chainsaw in the 3633 4C panel.	
57.4502(c)	Signs prohibiting smoking or open flames were not posted at the battery charging station at the No. 9 Shaft Station on the 3700 Level.	
57.4502(c)	Signs prohibiting smoking or open flames were not posted at the battery charging station at the No. 9 Shaft Station on the 3800 Level.	
	Third Quarter Fiscal Year 1993	
Section of 30 CFR	Remarks	
57.12034	Two 110-volt lights located in the work station in the compressor building were not guarded to protect a person from being shocked or burned.	
57.12018	The electrical circuit breakers in the warehouse were not labeled.	
57.12025	The electrical grounding prong was missing on the fan located in the welding area in the LHD underground shop on the 3700 Level.	
57.12034	The heating elements of the 220-volt electric heater in the car knocker shed on the 500 Level were not guarded.	
57.12025	A 110-volt electrical receptacle located at the car knocker shed in the 500 Level yard had an open grounding circuit.	
57.3200	Loose, unconsolidated material had not been removed from the ribs at the 3633 stope.	
57.3360	Ground supports used in the 41 and 45 North panels of the 3633 stope were not adequate.	
Fourth Quarter Fiscal Year 1993 through August 10		
Section of 30 CFR	Remarks	
50.40	The operator failed to submit a MSHA form 7000-1, accident and injury report for an accident that occurred on May 6, 1993.	

#### **Appendix D - Quality Control Review Form**

Accountability Program Quality Control Review Report	U.S. Department of Labo Mine Safety and Health A	dministration
	Metal & Nonmetal Regular Inspection	
Supervisor:	Date of Review:	
nspector/Specialist:	Mine Name:	
vent Number:	Mine I.D.:	
<ol> <li>Review of mine files, management reports, etc., prior to inspectio</li> </ol>	information system (MIS) reports, accident n (see Supervisor's Guide).	
a. Did field notes document the	review?	Yes No*
b. Was documentation specific to	what was reviewed?	Yes No*
comments:		·
2. Pre-Inspection conference and ins	pection participation.	
a. Was a pre-inspection conferen	ce conducted?	Yes No*
b. If conducted,		
1) Were participants, includi	ng miners representatives, documented?	Yes No *
2) Were conference discussion	s summarized?	Yes No *
c. Was a miners representative g	iven opportunity to accompany on	
inspection?	inspection?	
d. Were all accompanying partici	pants documented in field notes?	Yes No*
Comments:		
<ol> <li>Review of required records, maps, required to be posted on the mine</li> </ol>	plans, and logs as well as those items bulletin board (see Supervisor/s Guida)	
a. Did field notes document that	Facords plane mana lass and math	
were reviewed for compliance	as appropriate?	Yes No*
b. Did documentation include "ho	w many" were reviewed of each type	—
(training records, accident r	eports, etc.)?	Yes No*
Comments:		





Accountability Program Quality Control Review Report



BY SIGNING THIS FORM YOU ARE INDICATING THAT THIS QUALITY CONTROL REVIEW WAS PROPERLY CONDUCTED AND DOCUMENTED BY THE SUPERVISOR.

#### Appendix E - Metal and Nonmetal's Response

#### **U. S. Department of Labor**

Mine Safety and Health Administration 4015 Wilson Boulevard Arlington, Virginia 22203-1984



September 16, 1994

MEMORANDUM FOR J. DAVITT MCATEER

FROM:

VERNON R. GOMEZ Administrator for N. R. Some Metal and Nonmetal

SUBJECT: Metal and Nonmetal Mine Safety and Health Management Initiatives

This is in response to your August 10 memorandum concerning the recommendations of the Internal Review of MSHA's Actions at Magma Copper Company's Magma Mine. You requested that Metal and Nonmetal Mine Safety and Health develop a plan for the Rocky Mountain District and the National Office which would address the Review team's findings.

This memorandum broadly outlines initiatives which respond to those recommendations and which will help to improve compliance with health and safety standards, a goal central to the Agency's purpose of protecting the lives and well-being of miners. An attachment lists each of the Review team's recommendations, an action plan, and the status of each element of the plan. Because certain elements will require some time to implement, I will update you quarterly concerning their progress.

As noted in the Report of Internal Review, many issues identified by the Review Team have already been corrected by Metal and Nonmetal Mine Safety and Health and the Rocky Mountain District. This memorandum and its attachment include only the recommendations which were not fully resolved as of August 10.

Metal and Nonmetal examined its national program in light of the Report and formulated a broad-based course of corrective action. The objective of the plan is greater industry compliance with an attendant improvement in the safety and health protection afforded miners. To that end, we will re-educate field office supervisors in the full range of enforcement tools available. revise and clarify existing policies and procedures, and reassert our commitment to appropriate levels of enforcement. We will emphasize management oversight, establishing national monitoring and audit programs for internal evaluation, and provide forums for open dialogue with the mining industry. Following is a summary of Metal and Nonmetal's approach to achieving these objectives.

#### National Supervisor Conference

Managers, supervisors and inspectors will read the Internal Review Report as soon as it becomes available and discuss it in staff meetings. A National Supervisors' Conference scheduled for November will address each recommendation in the Report. The findings described in the Report will be assessed in relation to each field office.

The Conference will also provide classroom training for consistent enforcement, identification of recurring violations, matching the level of enforcement with the level of the compliance problem, and the historical relationship between firm enforcement and reduced injuries and illnesses. To continue this education process, supervisors will be trained annually thereafter in subjects selected by the District Managers Council.

#### Enforcement Information Coordinator

A collateral duty of Enforcement Coordinator will be established for Assistant District Managers in each District. The Coordinator will produce a quarterly report to the District Manager on enforcement trends in the District. This report will be organized by field office and include data on enforcement actions taken. The report will also include basic injury and illness experience, such as Non-Fatal Days Lost, for each field office. This data collection will be used to enhance our focus on compliance and injury trends and to measure our progress. The District Manager will report the information quarterly to the Administrator. A National Report will then be prepared for dissemination and to the field.

#### Enforcement Audit Teams

An Enforcement Audit Team, reporting to the Administrator, will be established to conduct inspections and help identify enforcement issues. This is a new approach which will give the Administrator's Office first hand knowledge of compliance in the field. As currently envisioned, the teams will be comprised of field enforcement representatives from each district. A coordinator function will be established as a collateral duty in headquarters. A copy of the results of an audit will be given to the Administrator with a copy also sent to the District Manager. Regular audits will identify potential enforcement weaknesses, produce prompt corrective action, and in the long term improve safety and health conditions for miners.

Changes to Policy and Proposals for the Regulatory Agenda Several significant policy revisions are being prepared which will clarify compliance obligations for mine operators and inspection responsibilities for enforcement personnel. These include the following:

<u>Examinations:</u> Policy and inspection procedures for all Metal and Nonmetal examination standards will be revised to specify the thoroughness and documentation required for each examination. Metal and Nonmetal enforcement staff will be further instructed to evaluate compliance with examination standards whenever safety and health violations are found where examinations are required. Violations of examination standards will be carefully considered for "significant and substantial" and unwarrantable failure determinations. These policies and instructions will enhance the effectiveness of all Metal and Nonmetal examination standards, including working place examinations which were a subject of the Report of Internal Review.

Notice of Major Construction: Pending future rulemaking, new policy will be issued requiring notification of the District Manager when underground construction or other undertaking is planned which will significantly change the mine ventilation system. As a result, these projects will be reviewed in the district office and, if necessary, additional inspection attention will be given to them.

<u>Health Sampling:</u> Specific inspection procedures will be issued detailing the types of contaminants, occupations, locations, and frequency of sampling that enforcement personnel will conduct. This revised inspection policy will increase the accountability of enforcement personnel, ensure better targeted health work, and improved compliance at the mines.

## Joint Health and Safety Conferences

Regional Industry-Labor-MSHA conferences will be conducted to reaffirm working relationships and ensure continuing open communication with the regulated community. These conferences will be forums for frank discussions of enforcement issues, communication of policy changes, and articulation of Agency expectations for compliance. The conferences will also present safety and health workshops on mine safety and health topics. Particular attention will be given to conducting conferences in locations which encourage participation by all members of the mining community, large and small operators, miners, and their representatives.

I believe Metal and Nonmetal Mine Safety and Health's response to the Internal Review Report's recommendations will augment our program and strengthen it for the future. As noted above, I will report to you periodically on the progress of these initiatives.

RECOMMENDATIONS	RESPONSE	STATUS
1) Administrator should re-enforce the need for all enforcement personnel to review mine files prior to inspections.	Interim: Managers instructed at 8/18/94 meeting to ensure all inspectors review mine files prior to inspection. Permanent: Procedure Instruction Letter (PIL) issued: all inspectors will review mine files prior to inspections.	Completed
2) Administrator should establish procedures which address how enforcement personnel conducting regular inspections should determine whether safe work procedures are followed during each portion of the mining cycle.	Interim: Managers instructed at 8/18/94 meeting to ensure inspectors observe all phases of mining cycle that occur during inspection. Permanent: PIL issued directing inspectors to observe all phases of mining cycle that occur during inspection.	Completed Completed
3) Administrator should take steps to require that when mine assignment are rotated, enforcement personnel exchange relevant information on the mines assigned to them.	Interim: 1) Managers instructed at 8/18/94 meeting to ensure inspectors exchange relevant mine information when assignments are rotated. Permanent: PIL issued directing inspectors to exchange relevant mine information when assignments are rotated. PIL outlined guidelines on types of information to be exchanged	Completed

	T	T
RECOMMENDATIONS	RESPONSE	STATUS
4) In order to make the most efficient use of personnel resources, the Rocky Mountain District Manager should instruct enforcement personnel that journeymen inspectors should not concurrently inspect the same areas of a mine.	<b>Permanent:</b> Managers instructed at 8/18/94 meeting to ensure inspectors do not concurrently inspector the same areas of a mine except when training or when a specialist is on-site for atypical problem.	Completed
5) The Administrator should take the action necessary to finalize the policy regarding health sampling procedures and train enforcement personnel in the new procedures.	<pre>Interim: Managers given draft of revised policy at 8/18/94 meeting. Permanent: 1) New policy finalized by 10/1. 2) Supervisors receive training at 11/94 meeting. Local training held.</pre>	Completed Scheduled 10/1/94 11/3/94
6) The Administrator should consider the need for requiring metal and nonmetal mine operators to obtain certifications by registered engineers of plans for major construction projects.	Interim: 1) Managers instructed at 8/18/94 meeting concerning draft policy change in re 57.8520. 2) Program Policy Letter (PPL) informing mine operators that a significant change to a mine	Completed
consider the need for mine operators to submit these plans to the appropriate district manager so a determination can be made as to whether additional inspection activity is necessary.	<pre>ventilation system is subject to district notification. 3) Letters from managers will be issued to inform operators that ventilation plans be submitted annually and when updated for review by the districts. Permanent: A regulation requiring certification</pre>	10/15/94 11/15/94
	of major construction projects by a registered, independent engineer and review by districts will be proposed for inclusion on MSHA's regulatory agenda.	Scheduled 01/95

RECOMMENDATIONS	RESPONSE	STATUS
8) The Administrator should consider providing specific guidance to enforcement personnel on the consideration of continued normal mining operations when evaluating the reasonable likelihood of illness or injury.	<b>Permanent:</b> MNM will implement a major enforcement initiative: National Supervisor's Conference Enforcement Information Coordinator Management Information Monitoring Enforcement Audit Team	Initiate 11/1-3/94
9) The Administrator should take measures to underscore the importance of exerting appropriate levels of enforcement at all mining operations with emphasis on the proper evaluation of S&S and the appropriate use of section 104(d) enforcement actions.	<b>Permanent:</b> MNM will implement a major enforcement initiative: National Supervisor's Conference Enforcement Information Coordinator Management Information Monitoring Enforcement Audit Team	Initiate 11/1-3/94
10) The Administrator should instruct enforcement personnel to determine compliance with 57.3401 when they encounter inadequate ground control.	Interim: Managers instructed at 8/18/94 meeting to ensure inspectors issue citations for failure to conduct adequate examinations. Permanent: PIL will be issued directing inspectors to ensure all examinations and inspections are adequate and appropriate citations are issued.	Completed 10/15/94
11) The Administrator should revoke the policy which allows operators to make annual certifications that working place examinations have been conducted and inform enforcement personnel that a certification is required for each examination.	<b>Permanent:</b> PPL will be issued notifying operators of requirements for record of each examination. PIL will be issued concerning examinations.	10/15/94 10/15/94

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RECOMMENDATIONS	RESPONSE	STATUS
12) The Administrator should emphasize that enforcement personnel shall review certifications of work place examinations during each regular inspection.	Interim: Managers instructed 8/18/94 meeting to ensure inspectors review certifications of work place examinations during each regular inspection. Permanent: PIL will be issued concerning examinations.	Completed 10/15/94
13) The Administrator should consider revising the policy which prohibits enforcement personnel from challenging the operators' judgement when designating "competent persons."	Interim: Managers instructed at 8/18/94 meeting to ensure inspectors determine if persons conducting work place examinations are qualified. Permanent: PPL will be issued concerning competence of examiners.	Completed
14) The Administrator should consider requiring that only certified persons perform working place examinations.	<b>Permanent:</b> A regulation requiring certification of persons who conduct examinations will be proposed for inclusion on MSHA's regulatory agenda.	Scheduled 01/95
15) The Administrator should clarify the scope of the application of 57.6302(b).	<b>Permanent:</b> The standard has been submitted to the Explosives Standards Development Committee for possible revision of this standard.	Proposed Rule 11/94
16) The Rocky Mountain District Manager should follow-up on the effectiveness of the actions taken to address the deficiencies identified in the District's Accountability Program.	<b>Permanent:</b> Rocky Mountain District will report follow-up on Accountability Program to the Administrator.	Scheduled 01/01/95

# Report of Technical Investigation Underground Metal Mine Fatal Fall of Materials Accident



U. S. Department o<sup>5</sup> Labor Robert B. Reich Secretary

Mine Safety and Health Administration J. Davitt McAteer Assistant Secretary

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United States Department of Labor Mine Safety and Health Administration Metal and Nonmetal Mine Safety and Health

### TECHNICAL INVESTIGATION REPORT UNDERGROUND METAL MINE

### FATAL FALL OF MATERIALS ACCIDENT

Mine ID 02-00152 Magma Mine Magma Copper Company Superior, Pinal County, Arizona

August 10, 1993

Originating Office Mine Safety and Health Administration 4015 Wilson Boulevard Arlington, Virginia 22203

Kenneth T. Howard Director, Office of Technical Support

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Mining Engineer Principal Investigator

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Jerry Davidson Geologist

Sidney L. Hansen, P.E.

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ames

James Warren Andrews, P.E. Mining Engineer

JoAnn V. Gutierrez Secretarial Assistant

Reviewed and Approved By:

John J. Mulhern Assistant Director for Safety

May 6, 1994

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#### INTRODUCTION

As a result of a multiple fatality accident at the Magma Mine (ID No. 02-00152), Magma Copper Company, Superior, Arizona, the Mine Safety and Health Administration's, Denver Safety and Health Technology Center's, Ground Support Division (GSD), was requested to evaluate the design, construction, maintenance and geologic environment of the 865 Raise at the Magma mine. This report is the engineering and geologic investigation of that accident.

The 865 Raise is a two compartment timber-framework constructed to transfer broken ore (muck) between the 3636 level and the 4000 level of the Magma Mine. One compartment is a 6 ft x 8 ft ore pass compartment, the other is a 6 ft x 6 ft manway compartment which served both as a secondary escapeway off the 4000 level and as a ventilation conduit.

The raise is entirely within a sequence of horizontally layered (bedded), dacite, volcaniclastic rocks which are characterized as hard, competent rocks. This layered, dactite rock mass is geologically termed a "graben" or down-thrown fault block.

The construction of the Raise began on March 31, 1993. Portions of the raise were in service at the time of the August 10, 1993, multi-fatility accident.

#### **A. MINE HISTORY**

The Magma Mine, an underground multi-level copper mine, is owned and operated by Magma Copper Company, Superior Mining Division. The mine is located at Superior, Pinal County, about 70 miles east of Phoenix, Arizona. At the time of the accident, it employed approximately 360 miners and worked three 8-hour shifts per day, 7 days a week.

The mine has five working shafts. Shaft Nos. 3, 5, and 9 are the main intake shafts, while Nos. 4 and 6 are the exhaust shafts. The No. 9 shaft is located approximately 8 miles east of the town of Superior, Arizona, and is designated as the mine's main service shaft and primary escapeway.

The mine opened in the early 1900's and operated continuously until 1982. The mine was in a stand-by mode between 1982 and 1985. In 1985 the operation was closed and the mine was allowed to flood.

In 1988 Magma decided to reopen the mine. The No. 3 shaft, the No. 5 shaft, and the No. 9 shaft were rehabilitated. The No. 9 shaft extends to the skip loading pocket at the 4100 level.

After rehabilitation, production began using the underhand cut-and-fill method of mining. Decline and incline ramps for trackless haulage were constructed to the stoping areas. The primary mining area was between the 3400 level and the 3700 level. The 3800 level is presently the main haulage level. These areas had been developed prior to the 1982 production shutdown.

#### **B. MINING METHOD**

Magma's limestone replacement ore bodies are currently being mined by an underhand cut-and-fill

mining method refered to by Magma miners as slice- or drift-and-fill mining. In this method a horizontal 10-ft by 10-ft heading is driven across the width of a designated panel. After the panel is mined, Dywidag rock bolts with a bearing plate and a nut attached at the top are placed on a 3-ft by 3-ft pattern into short floor-holes in the drift to act as reinforcing rods for the sandfill. When mining the cut underneath, wire mesh is attached on the bottom end of the bolts.

After mining, the cut drift is backfilled with a hydraulic slurry, about 70-percent solids, consisting of a cementatious mill sand. This mill sand is a very fine sand and is mixed with cement in 10 : 1 to 25 : 1 ratios. Parallel drifts are mined to complete a sublevel to the ore body limit.

Successive sublevels, slices of ore, are taken from the top of the ore body downward toward the bottom. Each successive sublevel is offset toward the dip of the limestone beds.

The drifts and ramps developed outside the replacement ore bodies in the dacite graben are supported by 5-ft Split Sets, bearing plates and wire mesh. In large intersections, 10-ft-long Dywidag resin-anchored rock bolts are installed as additional "secondary ground support". Secondary ground support is the support added by miners to control unstable ground. Secondary support includes rock bolts, timbers, wire mesh, steel beams, etc. This supplements the primary support provided by the opening and pillar configuration determined in the original mine design.

Track haulage drifts are located on 400-ft intervals, the 3600 level and the 4000 level. Trackless Load-Haul-Dump (LHD) equipment moves mined ore from the stopes to the dump stations of ore transfer raises.

This report summarizes the technical aspects of the Mine Safety and Health Administration's investigation of the accident. The report evaluates the structural design of the timber framework, the blocking and backfilling procedures, and the operational practices as they were reported. Due to the inaccessibility of the actual failure location, video camera reconnaissance was used to gain after-accident information at the actual failure location. Independent engineering testing laboratories were used to determine engineering parameters for timber, soil, sand and rock characterization. The analysis of this information was used to determine the sequence of events, and the probable cause of the catastrophic failure of the 865 Raise.

The technical investigators reviewed the engineering design, construction and attempted repairs to the 865 Raise. They reviewed all engineering aspects of the 865 Raise to determine whether current, prudent engineering practice was demonstrated. This current, prudent engineering practice would be the application of the principles of mathematics, chemistry, physics and other engineering sciences to the design and construction of structures useful to man. In this application intense training in the engineering sciences is mandatory, expanded by experience and practice of these disciplines which always reflect prudent judgement to safeguard the safety, health and welfare of the public.

#### **MAGMA'S 865 RAISE**

The 865 Raise, a two-compartment, framed-timber structure was designed as a ground support structure to protect the ore pass and manway. It was designed for adverse ground conditions described as "swelling ground". "Swelling ground" is defined as a rock mass that contains large amounts of clay minerals that deform readily. This type of ground will squeeze excavated openings closed unless appropriate ground support is installed.

The 865 Raise design utilized experience gained primarily from Magma's attempt at boring the 895 Raise and driving an access drift on the 4000 level (Figure 1). Construction of the 895 Raise was initiated in early 1992 by the American Mine Services Company. This raise was to be an 8ft-diameter raise bored from the 3700 level to the 4000 level in close proximity to the No. 9 shaft. A pilot hole was drilled from the 3700 level to the 4000 level. Then an 8-ft-diameter reamer bit was attached at the 4000 raise station and back-reaming begun. At approximately 96 feet above the 4000 level the reamed hole began to cave. Magma officials determined that adverse conditions, described as "bad and running ground", had been encountered. After unsuccessfully trying to free the reamer, a drift (reamer recovery drift) had to be



Figure 1

driven off the 4000 level to intersect and recover the reamer bit. Based on this unsuccessful experience and two previously encountered adverse ground locations on the 4000 level, it was determined that ground conditions would not allow for a bored raise to be established from this level (Refer to Appendix A, 4000 level)

Magma therefore designed a new transfer raise to provide ore handling capability from the ore extraction stopes to the 4000 level track haulage station. Magma also included a manway in this transfer raise to provide a secondary escapeway off the 4000 level and to improve ventilation. Ore would be dumped into this raise at three locations, the 3763 level, 3700 level and the 3636 level. The ore would then be loaded into rail cars using a Syntron vibratory feeder at the 4000 level loading station and hauled to the skip loading pocket at the No. 9 shaft.

To develop the 865 Raise, Magma formed the 865 Raise project team. It was comprised of Magma personnel with varied expierences. Team representatives were drawn from the mines operating groups and were expierienced in engineering, mine construction, production and material handling. The 865 Raise project team provided Magma with the final design and construction drawings for the 865 Raise.

This ground support, manway and ore transfer structure was designed as a series of framed timber sets, each set consisting of six 10-in.-square posts, two 10-in.-square divider plates, two pairs of 10-in.-square end plates and two pairs of two-piece 10-in.-square wall plates. (Figure 2)





The ore pass compartment was constructed with armored 6-in. by 8-in. timber cribs inserted between the flanges of 8-in. by 3-in. steel channels welded together and nailed to the vertical posts. These cribbing timbers were not fastened in place, but instead were stacked one on top of another between the steel channel sections nailed to the posts. This concept was called the "bird cage" by Magma. Ladder landings were installed in the manway compartment at each set adjacent to an open timber slide. Three-in. by 12-in. lagging was installed between the posts and the rock excavation to enclose the other three sides of the manway compartment. (Refer to Appendix B) II - 2

The raise consists of 45 timber sets on 7-ft-4-in. centers numbered from the bottom up. The manway compartment terminates just above the 3700 level. *Each set of wall plates was designated as a "ring."* (Dynatec's designation) Rings 1 and 2 are concreted in place just above the 4000 level Syntron feeder loading station and act as the *only* "bearing sets" for the entire raise structure. *"Bearing sets" are periodic side wall anchorages for a shaft framework (timber or steel) created by using long cross timbers or beams as bearers anchored at their ends into hitches in the wall rock.* Cable bolt slings were used as tie backs at the 3763 and 3700 dump points. These are *not* structurally equivalent to bearing sets because they have little load bearing capability.

Dynatec Mining Corporation began construction of the 865 Raise on March 31, 1993. Dynatec was to provide the labor only for the Magma-designed raise. Magma furnished the design and construction drawings, specifications and all materials. Materials (timber, wedges, "bird cages" and armored cribs) provided by Magma were pre-fabricated by other contractors to Magma specifications. The design drawings are indexed in Appendix C.

During contract negotiations, Dynatec proposed the installation of six intermediate bearing sets. However no intermediate bearing sets were installed in the 865 Raise.

Raise excavation was initiated using split, partial face, blasting. This blasting method was used to advance the raise to Ring 11. Above Ring 11 full face blasting was used because by then Dynatec's experience had shown that ground conditions would allow full face advance and the ore pass could accommodate a full round of blasted rock. The advancing face generally was 2-ft to 4-ft above the top of the set being installed.

Alignment of the raise was controlled by following an inclined borehole, pilot hole, drilled in two increments, first from the 3700 to the 4000 level and later from the 3636 to the 3700 level. This pilot hole was the only control used to provide alignment for the raise.

Blocking and backfilling with blasted rock was used at each set intersection (ring). The installation of the blocking and blasted rock was intended to prevent the posts from being displaced outward and to keep the rings tight. The number of blocks used was dependent upon blasting overbreak.

Construction of the raise continued without incident through April, May and June 1993. Magma crews drifted into the 3763 dump point area and installed the 3763 grizzly and four sets. Dynatec came up from underneath and met the 3763 sets at Ring 28. A short transition set is located between Rings 29 and 28 accounting for some misalignment between the "drift" sets and the "raise" sets.

On June 25 Dynatec turned over the 865 Raise to Magma (with the exception of punch list items) from the Syntron feeder to the 3763 intermediate dump site. Magma began using the raise a few days after receiving it from Dynatec. Broken rock was first pulled from the raise on "C" shift, June 28, 1993, when 23 rail carloads were withdrawn. As each succeeding section of raise was completed, it was turned over to Magma, and Dynatec worked the next section above as well as the remaining punch list items. The final section of the raise, 3700 to 3636 levels, was turned over to Magma on August 9, 1993.

Significant events concerning the use and deterioration of the raise during July and prior to August 10, 1993, are summarized below. More detailed information can be found in Appendix D.

- > There were at least 10 hang-up events.
- > There were at least 20 blasting events.
- > The raise was pulled to empty at least 10 times.

As evident from the above, hang-up blasting in the raise and pulling the raise empty were common occurrences.

On July 29, 1993, (Thursday) 30 to 50 LHD buckets of wet, cemented sand fill were dumped into the raise. From the frequency of hang-up blasting on July 30 and 31, and August 2 and 3, 1993, this cemented sand fill set in the raise, causing a constriction which induced hang-ups. As determined from reported blasting locations, this cemented sand bank started at approximately Ring 8 and ran up to about Ring 12. Shift reports for "B" shift on August 2 and 3, 1993, and "A" shift on August 3 indicate that the raise was blasted repeatedly on these shifts. A divider wall plate, was pushed 1 1/2 in. into the manway on July 30, 1993, as a result of blasting. On "B" shift, August 3, 1993, a divider wall plate was broken at Ring 8. Two armored cribs were also knocked out at this location and muck spilled into the manway and filled several landings. Split blocking was also observed at Ring 8 behind the divider wall.

On August 4, 1993, Dynatec and Magma representatives made a joint inspection of the raise. Settlement of 8 to 10 inches was recorded at the manway/ore pass divider wall. Separation of the hanging wall/end wall cribs was also noted. Broken rock was in the manway and two pieces of armored cribbing were on the landing at Ring 20.

Raise deterioration and settlement were observed from Ring 24 down. Ladders were separated, landings were out of level, back lagging was canted, wall plate/post separation had occurred, and the timber slide was bowed.

On August 5, 1993, two Magma representatives inspected the 865 Raise from the 3763 and from the 4000 level. As a result of this inspection, the deterioration of the raise was addressed with repairs being ordered in a memorandum from Matt Kannegaard, Magma's Project Coordinator, (Appendix E) to Dynatec. It directed Dynatec to: (1) Remove sandfill banks in the muck compartment; (2) Clean down the manway; (3) Install spreaders (cleats) under all short wall plate; ... (5) Stabilize the broken divider at Ring 8; ... (8) Shotcrete the hanging wall plates at Rings 20 and 21; and (9) Close the open windows in the cribbing at Rings 8 and 21.

The raise was shut down for repairs from August 5 to 9, 1993. Most repair items were accomplished by Dynatec during this time period, and the raise was turned back over to Magma representative Don Graham on August 9, 1993. Magma began using the raise at that time, and reinitiated blasting on "B" shift on August 10, 1993.

Interviews indicated that Magma was dumping muck from all three dump levels on "B" shift, August 10, 1993. A hang-up had occurred near Ring 11 and blasting was being conducted to free the hang-up. Dynatec employees were working at Rings 12 and 13 early in the shift. However Dynatec's lead miner pulled the Dynatec crew out of the 865 Raise about mid-shift to perform other duties. The accident occurred at approximately 9:45 p.m., August 10, 1993.

Post-accident investigations were conducted inside the manway compartment of the 865 Raise by MSHA representatives on August 23, 1993; December 15, 1993; January 7, 1994 and February 12, 1994. Photographic records of observations were made and are located in Appendices F and L of this report.

Inspections of the raise above the 3763 dump point confirmed that:

- Settlement of the divider wall/hanging wall column had occurred.
- Hanging wall post rotation had occurred between Rings 18 and 23.
- Divider wall/hanging wall separation was apparent at many locations.
- The divider wall plate tenon was cracked at Ring 19.
- Divider wall/hanging wall posts were displaced toward the manway at the top of the post at many locations.
- Posts were cracked longitudinally.
- Hanging wall plates were cracked both in the manway and orepass compartments.
- Orepass hanging wall cribs had separated from the bird cage at Ring 20.
- Voids existed between the framework and the rock wall indicating non-uniform backfill placement.
- Posts had moved out of their daps.
- Five hanging wall cribs had fallen out of the bird cage at Ring 17.

Inspection of the raise above the 3763 dump point confirmed that:

- Overall deterioration was less severe, but apparent.
- Voids existed between the framework and the rock wall.
- Blocking deficiencies were apparent (Appendix F).
- At many locations, bird cage crib lap was inadequate. (Appendix M).

- Posts were moving out of their daps.

During raise recovery efforts conducted by Magma (February 10 through 15, 1993) on the 4000 level, 22 armored cribs from failed divider wall panels were recovered. Chamfering, feathering and other markings on two of these cribs indicated that they had been forced out of their bird cages by pressure applied from the ore pass side and rotated around the footwall post. Photographs taken of debris at Ring 17 confirms this type of divider wall failure.

Muck recovered from 4000 level clean-up operations and that remaining in the ore pass and manway compartments confirm that, assuming a hang-up at Ring 11, the ore pass was full to approximately Ring 41 at the time of the accident.
#### MAGMA MINE GEOLOGY

# The 865 Raise was driven through a layered, volcaniclastic graben. This graben is defined within the Magma mine by the North Boundary Fault and the South Boundary Fault. These faults are normal faults and are indicative of destressed or tensile stress conditions. (Figure 6)

This dacite, volcaniclastic rock is of Tertiary Miocene Age and is approximately 300 million years younger than the ore bearing Mississippian limestones juxtaposed adjacent to the graben. Observations of this rock in the raise excavation, in dump points and access drifts in the vicinity of the 865 Raise indicate that it is a strong, competent rock which does not exhibit a swelling, or squeezing, ground characteristic. Additionally raise excavation was accomplished without the installation of rock bolts, matts, or wire fabric and only routinely installed ground support was required in drifts and ramps in the vicinity of the raise.

#### A. STRATIGPHIC ORDER

Mining was first done in the steeply dipping vein structures of the Magma mine's main ore bodies. These ore bodies were emplaced in fracture zones along major faults in the Upper Precambrian Apache Group of rocks as veins and in a Paleozoic sequence of sedimentary rocks as manto replacement ore deposits in limestone beds. Underlying all of these formations is the Lower Precambrian Pinal Schist. The Pinal Schist is about 2500 million years old (m.y.) and is the oldest formation outcropping in this area of Arizona. The Paleozoic units consist of a Cambrian quartzite formation (500 m.y.), the Devonian Martin Limestone (360 m.y.), the Mississippian Escabrosa Limestone (330 m.y.) and the Pennsylvanian Naco Limestone (290 m.y.).

Upper Precambrian formations dip about 45 degrees toward the east. The Paleozoic formations of limestone beds dip about 30 degrees toward the east. These formations were faulted and tilted during the Laramide orogeny of Late Cretaceous time and into early Tertiary time. This wide-spread crustal deformation continued through much of the Tertiary Period of Cenozoic time (63 m.y.) when several episodes of silicic or granitic intrusions were emplaced.

It was during this period of intrusive activity that Magma ore bodies were thought to have been emplaced. Later, during middle Miocene Tertiary time (20 m.y.), volcanic activity began with local rhyolitic lava flows. This local volcanic activity was immediately followed by voluminous and widespread deposition of dacitic debris and volcanic ash.

#### **B. DACITE ROCK MASS**

These beds of dacite debris dip eastward about 15 to 25 degrees. This angular difference, from 15 degrees to 25 degrees, indicates the geological formations of the Magma mining area began to be tilted before the dacite was erupted and continued to be tilted after the dacite was deposited. This angular difference between upper Precambrian rock, Paleozoic rocks and the Cenozoic (Tertiary) rocks indicates that, while many episodes of regional uplift and subsidence have occurred in this area, the net geological dip since Precambrian time has continuously been toward the east-north-east.

The 865 Raise was driven up through a formation essentially consisting of a sequence of layered or bedded dacite, volcaniclastic rock. These rocks, while originally of volcanic origin, were very rapidly eroded and redeposited by sedimentary processes and are therefore considered to be sedimentary beds.

A Denver Technical Support Center chemist analyzed a dacite hand sample consisting mostly of this matrix material by x-ray diffraction. A large amount of amorphous material was found to exist, as should be expected in a volcanic ash.

The individual dacite layers may be locally characterized:

(a) by grain-size gradation from the bottom of an individual bed to the top of that bed.

(b) by large size variations of volcanic rock fragments (clasts) occurring within a finegrained to amorphous matrix of volcanic ash (a conglomerate).

(c) by the occurrence of hardened lens-like surfaces or partings occurring along bedding planes. Some of these hardened layers or surfaces may be local layers of welded tuff.

This cohesive rock mass can be characterized as a well-indurated, (hardened) structurally competent rock formation with no swelling ground characteristic. Both large hand-size rock samples and rocks in the rib walls emit a solid ringing sound when struck with a hammer.

#### C. NORTH BOUNDARY FAULT - SOUTH BOUNDARY FAULT

At the 865 Raise location, this dacite volcaniclastic formation occurs as a graben geostructural down-thrown block (graben) between two nearly parallel major geologic structures, the North Boundary Fault and the South Boundary Fault. (Figure 3)



The North Boundary Fault strikes east-northeast with a very steep south-southeast dip at current mining levels. This fault is located about 50 feet north of the 865 Raise station on the 4000 level and about 150 feet north at the 3763 dump. A tail drift was driven northward from the 865 Raise station reportedly through this fault on the 4000 level. Only routinely installed secondary ground support (Split Sets and wire mesh) was necessary for rock reinforcement in this area. No additional secondary ground support was necessary to stabilize the ground in these access drifts. However, mine personnel stated some areas required timber support where access drifts from the stoping areas in manto replacement stopes encountered this fault zone when driven to the dump stations at 865 Raise location in the dacite graben.

A second fault, the South Boundary Fault, reported by the mine operator to be only recently found, is located along the south side of this dacite graben. These two subparallel faults separate this barren, post-mineral Tertiary Miocene volcanic dacite (20 m.y.) from the Mississippian Escabrosa Limestone (330 m.y.). This limestone formation is the major host rock for the manto limestone replacement ore bodies currently being mined from C, D and E beds. Considerable manto replacement ore was formerly mined from upper and lower beds in the Devonian Martin Limestone Formation.

The dacite volcaniclastic is a strong, competent rock as indicated by the low level of secondary ground support required to stabilize the ground both in the access drifts and in the raise itself. There is no swelling ground condition surrounding the 865 Raise, and only a few tight, interlocked fractures were actually encountered as this raise was driven. Also, the rock mass around access drifts and ramps driven adjacent to the 865 Raise excavation do not exhibit swelling ground characteristics, nor is the installed ground support indicative of this type of ground.

This entire mining area appears to be geologically destressed because the faults identified are (extension-type) normal faults rather than reverse or thrust faults. Normal faults indicate tensile stress conditions, not compressive stress conditions. The development of a major graben where a large structural block of an overlying younger formation gravitationally subsides between two parallel faults and becomes juxtapositioned alongside older formations is also an indication of a destressed or a tensile stress condition predominates for that region.

The Pilot Hole Log (Figure 4) presents a brief summary of the comments on ground characteristics believed, to exist by Magma prior to driving the 865 Raise. Magma stated this belief of rock characteristics in the 865 Raise vicinity was based on the drillers's log of the pilot hole. The descriptions of ground characteristics are quite subjective as several sections are described as "broken ground", "soft ground", soft and broken" etc. Because no drill core was taken, there was no way to make an objective evaluation of rock quality. The fact that the raise was driven without supplemental support (bolts, straps, wire mesh, etc.) and that after Ring 11, full face excavation was used, indicates that this drillers log was not an accurate description of "in situ" ground characteristics.





III-4

The design of this two-compartment, timber raise was not in accordance with current, prudent, engineering practice. The raise design was based on a flawed, inadequate analysis of the geologic environment in which it was built. Additionally, no structural engineering analysis was preformed, generally accepted engineering procedures were not followed, and no modification of the design was made to adapt to the actual mining conditions encountered.

#### **A. FRAMEWORK**

The framework of the timbered raise is comprised of 10-in. by 10-in. wood posts, wall plates, end plates and a divider wall plate. These 10-in. by 10-in. framework members carry or transfer all loads (live loads, dead loads, and external ground stresses) imposed on the structure. These members are the structural or load bearing members of the framework. (Figure 2)

The 6-in. by 8-in. armored cribs, a wood crib with angle iron wear plate attached, contain the broken ore within the framework. Any load imposed upon them is transferred through the channel steel bird cage to the load bearing members of the framework.

#### **B. JOINTS**

The joints where the 10-in. x 10-in. members connect to one another are friction joints(Figure 5). These joints are formed by daps and tenons with the tenon lapping over or laying onto daps or notches cut into other structural members. (Figure 5) At no location does the design of the framework include any mechanical fasteners (lag bolts, plates, angle clips, tension rods, drift pins, etc.) to assist in developing the load transferring capability of the joint and therefore the structural integrity of the framework. Without some mechanical means of holding the joints together, the entire structure becomes totally dependent upon an external means of preventing individual joint separation caused either by the structure's own dead weight or live loads created when the ore pass compartment is being used to transfer "muck". "Muck" is any combination of broken ore, waste rock, or excess sand fill which is being transported through the orepass.



IV - 1

The primary method Magma used to prevent individual joint separation was the installation of external "squeeze" type blocking at each joint. This installed blocking was critical to the integrity and safety of the raise structure. A secondary method used was the random placement of broken, blasted rock backfill between the timber framework and the rock excavation.

#### C. BIRD CAGE

The armored crib timbers were inserted into the bird cage channel with only 2 inches of lap provided under ideal design conditions. (Figure 6) Considering that the crib timbers would tend to slide toward the downhill (footwall) side of the raise, and that some variation in rough timber construction "cuts" will occur, this design lap did not afford an adequate margin of safety. Under "worst case" conditions, only 1 3/8-inches of combined outward movement of the posts could release one or more crib timbers from the bird cage allowing material from the ore pass compartment to enter the manway. Prevention of outward movement or "spreading" of the bird cage posts was **critical** to the safe operation of the framework.



#### **D. UNBALANCED DESIGN**

The 865 Raise framework design failed to consider the unbalanced load between the two compartments. Loading of the manway compartment of the raise framework is limited to the weight of the timber framework, landings, ladders and the periodic travel of miners and work crews. Loading on the ore pass compartment is, however, considerably greater when the weight of the armoring steel attached to the 6-in. by 8-in. cribbing and the bird cage channel is added. In

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addition, the occurrence of a hang-up of broken rock in the ore pass compartment can impose tremendous loads on the already heavily loaded ore pass compartment. The filling and emptying of the ore pass compartment and the location of a hang-up changes the live load characteristics appreciably. This unbalanced loading causes a hinge effect at the divider wall joints of the structure, causing stretching and separation of the divider wall joints both downward and outward (toward the hanging wall and foot wall). The lack of *bearing sets* at intervals within the framework allows the effects of the unbalanced loading to become cumulative and causes more severe joint deterioration and separation in the lower sections of the framework.

"Bearing sets" are periodic side wall anchorages for a shaft framework (timber or steel) createdby using long cross timbers or beams as bearers anchored at their ends into hitches in the wallrock and placed under wall plates. By choosing the location of these bearing sets, the designer can insure that the weight of the structure is distributed in such a manner that allowable design stresses within the framework are never exceeded.

The design made no provision for controlling and distributing the "dead load" or the weight of the framework itself. Prudent engineering practice would have included consideration and evaluation of the weight of the materials being used in any type of structural framework. When the weight (dead load) of the structure exceeds the allowable design stress for the material being used, provisions should be made to distribute these loads to prevent the structure from failing from its own weight. In mining excavations where wood or steel frameworks are installed (raises, winzes, shafts) the commonly accepted method for transferring the "dead load" of the structure from the framework to the surrounding rock excavation is by installations of "bearing sets."

The structure at the Magma mine was a raise with a length of 364 feet, constructed of wood and steel. The weight of the structure alone required the use of bearing sets. Additionally the live load effects of muck in the ore pass compartment required a design of steel beams or cemented segments or rings at regular intervals to accomodate the combined dead load-live load on the structure.

#### **E. BLOCKING**

The blocking used for the 865 Raise was intended to ensure the integrity of the structure by transmitting compressive forces from the swelling ground to hold the framework together. The blocking in the 865 Raise was inadequate to maintain the alignment of the timbered framework in the actual geologic conditions of the raise.

Blocking is used in a timbered shaft, raise, or winze to rigidly brace and maintain alignment of the structural timbers. There is no difference whether the opening is vertical or inclined except that a shift in loading occurs onto the downward or footwall side in an inclined opening.

A timber structure used in a shaft or raise is basically a square set with vertical posts, horizontal wall plates and dividers. Blocking in timbered raises is used to prevent horizontal movement of the wall plates and to keep the posts in line. These blocks are positioned at the ends of the wall plates, overlapping the ends of the upper and lower posts. Blocking thus applies and absorbs load primarily in the plane of the wall plates. Any ability to resist vertical loads depends on the frictional forces between the blocking and the timber structure. The orientation of the grain of the

blocking affects the ability of the wood to resist the load applied to the structure. As wood is several times stronger, and thus stiffer, with load applied parallel to the grain as compared to load applied perpendicular to the grain, it makes a significant difference in the blocking ability to withstand the load whether the blocking was with grain parallel to the plates or perpendicular to the plates. (Figure 7)



Figure 7

The more pieces of wood used in any one set of blocking, the more susceptible the unit is to dislodgement and failure by any movement or settlement of the raise framework. The only initial load that can be applied to tighten the blocking is by wooden wedges. Since these were made of soft pine, they have limited ability to tighten the blocking.

Unless the ground is swelling uniformly around a structure, the effects of drying of the timber, vibration and impact loads can be expected to reduce the horizontal constraining effect imposed by the blocking. Even in actively swelling ground the direction of forces is rarely uniform and can distort the structure.

At Magma the blocking behind the structural timber joints was photographed at Ring 34, Ring 37, Ring 38, and Ring 41 where access was obtained through the manway lagging. Appendix F describes these Photos.

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#### F. BACKFILL

Backfill is broken rock that was blasted in driving the raise, placed and sized as it was blasted free between the timbered structure and the rock wall of the raise. It did not provide sufficient stability for the timbered framework so that it could withstand the constant battering from the falling muck.

Placement of backfill in the area between the wall rock of the raise and the timber framework was intended to compress and stabilize the structure. However, the stability effect of any backfill depends on the particle size distribution and placement of the backfill. The material used around the 865 Raise was poorly sorted and contained chunks that could damage or dislodge blocking during placement. Voids were created when material did not flow around obstructions such as blocking and large rocks wedged between the framework and raise sides. It was randomly and non-uniformly placed, and contained voids. Even with this blasted rock backfill, the framework members were able to move outward. Magma's designed backfill was not a non-yielding, non-engineered medium that could resist the outward forces created by the muck moving through the ore pass.

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#### STRUCTURAL ENGINEERING ANALYSIS OF MAGMA'S 865 RAISE

This engineering analysis of the structural design of Magma's 865 Raise focuses on the raise structure at Ring No. 1 and above, and does not consider the steel structure on the 4000 level. The timber framework was designed without intermediate bearing sets which allowed the cumulative weight of the structure and its loads to be applied to the lower rings. In failing to perform routine engineering calculations, Magma designers were ignorant of the excessive loading and the over-stressed condition of some critical structural members.

The 865 Raise was evaluated by static analysis techniques and subjected to two types of loading: dead load and live loads. The dead load is the weight of the structure on itself. Live loads are produced by the mined rock or "muck" in the orepass side of the raise. Two types of live loading were considered for analysis. These include the usual free-flowing condition, where the axial weight component (parallel to centerline) of the muck rests on the bearing structure below; and the hung condition, where the weight component of the muck is transferred downward from the hang-up point through the posts and joints of the framework.

Engineering design for projects the size of the 865 Raise are routinely undertaken by developing preliminary designs based on liberal or advantageous (best case) assumptions of engineering properties for the materials intended for use. After comparisons of alternate preliminary options, decisions on size, construction materials, etc., are made and final decisions are developed based on the designer's judgement. The analysis contained in this report is based on a best-case condition and uses liberal or nearly perfect values for wood properties to emphasize the fact that even the most cursory evaluation of the structure would indicate its inherent inadequacy. An experienced designer would decrease the strength values used in the analysis to compensate for (for example) moisture conditions in the mine and fabrication errors.

The methodology for this analysis includes certain assumptions. These are: 1.) The properties for the strongest species of Douglas fir were chosen and were assumed to be select, flawless and dried. 2.) Although tolerances allow actual timber dimensions, width and depth, to be less than specified on the drawings, this design analysis considered that exact cuts were made. 3.) Average load-produced stresses (lb/in<sup>2</sup>) were used to evaluate design stress at sections. 4.) Pinned-frame static analysis methods were used to determine forces. 5.) Blocking between the framework and the wall rock was considered to act as frictionless rockers so that only forces normal to the wall rock resulted. This method is routinely

used for analyzing civil structures. The frictional component of the blocking was therefore considered negligible.

The mechanics of the outward movement, or spreading, of the posts at the divider wall, were studied. It was assumed that the spreading released the divider wall cribs allowing rock to fall into the manway. The mechanics of this failure were investigated analytically for three possibilities.

1) The cribbing wall failed in shear.

2) The wall blocking crushed and allowed the divider wall posts to move outward.

3) The joints in the structure were crushed which weakened the framework and allowed settlement.

#### A. Structural Elements of the Raise

The 865 Raise is a two-compartment, square-set-type raise, which consisted of a manway and an armored-crib orepass. The term "raise" is used to describe the sequence of excavation and construction. The raise was developed from the 4000 level, where a steel structure was built to support a Syntron vibratory feeder for loading rail cars. Figure 8 shows a side view of the 865 Raise. The long axis of the raise is tilted at approximately 10 degrees from vertical toward the footwall. This inclination was to facilitate the flow of muck which tended to hang-up in this mine's orepasses with regularity.

The first "ring" of 10-in.-square timber plates was built about 30 ft. above the 4000 level floor (scaled from company drawings). Ring No. 1 was built as a bearing set hitched into the wall rock (hanging wall and footwall) and cemented in place. Sets were constructed sequentially upward as part of the development cycle. Figure 9 is a front view of the raise looking toward the footwall and shows the raise intersecting the 3763 and 3700 levels.

#### **1. Timber Framework**

The timber framework was built from 10-in.-square Douglas fir, "rough-cut" lumber, which was cut to size prior to its arrival at the mine site. The wood used for analysis was Interior West species of Douglas fir and was used for all timber construction except blocking wedges.

The framework was a modified square-set where the inside manway dimensions produced a square opening (6-ft by 6-ft), but the inside orepass dimensions produced a rectangular (6-ft by 8-ft) opening. Figure 10 shows a top view of the timber frame at a ring section of a typical set. Sections A, B, and C are also shown. Section A is the left side of the manway; section B contains the critical divider wall; section C is the right side of the orepass.

The center-to-center spacing (along the long axis of the raise) between sets was indicated in Magma's drawings as 7 ft 4 in. and is shown in the orthographic view, figure 11. Figures 12 and 13 were provided to facilitate understanding of the square-set timber cuts. "Daps" (removed wood) are typically sawn 1 in. deep in the divider- and wall-plate timbers to counter-sink the posts. Daps on the opposite side are sawn 5-in. deep to fit the 4-in. tenons and leave a 1-in. counter-sink for the adjoining post.

#### 2. Timber Properties

Timber strength properties in the elastic range were estimated using ASTM (American Society of Testing Materials) Designation: D2555-69. These values are best-case values and are generally not used for final design because they are limiting values at failure and therefore include no factors of safety. These ASTM values do not consider the intended end-use of the timber, and are for clear (free of defects) wood strengths. The values are readily available and give designers a preliminary estimate for maximum limits. For actual civil engineering design, the strength values would be lowered based on the designer's judgement of the end use conditions. The species chosen for analysis was dry, Interior West Douglas fir. The following theoretical failure strengths

for wood properties were used for this analysis:

Compression Strength Parallel to Grain = 7,434 psi

Compression Strength Perpendicular to Grain = 761 psi

Shear Strength = 1,292 psi

Modulus of Elasticity = 1.831x(10)psi

The specific weight was taken as an average for wood between 12% and 20% moisture content and was therefore determined to be 34 pcf.

#### 3. Cribbing Wall / Bird Cage Construction

The orepass compartment was formed by four cribbing walls, which were constructed with 6-in. by 8-in., Douglas fir cribbing timbers. One of these walls separated the ore compartment from the manway. The cribbing timbers were not fastened in place, but instead were stacked; one on top of another between channel steel birdcages. A top view of the divider wall, between rings, is provided as figure 14. The armor, 4-in. by 6-in. angle iron, 3/8-in. thick, on the cribbing was attached prior to transporting the materials underground. This armoring was added to provide longevity to the orepass and provided no structural support. The design does not allow the armoring to lap into the channel members of the bird cage, and therefore does not resist shear at these points.

#### **B.** Dead Load Analysis

Dead load is the gravity load on the structure due to its own weight. Volumes and weights of wood used in the 865 Raise were determined from Magma's drawing No. 55-1-33 B, Rev. 10. The weight per set of the timber frame was determined to be 2,149 lb. The weights of the other wood members including cribbing, ladders, lagging, landings, and other such miscellaneous items, was 4,320 lb. The total wood weight per set totaled 6,469 lb. (excluding wall blocking).

Each bird cage was made from two 8-in. x 3-in. (1/2-in. flange, 3/8-in. web) steel channels, welded together along a common corner. This analysis did not deduct weight due to the slots cut at the tops of the bird cages to assemble the cribbing walls. However, the weight of the air and water pipes, nails, dust boards, ventilation duct, and welding bead was not added which more than compensates for the slots. The total weight of steel channels per set was found to be 935 lb.

The steel angles used for armoring the cribs were 4-in. x 6-in. x 3/8-in. (part RA-1,2 in the Magma drawings). The weight per set for the steel angles was 3,198 lb. The total weight of steel per set, including channels and armoring, was therefore 4,133 lb. This is a conservative estimate, because video tapes revealed that the 10-in. by 10-in. wall plates and end plate timbers in the orepass were also armored. This additional weight was not included in this analysis.

The total weight for the wood and steel per set was calculated as 10,602 lb.

#### **1. Dead Load Distribution**

The effective distribution of the structure's weight on the posts of each section was used for determining dead loading. Pinned-frame, static analysis was used which resulted in section A (left-side posts of manway) acting independently from section C (right-side posts of orepass). However, section B, the center divider posts, shared a portion of the manway dead loads and a portion of the orepass dead loads. Moments were used to determine the total dead loads at the sections. The axial (10 degrees from vertical) dead load was proportioned as 15.7% to section A, 46.4% to section B, and 37.9% to section C. The posts take about the same load whether they are at the hanging wall or footwall side of the section for a given set. The greatest amount of dead load is imparted on the center section where the divider wall failed. Sections A and C are not critical for the suspected mode of failure and were not detailed in this analysis.

For the 45-ring, two-compartment raise, the dead load stress on posts at section B, near Ring No. 1 was 1,066 psi. Although shear and parallel-to-grain compression strengths were not exceeded by this axial stress, the perpendicular-to-grain strength was exceeded. Crushing of the tenons in the center joints would occur. The significance of this crushing is that the divider timber is weak-ened and settlement occurs. Figure 15 shows the axial dead load on the critical section B structural members. Note that cross-grain crushing would have occurred from Rings 1 through 13.

In this analysis, a 100-sq.-in. area was used for stress calculations for each post. However the tenons of the wall plate timbers at the center joint do not touch. A one-in. gap is therefore formed which leaves the effective area smaller and allows a greater stress concentration on the weakened member of the joint, the tenon.

The compressional lateral load on the blocking from the structure's weight (dead load) was not excessive.

#### **C.** Live Loads Analysis

Live load analysis includes the forces resulting from muck in the orepass which are superimposed on the dead loads already carried by the framework. To analyze the stresses caused by live loading, a broken ore density of 160 pcf was used and a hang-up was placed at Ring 10 with the orepass filled to Ring 29.

#### **1. Uniform Weight Distribution**

With a tilted raise, a portion of the live load (resolved into normal and axial components) acts on the footwall only. This weight is uniformly distributed along the footwall blocking for sections B and C. The blocking along section A is not directly effected by the weight of broken ore.

#### 2. Side-Pressures from Muck

The horizontal pressure acting on the sides of the orepass is related to the angle of internal friction (i) of the broken ore according to:

$$p = (160 \text{ pcf})(h)(1 - \sin i)$$
  
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The angle of internal friction can be estimated using the natural angle of repose. The angle of repose was measured at the mine property and found to be about 42 degrees. This would yield a horizontal-to-vertical pressure ratio of 1/3.

Side-pressures are related to vertical pressures according to Poisson's ratio. This relationship is as follows:

$$p = (v)/(1-v)(160)h$$

where, p = horizontal pressure, psf,

h = vertical depth of muck, ft.,

v = Poisson's ratio for the muck,

and 160 = the unit weight of broken muck,  $lb/ft^3$ .

Poisson's ratio is a characteristic of a specific material. For example, Poisson's ratio for liquids is 1/2, which causes pressure to be hydrostatic, horizontal is equal to vertical pressure (160 x h) at a given depth. Hydrostatic-like conditions can occur as material is drawn from the bottom of material bins and silos, analogous to muck moving down the orepass as the feeder is withdrawing material.

For this analysis, the horizontal pressure was chosen to be 1/2 times the vertical pressure because evaluations of the muck samples closely resembles silty sand, with rock fragments added. Therefore a dense sand having an average Poisson's ratio of 1/3 was considered applicable. This determination somewhat underestimates the side-pressures caused by the muck when movement occurs or when the moisture content of the broken rock is high. For this analysis the side-pressures generated from a given depth of broken ore in the orepass is a non-uniform, normal (perpendicular to the long axis of the raise) load that increases linearly with depth.

Figure 16 is a schematic representation of the reactions from the wall rock, hanging wall and footwall, on the blocking due to the three following factors:

1. Uniform weight distribution from the dead load of the structure along the entire length of the footwall contact;

2. Uniform weight distribution from the muck along the footwall from the top of the broken ore, Ring 29, to the hang-up point at Ring 10;

3. Non-uniform, linearly increasing distribution of side-pressures from the broken ore, along both the footwall and hanging wall, from the top of the broken ore to the hang-up point.

#### 3. Wall Blocking

The maximum effective contact area at each framework blocking point used in this analysis was 170 sq. in.

#### 4. Axial Component of Weight

For the free-flowing condition (no hang-up), the posts were only subjected to the dead load of the structure. However, when the material in the orepass is hung, the weight of the muck (axial component) is transferred through the posts and joints from the location of the hang-up downward through the remainder of the raise. In the hung condition, this live load weight is superimposed with the dead load onto posts and joints in section B that were already damaged from the weight of the structure itself. This further crushes and weakens the tenons in the divider timber at section B.

#### 5. Divider Cribbing Shear

Cribbing timber composing the divider wall at section B was analyzed for shear stress against the flanges of the channels. The shear stress is imposed by side-pressures from the muck in the orepass. The analysis indicated that the cribbing could withstand the side-pressures when the orepass was filled to the 3600 level. The analysis assumed a Poisson's ratio of 1/3. Cribbing failure in shear did not occur.

#### 6. Loads from a Hang-Up

Hang-ups in the orepass were common occurrences. To determine the effects on the framework, a hang-up was placed in the orepass at Ring 10 and muck was assumed to fill the orepass to Ring 29. Figure 17 illustrates the results. Wall blocking would be crushed along section B from Rings 10 through 21. The cross-grain strength of the divider and wall plate tenons was exceeded along section B from Rings 1 through 13.

The 865 Raise was not designed to withstand its own weight without failure of some of its structural members. The weight of the timber and steel used in construction of the structure produced a dead load that caused crushing of the tenons of the center divider joints from Rings 1 through 13.

Under a simulated live load condition, with a hang-up at Ring 10 and with muck in the orepass to Ring 29, side-pressures would cause cross-grain crushing of wall blocking along the orepass/ manway divider wall, from Ring 10 through 21, allowing outward flexure of the wall constraints. The hang-up would have also severely damaged the tenons of the center dividers from Ring 1 through 13, allowing settling of the framework. Settlement of the raise causes the blocking to become dislodged and can then no longer provide support to the structure. Differential settling (the divider section B settles more than the manway section A) causes the daps to become ineffective at restraining the posts. This releases the posts from the daps and allows them to move into the manway when subjected to side-pressures (live loads) from the orepass.

The most probable area of divider wall failure was where the load effects are combined at Ring 10, 11, 12 and 13. Had Magma designers performed proper engineering calcutions they would have realized that the framework would fail.



FIGURE 9. - FRONT VIEW (LOOKING TOWARD FOOTWALL)

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### FIGURE 10. – TIMBER FRAME, TOP VIEW AFTER MAGMA DRAWING 53–1–33B REV. 10



FIGURE 11.- TIMBER FRAME, ORTHOGRAPHIC VIEW AFTER MAGMA DRAWING 53-1-33B REV. 10



FIGURE 12.- CORNER JOINT, EXPLODED VIEW



FIGURE 13.- CENTER JOINT, EXPLODED VIEW



FIGURE 14.- BIRD CAGE AND DIVIDER WALL



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FIGURE 16. – UNIFORM AND NON-UNIFORM LATERAL LOADS REACTION ON BLOCKING, SECTION B



FIGURE 17.- EFFECTS OF LIVE AND DEAD LOADS ALONG SECTION B

\* NOTE: CROSS-GRAIN STRENGTH IS 761 PSI

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#### SUMMARY OF TECHNICAL INVESTIGATION

Magma designed the 865 Raise without mechanical connectors to ensure the structural integrity of the framework. The design of the 865 Raise was typical for ground conditions best described as swelling or squeezing where the surrounding ground would envelop the exterior walls thereby squeezing the timber framework together. The lack of drill cores, or any in-place evaluation of ground conditions as the raise was constructed resulted in a Magma design which was inadequate for the actual geologic conditions encountered.

Compounding this design error was the absence of bearing sets. A prudent designer would have placed bearing sets at intervals within the raise to transfer the weight of the structure to the solid rock walls. The lack of bearing sets allowed the strength of load bearing members to be exceeded, causing crushing and cracking of the wall plates. The resulting settlement dislodged the blocking and caused distortion and separation of the timber framework.

The bird cage design, without the use of mechanical fasteners to ensure crib-cage integrity, is a poor engineering design, compounded by the fact that it was inappropriate for the existing mine geology and rock characteristics.

The blocking and backfill design was inadequate for the loading placed on the structure.

The attempt at stabilizing the structure (cleats nailed to the underside of the wall plates shotcreting, and angle iron extensions) did not address the cause of the problem, settlement of the structure. It therefore proved to be ineffective.

Blasting too close to the framework contributed to the rapid failure of the raise. Additionally, the practice of pulling the raise dry and blasting high hangups added impact loads to the framework and accelerated its failure.

Magma's design, construction, and attempted repairs of the 865 Raise at the Magma mine did not demonstrate the application of current, prudent, engineering judgement.

#### FINDINGS

I. The design of the 865 Raise was apparently intended for ground conditions best described as "swelling", or "squeezing", ground. This design flaw was not corrected during excavation and construction. The design of the raise, therefore, was not consistent with the ground conditions actually encountered.

II. The North Boundary Fault, the major geologic structure in the vicinity of the 865 Raise, was not a factor in the failure of the Raise.

III. Stope mining in the vicinity of the 865 Raise was not a factor in the failure of the timber framework. The nearest stoping activity to the raise at the time of the accident was approximately 150 feet away and about 80 feet above that portion of framework that failed, too far away to generate any significant failure forces.

IV. The absence of bearing sets installed at regular intervals in raise to systematically distribute the structural weight (dead load) and muck transfer (live) loads to the wall rock of the raise allowed: (a) the development of differential vertical settlement of the timber framework; and (b) crushing and bending failure of structural members in the rings in the lower sets of the raise.

V. Settlement, resulting from crushing of framework members, allowed downward movement of the divider wall column and dislocation of the blocking.

VI. Deterioration of the blocking by crushing and dislocation reduced or destroyed the blocking's ability to keep the framework posts in place and allowed outward movement (spreading) of the posts, thereby releasing the bird cage cribbing.

VII. Steel channel bird cages available for inspection exhibited no tearing, warping, bending or weld failure; therefore, the structural strength of the bird cages was not a factor in the failure of the raise.

VIII. No tensile connectors or mechanical fasteners were installed in the raise to insure joint integrity and dimensional alignment of the framework.

IX. Alignment and dimensional integrity of the framework were critical to maintain the minimal tolerances required to keep the cribbing intact within the bird cage. Magma's design did not provide an adequate means of insuring the required dimensional integrity, and relied solely on the external blocking and the assumption of swelling ground.

X. The unbalanced design of this two compartment raise and the designers' omission of a means of accommodating the obvious greater loading of the orepass compartment with respect to the manway compartment allowed a predictable differential settlement, resulting in separation of the divider wall joints.

XI. The "bird cage" design without the use of mechanical (tensile) fasteners or a positive, nonyielding confining medium (e.g. cemented sandfill) is an unsafe design. Wood blocking and blasted rock backfill did not provide an adequate external constraint to maintain and ensure the close tolerances required to keep the "bird cage" cribbing in place. XII. The types of repairs to the framework observed in the various examinations of the raise confirmed that Magma realized: that settlement had occurred, that structural joint integrity was being compromised and that framework separation was occurring. The repairs (3 in. x 6 in. wood cleats nailed to short wall plates) were inadequate and failed to address the root cause (settlement) of the structural deterioration.

XIII. No evidence of engineering calculations analyzing the effects of loadings on the structural framework of the 865 Raise were produced by Magma.

XIV. The "trigger" which initiated the catastrophic failure of the 865 Raise was the sudden release of a large, high hangup which produced impact loading on the already deteriorating timber framework.

XV. The practice of repeatedly pulling the ore pass dry and then dumping more rock into the empty ore pass caused repeated impact loading of the end wall, hanging wall, and divider wall sides of the ore pass. This cyclic loading accelerated the deterioration of the blocking on both the hanging wall and foot wall sides of the orepass by crushing and dislodging the soft pine wedges.

XVI. Structural engineering calculations by MSHA indicate that:

- The 865 Raise was not designed to withstand its own weight without failure of some of its structural members. The weight of the structure produced a dead load that caused crushing of the tenons of the center divider joints from Rings 1 through 13.

- Under hang-up conditions (live loading) cross-grain crushing of wall blocking and crushing of wall plate tenons would occur. The most probable area of divider wall failure would be where these effects are combined or at Rings 10, 11, 12 and 13 if a hang-up is placed at Ring 10.

XVII. Evidence collected during this investigation indicated that pressure exerted on the divider wall panels from the ore pass side caused spreading of the deteriorated framework and post rotation, which released the armored cribbing.

#### CONCLUSIONS

I. The design and installation of the 865 Raise demonstrates a disregard for the application of mining and civil engineering analysis involving those design principles and practices consistent with maintaining a safe workplace for miners traveling within a structure of this size. Engineering calculations investigating dead and live loadings intended for this structure clearly indicate that the structure, as designed, was not able to withstand its own weight and would suffer severe structural damage when subjected to the anticipated live loading.

II. The repairs attempted by Magma after settlement was recognized did not address the root cause of the deterioration, settlement. Continued settlement of the structure and distortion of the sets weakened the divider wall between the orepass and manway compartments. Sections of this divider wall failed when a quantity of hung material was released and impacted the deteriorated area. The impact destroyed several sections of the divider wall and allowed broken rock to enter the manway at an uncontrolled, catastrophic rate.

#### MAGMA COPPER COMPANY SUPERIOR MINING DIVISION

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#### **865 RAISE DRAWINGS**

#	DWG #	DESCRIPTION	REV
0	COVER	3D VIEW OF 865 RAISE WITH ELEVATIONS	0
1	53-1-41	865 - EXCAVATION ADVANCE UPDATE	2
2	53-1-29	4000 LEVEL HAULAGE TRACK GENERAL ARRANGEMENT	0
3	53-1-31	865 OREPASS LOADING STATION EXCAVATION	1
4	53-1-32	865 OREPASS GRIZZLY TYPICAL	B
5	53-1-33B	865 OREPASS TIMBER ARRANGEMENT	10
6	53-1-34	865 O.P. AND LOADING STATION GENERAL ARRANGEMENT	0
7	53-1-35	865 OREPASS INTERMEDIATE DUMP GENERAL ARRANGEMENT	0
8.	53-1-36	865 LOADING STATION STEEL ASSEMBLY	0
9	53-1-40	865 LADDER DETAIL	2
10	53-4-45	GRIZZLY STEEL - 865 OREPASS	G
11	53-4-46	GRIZZLY STEEL - 865 OREPASS	C
12	53-4-47	856 OREPASS BORE STATION STEEL SETS - 3633	C
13	53-4-47A	865 OREPASS LOADING STATION EXPLODED 3D CHUTE	<b>A</b>
14	53-4-47B	865 OREPASS LOADING STATION EXPLODED STEEL SETS	<b>A</b>
15	53-4-47C	865 OREPASS LOADING STATION EXPLODED STEEL SETS	<b>A</b>
. 16	53-4-48	865 OREPASS LOADING STATION LOWER CHUTE DOOR DETAIL	E
17	53-4-49	865 OREPASS LOADING STATION CHUTE SUPPORT BEAMS	E
18	53-4-50	865 O.P. LOADING STATION CHUTE PANEL & WEAR PLATE DETAIL	E
19	53-4-51	865 OREPASS LOADING STATION SIDE ASSEMBLY DIAGRAM	B
20	53-4-52	865 OREPASS LOADING STATION CHUTE BASKET	E
21	53-4-53	865 LOADING STATION CAP DETAILS FOR STEEL (1 OF 2)	E
22	53-4-53	865 LOADING STATION CAP DETAILS FOR STEEL (2 OF 2)	B
23	53-4-54	865 LOADING STATION PILLAR DETAILS	E
24	53-4-60	865 OREPASS TIMBER DETAIL - 10" x 10"	2
25	53-4-61	865 OREPASS BIRDCAGE DETAIL	1
26	53-4-64	865 STEEL BEAMS DETAIL	A
27	53-4-67	865 OREPASS ADDED BEAM TOP FLOOR	D
28	53-4-68	865 OREPASS ANGLE IRON DETAIL	2
29	53-4-69	865 OREPASS RAISE STATION MINIMUM EXCAVATION	0
30	53-4-70	865 OREPASS CRIB RAISE 3600-3636 SILL	0
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31	53-4-71	865 OREPASS CHUTE AND BASKET ASSEMBLY DRAWING	A
32	53-4-72	865 OREPASS CHUTE STEEL ASSEMBLY DRAWING	A
33	53-4-73	865 OREPASS CHUTE STEEL ASSEMBLY DRAWING	A

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#### 865 Raise Chronology

 $\bullet_{1,2} = \{1, 2, \dots, n\}$ 

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#### A = Day Shift (7:00AM - 3:00PM)

**\***"Cars Pulled" from Support Tech reports

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 $(A_{ij})_{ij} = (A_{ij})_{ij} = (A_{ij})_{ij$ 

B = Night Shift (3:00PM-11:00PM) C = Graveyard Shift (11:00PM-7:00AM)

DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
6/25/93 <sup>1</sup>	Raise not in service.	Raise not in service.	Documentation not requested.
6/26/93	Raise not in service.	Raise not in service.	Documentation not requested.
6/27/93 <sup>2</sup>	Crew Off	Worked at location other than 865 raise. *No cars pulled "C" Shift	Documentation not requested.
6/28/93	Worked at location other than 865 raise. *No cars pulled "B" Shift	Pad 1 broke - went to 3800 Level. *Pulled 23 cars "C" Shift	<b><u>DAY</u></b> - Bulkhead at 3763 Level and install timber slide. <u>NIGHT</u> - Drill, blast and clean manway.

<sup>1</sup> Mark Spaulding trains McConnel on Syntron feeder procedures.

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<sup>2</sup> The raise becomes operational on "C" shift but ore is not pulled until June 28.

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Appendix D

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
6/29/93 <sup>3</sup>	Worked at location other than 865 raise. *No cars pulled	Off track - hit and repaired slime line. *No cars pulled	Worked at location above 3763 Level.
6/30/93	Worked at location other than 865 raise.	Timber in chute - cars ran good.	Worked at location above 3763 Level.
	*No cars pulled	*Pulled 44 cars	
	"B" Shift	"C" Shift	
7/1/93	Worked at location other than 865 raise.	Timber hang-up in 865 chute. "Popped" three times - took three hours to get timber down. <sup>4</sup>	Worked at location above 3763 Level.
		*Pulled 18 cars.	
	"B" Shift	<u>"C" Shift - 5th Shift</u>	

<sup>3</sup> McConnel trains Allison on Syntron feeder operating procedures.

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Appendix D

<sup>&</sup>lt;sup>4</sup> Between July 1 and August 3, Spaulding and\or Dalton assisted McConnel\Allison in blasting timber and rock hang-ups at the Syntron feeder. Documentation is not available as to the exact date.

May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/2/93	Worked at location other than 865 raise.		Worked at location above 3763 Level.
	<u>"B" Shift - 5th Shift</u>	Crew Off	
7/3/93	Crew Off	Crew Off	Crew Off
7/4/93	Holiday	Holiday	Holiday
7/5/93	Worked at location other than 865 raise.	Three hang-ups - two were "popped" with one still in door. Lots of timber and boulders to clean out.	<u>DAY</u> - Worked at 1C Ore Pass.
			<u>NIGHT</u> - Worked at 1C Ore Pass.
		*Pulled 20 cars.	
	"B" Shift	"C" Shift	
7/6/93	Worked at location other than 865 raise.	Chute hang-up - picked out "BO" timber. Derailed three times.	Worked at location above 3763 Level.
	"B" Shift	"C" Shift	
7/7/93	Worked at location other than 865 raise.	Having trouble with latch on Syntron chute door.	Worked at location above 3763 Level.
		*Pulled 40 cars.	
	"B" Shift	"C" Shift	

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## APPENDICES

A. MAGMA MINE, 4000 LEVEL HAULAGE

**B. COMPUTER GRAPHICS OF 865 RAISE (2 pages)** 

C. INDEX OF 865 RAISE DRAWINGS

**D. 865 RAISE CHRONOLOGY** 

E. 865 RAISE REPAIR MEMORANDUM OF AUG. 5, 1993

F. EVALUATION OF 865 RAISE BLOCKING (inc. 8 pages of photos)

G. KNOTT LABORATORY'S LETTER OF JANUARY 20, 1994, and PHOTOS OF WOOD TESTING RESULTS (2 pages)

**H. SOIL TESTING RESULTS** 

I. SUMMARY OF CRIB/BIRD CAGE CHANNEL LAP MEASUREMENTS

J. ARTIST'S CONCEPTION OF FATAL ACCIDENT OF AUGUST 10, 1993

K. INVESTIGATORS' CONCEPTION OF 865 RAISE FAILURE (FIGURES 1 - 8)

L. PHOTOGRAPHIC RECONAISSANCE OF 865 RAISE (26 pages)







# Computer Graphic of 865 Raise as Constructed

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Appendix B Page 2 of 2

May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/8/93	Worked at location other than 865 raise.	Had trouble with Syntron chute door not closing - blasted two times. *Pulled 65 cars.	Worked at location above 3763 Level.
	"B" Shift	"C" Shift	
7/9/93	Worked at location other than 865 raise.	Miscellaneous work around raise - cleaned up "BO" timber. *Pulled 48 cars.	Worked at location above 3763 Level.
	<u>"B" Shift - 5th Shift</u>	<u>"C" Shift - 5th Shift</u>	
7/10/93	Crew Off	Crew Off	Worked at location above 3763 Level.
7/11/93	Miscellaneous work around the raise. *Pulled 34 cars.		Worked at location above 3763 Level.
	"C" Shift	Crew Off	

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May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/12/93	Pulled raise empty - blasted 4100 Level transfer (pocket) raise.	Worked at location other than 865 raise.	Worked at location above 3763 Level.
	*Pulled 62 cars.	·	
	"C" Shift	"A" Shift	
7/13/93	Pulled raise empty - went to 4100 transfer (pocket) raise.	Worked at location other than 865 raise.	Worked at location above 3763 Level.
	*Pulled 82 cars.		
	"C" Shift	"A" Shift	
7/14/93	Pulled raise empty then miscellaneous duties.	Worked at location other than 865 raise.	Worked at 3700 Level grizzly area.
•	*Pulled 32 cars.		
	"C" Shift	"A" Shift	
7/15/93	Transfer pocket at 4100 Level is full.	Worked at location other than 865 raise.	Worked at location above 3763 Level.
	*Pulled 44 cars.		
	<u>"C" Shift - 5th Shift</u>	"A" Shift	

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May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/16/93	Crew Off	Hand mucked under raise chute - waiting for partner. *Pulled 44 cars. "A" Shift - 5th Shift	Worked at location above 3763 Level.
7/17/93	Crew Off <sup>5</sup>	Crew Off <sup>6</sup>	Worked at location above 3763 Level.
7/18/93	Pulled raise empty. *Pulled 18 cars. "C" Shift	Crew Off	Worked at location above 3763 Level.
7/19/93	Miscellaneous work around 4000 Level. *Pulled 72 cars.	Worked at location other than 865 raise.	Worked at location above 3763 Level.
	"C" Shift	"A" Shift	

<sup>5</sup> Even though crew is off, Edwards comes to the mine for a meeting.

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<sup>6</sup> Even though crew is off, Dahlstrand comes to the mine for a meeting.

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/20/93	Pulled raise empty. *Pulled 87 cars. "C" Shift	Repaired 3 SD cars. No other work performed on 4000 Level. "A" Shift	Form grizzly and concrete on 3700 Level.
7/21/93	Pulled raise empty. *Pulled 51 cars. "C" Shift	Worked at location other than 865 raise. "A" Shift	Worked at location above 3763 Level.
7/22/937	Pulled raise empty then crew went to 3600 Level. *Pulled 40 cars. <u>"C" Shift - 5th shift</u>	Worked at location other than 865 raise. "A" Shift	Worked at location above 3763 Level.
7/23/93	Edwards Off - No crew activity recorded on 4000 Level.	Miscellaneous duties on 4000 Level. <u>"A" Shift - 5th Shift</u>	Drill and install 3700 Level bulkhead, ladders - blast and stand set.
7/24/93	Crew Off	Crew Off	Level and grade 4000 Level track.

7 3700 Level dump site is completed.

May 3, 1994

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	LDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/25/93	Edwards Off - No crew activity recorded on 4000 Level.	Crew Off	Crib, drill and repairs on 3763 Level.
7/26/93	Edwards Off - No crew activity recorded on 4000 Level.	Miscellaneous work around the raise. Cover timber slide - rocks falling. *Pulled 68 cars. "B" Shift	Worked at location above 3763 Level.
7/27/93	Worked at location other than 865 raise.	Miscellaneous work around the raise. Raise still has muck. *Pulled 112 cars.	Worked at location above 3763 Level.

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May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/28/93	Worked at location other than 865 raise.	Two ore cars full of water and muck. Crew closes manway for one hour due to water coming down chute and manway. Raise is emptied at 8 p.m. and crew went to another level for the rest of the shift. *Pulled 80 cars.	Worked at location above 3763 Level.
	"A" Shift	"B" Shift	
7/29/93 <sup>8</sup>	Worked at location other than 865 raise.	Hand mucked around chute - raise is empty.	Install grizzly on 3700 Level. <sup>9</sup>
		*Pulled 14 cars.	
	"A" Shift	"B" Shift	

<sup>8</sup> Team Leader Graham's report shows LHD Operator Purcella dumping 30-50 buckets of sandfill into the 865 Raise from 16 panel 3733 extension stope.

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<sup>9</sup> Dump was ready to use from this date.

DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
7/30/93	Worked at location other than 865 raise.	Raise hung-up - "popped" three times - still hung- up. <sup>10</sup>	Crib, then moved to 3636 Level.
		*Pulled 14 cars.	
	<u>"A" Shift - 5th Shift</u>	"B" Shift - 5th Shift	
7/31/93	Blasted the hang-up at least two, and possibly four, times. Regular crew off and another crew blasted hang-up.		
	"A" Shift	Crew Off	Crew Off
8/1/93	Crew Off	Crew Off	Crew Off

<sup>10</sup> Team Leader report says raise was blasted all shift. Allison says he saw a cracked and deflected divider pushed into the manway about 1½ inches at Set 8 during the first blast.

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
8/2/93	Raise empty or hung-up - air going up the raise. Crew went to 3000 Level. *Pulled 28 cars. "A" Shift	Raise hung-up ¼ way down - blasted twice but raise is still hung-up. <sup>11</sup> *Pulled 11 cars. "B" Shift	<b>DAY</b> - Installed intermediate window and cleared up Syntron feeder. <u>NIGHT</u> - Work on track then miscellaneous duties.
8/3/93	Blasted raise three times (two in Syntron and one in the manway) but still hung-up. *Pulled 24 cars. "A" Shift	Raise hung-up - blasted six times (two in Syntron and four in manway). Manway is noted as "BO." *Pulled 3 cars. "B" Shift	<b><u>DAY</u></b> - 1 <sup>1/2</sup> hour delay because of hang-up blasting in the raise. <u>NIGHT</u> - Delay due to hang-up blasting - "BO" crib and dividers from blasting hang-ups.

<sup>11</sup> Allison said the cracked divider, from the July 30 blasting activities, is still in the manway.

May 3, 1994

DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
8/4/93	Transfer pocket at 4100 Level is full. Other duties on 4000 Level. *Pulled 40 cars. "A" Shift	Miscellaneous duties on the 4000 Level. Water coming down chute and manway. Support Tech report notes "Manway - Be Alert." <sup>12</sup> "B" Shift	<b><u>DAY</u></b> - Repairing the raise. <u>NIGHT</u> - Open blast window, blast sand and clean down manway.
8/5/93	Worked at location other than 4000 Level. "A" Shift	Team Leader report notes crew was on the 4000 Level but does not state what activity was done. "B" Shift	<b>DAY</b> - Supplies - clean down to Set 13 and repair ladders. <u>NIGHT</u> - Clean manway and install kickers.
8/6/93	Worked at location other than 865 raise.	Report notes that #7 locomotive is "BO."	<b>DAY</b> - Cleats, set up tugger, close windows, tram muck and blast raise. <b>NIGHT</b> - Blast and pull packed muck. Kickers, sealed manway, and installed skip and communication lines

<sup>&</sup>lt;sup>12</sup> Support Tech report notes the 4000 Level auxiliary explosives storage facility (detonators) is moved to the 3700 Level.

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
8/7/93	Edwards works at location other than 4000 Level. Crew Off. "B" Shift	Crew Off	<b>DAY</b> - Set up shotcrete, mucked sand and raised landings. NIGHT - Crew Off
8/8/93	Edwards works at location other than 4000 Level. Crew Off.	Worked at location other than 865 raise.	<b>DAY</b> - Shotcrete at Sets 20 and 21, install cleats and clean landings.
	"B" Shift	"C" Shift	<u>NIGHT</u> - Crew Off
8/9/93	Had problems with motor - miscellaneous duties at location other than the 865 raise.	Switched out #7 motor and cleaned station. Need better ventilation down here.	<b><u>DAY</u> -</b> Cleats, straps, ladders and remove timberslide.
	*Pulled 12 cars.	*Pulled 81 cars.	<b><u>NIGHT</u> - Remove tugger</b> from 3700 Level. Clean
	"B" Shift	"C" Shift	3763 Levels.

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Appendix D Page 13 of 14

May 3, 1994

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DATE	EDWARDS	DAHLSTRAND	DYNATEC (Both Shifts)
8/10/93	No report. Raise hang- up blasted at least once and a second blast was attempted during which a primed explosive charge was dropped into the ore pass compartment. "B" Shift	Accident on preceding shift. "C" Shift	<b>DAY</b> - 4000 Level track work then crew to another level. <b>NIGHT</b> - One crew working in raise and on Syntron deck until about 8 p.m. Another crew at 3636 Level working at extension raise.

# MAGMA COPPER COMPANY SUPERIOR MINING DIVISION

\*Pursuing Team Excellence\*

TO: Distribution

FROM: Matt Kannegaard

DATE: August 5, 1993

SUBJECT: 865 REPAIR

Due to some structural settling 865 has been closed and should not be used. It will take several days to stabilize the raise and return it to operation.

Dynatec will be doing the following:

- 1) Removing sandfill banks in the muck compartment.
- 2) Clean down manway.
- 3) Install spreaders under all short manway wallplates.
- 4) Finish closing all blow pipe windows.
- 5) Stabilize broken divider #8.
- 6) Repair broken ladders.
- 7) Secure ladders to wallplates.
- 8) Shotcrete at #20 and #21 hanging wall wallplates.
- 9) Close windows at #8 and #21.

Return to service on C-Shift Monday, August 8, 1993.

<u>NOTE:</u> It may be necessary for Magma to help Dynatec find or acquire some materials i.e., shotcrete, pump, and timber. Your help will be greatly appreciated.

MA12 roject Coordinator

MAK/om

WITE COMMENSION

Appendix E











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Figure 3



Figure 4

Note:

- 1) Post Moves Toward Manway at Top Only.
- 2) Cribbing Separates From Birdcage at Top of Panel.
- 3) Closure of Plate/Crib Gap.

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- 4) Cracking of Divider & Wall Plates.
- 5) Crushing of Wall Plate Tenons.

Investigators Conception of Deterioration of 865 Raise Framework After 10 Inches of Settlement







Figure 6





Figure 8

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Review of Ground Engineering Consultants, Inc., soils testing report dated February 22, 1994, finds that all materials - ore, muck, and sand fill - exhibit higher than normal specific gravity and compacted dry densities. These physical properties do not, however, influence the strength characteristics. Results of three unconsolidated undrained (UU) triaxial compression shear tests show an apparent cohesion intercept above the x-axis even though all eight samples used for index property identification are nonplastic.

Five different sieve analysis show that four samples are virtually identical and identified as dirty silty sand (SM) using the Unified Soil Classification System. The sand fraction was well represented by all sand sizes but is not technically classified as well graded. It is sufficiently well graded, however, to minimize voids and maximize density. A fourth of the remaining fifth sample contained gravel size rock fragments upto three inches in diameter. The sample is in effect a dirty sand with rock fragments added. The sand portion of the matrix is slightly finer than the other four samples, but contains ten percent fewer fines. The net effect in the mine environment is fewer voids and greater density.

The compacted unit weight was determined using the standard Proctor test. The results of four tests show that two silty sand samples were compacted to 152.5 and 152.9 pcf at optimum moisture contents of 12.8 and 12.5 percent respectively; the silty sand with four percent cement was compacted to 152.0 pcf at 10.0 percent optimum moisture; and the muck without gravel fragments was 199.7 pcf at 6.6 percent optimum moisture. Laboratory technicians scalped the +no.4 material from the muck sample to satisfy ASTM requirements regarding maximum particle size and mold diameter. Normally, the addition of four percent cement to two identical soils should increase unit weight. This was not the case. The difference can be attributed to a slight difference in the amount of high specific gravity magnetite ore in the soil mixture.

Mohr strength envelopes were developed from triaxial information generated on the three material types described in the previous paragraph. MSHA and the consultant agreed the specimens should be compacted to 90 percent of the maximum dry density with the moisture contents slightly below optimum to simulate mine conditions. The laboratory triaxial moisture contents were three percent low for the silty sand; one percent low for the silty sand with four percent cement; and one tenth of one percent low for the muck matrix. Each specimen series was subjected to three different lateral confining pressures to create each envelope; 1500, 3000, and 4500 psf. As expected, the sand fill material with cement

> Appendix H Page 1 of 2

exhibited the greatest strength with a 33 degree angle of internal friction and an apparent cohesion intercept of 360 psf. Photographs of these specimens show that the failire plane is clean and that the shear zone is a brittle type failue. They are indicative of higher placement densities but can be attributed to the cement. The strength values for the silty sand and muck were  $\phi = 25^{\circ}$  c = 500 psf and  $\phi = 17^{\circ}$  c = 525 psf respectively. The lower phi angle of 17 degrees can be attributed to lower fabricated densities than agreed upon; 85 percent. Photographs show bulging specimens indicative of loose particle arrangement. Overall, the strengths were typical for the grain size distributions discussed and the densities generated in the laboratory.

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# SUMMARY OF CRIB/BIRD CAGE CHANNEL LAP



Ring No.	Lap (in.) (Hanging Wall End)
39	1 3/4, 1 7/8, 1 5/8
38	1 1/2, 1 1/2, 1 3/4
37	1 1/2, 1 3/8, 2 1/8, 1 1/4
36	1 1/2, 1 1/2, 1 1/4, 1 1/2, 1 1/2
34	2, 1, 7/8, 3/4, 3/4, 1/2 **
32	2, 2, 21/8, 2

**\*\*** NOTE: Minimal Lap

APPENDIX I



PHOTO NO. 3. - Close-up of Photo No. 1. Note "mashing" and "splitting" of divider wall tenon in center of photo and post splitting.



PHOTO NO. 4. - View of manway - ore pass joint from manway side of joint.

Robert Ferriter, P.E. KL 4597-1193 January 20, 1994 Page 2 of 3.

# 4. ULTIMATE STRENGTH, Small Specimens (Appendix-C)

a. <u>Bending</u>: (ASTM D143 using 1"x1"x16" specimens):

Tensile failure stress = 6072 psi average, std. dev. 828 psi

b. <u>Tension</u>:

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Direct tension tests were not performed. Ultimate tensile strengths can be taken as roughly equal to the ultimate bending stresses given above and in Appendix-C.

c. <u>Horizontal Shear</u>: (2"x2" specimens)

Ultimate stress = 840 psi average, std. dev. 40 psi.

d. <u>Compression Parallel to Grain</u>:

Ultimate stress = 3940 psi average, std. dev. 550 psi.

e. <u>Compression Perpendicular to Grain</u>:

Ultimate stress = 748 psi average, std. dev. 96 psi. at 0.04 inches displacement (ASTM D143-83). Testing was continued to higher deformations with specimen 7 resisting 1050 psi at 0.08 inches.

# 5. ULTIMATE FLEXURAL STRENGTH, Full Sized Timbers (Appendix-A)

Flexural tests were performed on two 6x8 cribbing timbers spanning 5'-6" and bending about their weak axes.

Ultimate bending moment = 28.5 and 35.5 kip-feet.

# 6. JOINT BEARING STRENGTH, Full Sized Timbers (Appendix-D)

Two full-size interior joint assemblies with 10x10 posts were loaded axially until the assembly could take no more load.

Assembly 1 = 82.5 kips Assembly 2 = 80.0 kips

### 7. WEDGE FORCE (Appendix-A)

Approximate single wedge force in bearing = 4800 pounds at 2 inches of penetration.

Robert Ferriter, P.E. KL 4597-1193 January 20, 1994 Page 3 of 3.

If we may be of assistance in explaining or expanding any part of this report, please contact us. Thank you for using Knott Laboratory.

Very truly yours,

KNOTT LABORATORY, INC.

Approved:

Mark A. Miller, P.E. Senior Engineer

Dr. Albert W. Knott, P.E. Senior Consultant

MAM:11

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Enclosure - Appendices A through D.





PHOTO NO. 1. - Manway - Ore pass joint after application of 80,000 lbs. of load.



PHOTO NO. 2. - Close-up of Photo No. 1. Note splitting of vertical post.

Appendix G Page 4 of 5 DENVER OFFICE: (303) 936-2700 FAX (303) 936-2739

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KL 4597-1193 January 20, 1994

Robert Ferriter, P.E. U. S. Department of Labor Mine Safety & Health Administration P. O. Box 25367 Denver, Colorado 80225

**RE:** Timber Testing Magma Copper Mine Accident DOA: August 11, 1993 MSHA Purchase Order P2742132

Dear Mr. Ferriter:

This cover letter summarizes the results of the Magma Copper Mine timber testing conducted under MSHA Purchase Order No. P2742132, dated December 2, 1993. Testing was conducted by four agencies under the direction of Knott Laboratory. Individual reports by each are appended. Please refer to the reports for details and load-displacement curves. The agencies were as follows.

Knott Laboratory, Inc.,	Appendix-A
Intec Services, Inc.,	Appendix-B
Engineering Data Management, Inc	Appendix-C
CTC-Geotek, Inc	Appendix-D

See Figure 1 of Appendix A for specimen identification.

1. WOOD SPECIES IDENTIFICATION (Appendix-B)

Douglas Fir. One wedge sample was Western Pine.

#### 2. DENSITY (Appendix-A)

29.6 pcf, (spec. grav. 0.48) in as-received condition.

This is consistent with Douglas Fir, South Species, which has an oven-dry specific gravity of 0.46.

#### (Appendix-C) 3. MOISTURE CONTENT

Moisture content in specimen G4, a 10" x 10" short wall plate, ranged from 20 to 30 percent in the as-received condition. Small clear test specimens soaked in water in accordance with ASTM D143-83 ranged from 45 to 74 percent.

Appendix G Page 1 of 5

### EVALUATION OF 865 RAISE BLOCKING

Photo 1 at Ring 37 shows an example of blocking with the horizontal force across the grain of the blocks. Photo 2 is a closeup of the wedged area in Photo 1. The actual effective surface area is between the two crossed wedges. Photos 3 and 4 at Ring 34 show additional examples of blocking with the wood grain perpendicular to the horizontal force. The Timber Construction Manual, published by the Timber Construction Institute, shows in Table 213, "for dense select structural Douglas fir the allowable unit stress parallel to grain is 1500 psi while across the grain is 455 psi". If the block had been turned 90 degrees, end on, it would have taken three times the load before crushing. The two header boards against the rock are possibly adequate but the wedge is driven only from the top so it would loosen if any settling of the raise timbers and/or the block occurred. If two wedges were opposed then the lower wedge would tighten with any downward movement.

Photos 7 and 8 taken at Ring 41 show inadequate wedge installations. In both cases additional wedges should have been installed from the bottom to tighten the blocking from any downward movement of the framework. Photo 9 at Ring 38 shows a single horizontal wedge carrying the entire load of the blocking. There is no wedge driven from underneath to tighten the blocking. Photo 10 at Ring 38 shows blocking without wedges. Photo 13 at Ring 41 shows two headers against the post but not wedged to keep the post from moving outward. Also, the surface area of contact against the post is quite small. In Photo 5 at Ring 34 the blocks are again placed so any crushing is across the grain, not on the end of the grain. The wedges between the rock and the outer block provide surface frictional area. A spike is in the post to hold up the inner block. Photo 6 shows a similar spike, driven into the post on the left to keep the block from slipping downward. Part of the split block is held up by another angled spike. Again note the horizontal force on the block is across the grain, not on the end of the grain.

Where large voids exist behind the framework, timber bridging should be used with blocking. The bridging timber need to be braced against the rock where the force from the horizontal block is against the bridging. Photo 14 shows a situation where a short block and/or wedges need to be placed between the bridging and the rock wall. If force were exerted on the bridging it would bow out or even crack the bridge timber. Photo 15 shows an extensive void behind the footwall plate.

> Appendix F Page 1 of 9

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PHOTO NO. 1. - 865 Raise-Ring 37. This blocking example shows how muck will pile up on top of blocks and leave a void below those same blocks.



PHOTO NO. 2. - 865 Raise-Ring 37. This closeup of Photo No. 1 indicates that continuous blocking is achieved only where the two wedges (at arrows) cross each other, a 4-inch square area. The large blocks only appear to be active blocks.

Appendix F Page 2 of 9



PHOTO NO. 3. - 865 Raise-Ring 34. Blocking behind hanging wall/end wall corners. Three 12 x 12 x 12-inch blocks placed and loaded perpendicular to the grain with assorted wedges. Note crushing of wedge above blocking. Blocking "toe-nailed" together.



PHOTO NO. 4. - 865 Raise-Ring 34. Assorted sizes of blocking (12 x 12, 6 x 12 and 3 x 8) wedged between raise framework and rock wall. Blocking "toe-nailed" or possibly unattached. Assorted wedges.


PHOTO NO. 5. - Ring 34, this example of blocking shows three blocks (one of them is split at small arrow) installed as support.



PHOTO NO. 6. - Ring 37, this example of Raise 865 blocking shows two blocks tightened and held in place by a bunch of wedges.



PHOTO NO. 7. - 865 Raise-Ring 41. Hanging wall/end wall corner blocking behind end wall. A small amount of movement of wall plate will allow left-hand block to be released.



PHOTO NO. 8. - 865 Raise-Ring 41. Foot wall/end wall blocking behind end plate. Note entire load transfer is carried through one 4-inch wedge.



PHOTO NO. 9. - 865 Raise-Ring 38. Blocking and wedges behind end wall plate/ foot wall plate corner on end wall side. Note load is carried by one wedge.



PHOTO NO. 10. - 865 Raise-Ring 38. Blocking behind end wall plate/hanging wall plate corner on end wall side.



PHOTO NO. 11. - 865 Raise-Ring 41, this photo indicates that a jumble of blocking has been placed at the footwall divider. Even so, the footwall divider post moved outward about 1 inch (notice arrow point). Photo taken in August 1993.



PHOTO NO. 12. - 865 Raise-Ring 41. Blocking behind divider/foot wall plates corner. Note gap between wall plate and block. Photo taken in January 1994. Note additional separation of blocking from wall plate in comparison with Photo No. 11.



PHOTO NO. 13. - Ring 41, this footwall corner post in manway is also moved about 1 inch out of position (notice arrow).



PHOTO NO. 14. - This shows blocking to a center of a timber - the weakest point of a timber. If this block position is necessary, a back-up block should be placed between rock wall and timber.

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KNOTT LABORATORY, INC.

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KL 4597-1193 January 20, 1994

Robert Ferriter, P.E. U. S. Department of Labor Mine Safety & Health Administration P. O. Box 25367 Denver, Colorado 80225

RE: Timber Testing Magma Copper Mine Accident DOA: August 11, 1993 MSHA Purchase Order P2742132

Dear Mr. Ferriter:

This cover letter summarizes the results of the Magma Copper Mine timber testing conducted under MSHA Purchase Order No. P2742132, dated December 2, 1993. Testing was conducted by four agencies under the direction of Knott Laboratory. Individual reports by each are appended. Please refer to the reports for details and load-displacement curves. The agencies were as follows.

Knott Laboratory, Inc.	Annondius A
Intec Services. Inc.	Appendix-A
Engineering Data Management The	Appendix-B
CTC-Cootok Inc.	Appendix-C
CIC-Geoler, Inc	Appendix-D

See Figure 1 of Appendix A for specimen identification.

1. WOOD SPECIES IDENTIFICATION (Appendix-B)

Douglas Fir. One wedge sample was Western Pine.

## 2. DENSITY (Appendix-A)

29.6 pcf, (spec. grav. 0.48) in as-received condition.

This is consistent with Douglas Fir, South Species, which has an oven-dry specific gravity of 0.46.

## 3. NOISTURE CONTENT (Appendix-C)

Moisture content in specimen G4, a 10" x 10" short wall plate, ranged from 20 to 30 percent in the as-received condition. Small clear test specimens soaked in water in accordance with ASTM D143-83 ranged from 45 to 74 percent.

Structural, Mechanical & Construction Failure Analysis / Accident Reconstruction / Fire Investigation

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