



MINTO EXPLORATIONS LTD.

A Subsidiary of Capstone Mining Corp.

EXPLOSIVES MANAGEMENT PLAN

June 2011

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1.0 INTRODUCTION

Minto Mine is a high-grade copper and gold mine that is located 240 km north of Whitehorse, Yukon. Operations began in October 2007 and are ongoing at this time.

The mine is located in the boreal forest at an elevation of about 760 m ASL. The access road starts at the western side of the Yukon River crossing site, continuing north adjacent to the Yukon River and then heading southwest 12 km up the Minto Creek valley to the Minto mine site. Access to the mine over the Yukon River is gained by way of a barge in open-water months, an ice-road during winter months and by air during the shoulder seasons.

As with most mines, Minto Mine employs explosives as the primary means of breaking rock.

1.1 Explosives Management Plan Objectives

The purpose of the Explosive Management Plan is to outline management practices employed at Minto Mine that are aimed at minimizing the safety and environmental risks of handling nitrates, which are present in blasting agents. Specifically, methods used to minimize nitrate losses to the environment will be explained.

2.0 EXPLOSIVE USAGE

Minto Explorations Ltd. (MintoEx) contracts Dyno Nobel to supply explosives to the Minto Mine site. Dyno Nobel is a leading supplier of industrial explosives to the mining industry and employs a health, safety and environment management system known as Zero Harm. It captures all aspects of occupational health and environmental releases. Blasting services are provided by Pelly Construction Ltd., a Yukon-based mining contractor with a long history of development in the north. Pelly Construction Ltd. counts safety and environment among their key core values and it is with their combined expertise and guidance that MintoEx has carried out over 1000 successful blasts at the mine to date.

2.1 Blasting agent types, transportation, and storage

Minto Mine uses the following blasting agents:

- ANFO (94% Ammonium Nitrate, 6% fuel oil) which contains over 30% by weight nitrogen. Ammonium nitrate takes the form of porous prills (small spherical pellets about 1mm in diameter), which absorb fuel oil to form an explosive. The nitrogen present is readily soluble.

- Site mixed emulsion, which uses the same ammonium nitrate / fuel oil chemistry as ANFO, but differs in the physical form the reactants take: the final product is substantially denser than ANFO and highly water-resistant.

This product is a mixture of emulsion (typically 70%) and ammonium nitrate prill (typically 30%). The prill is identical to the sort described previously. The emulsion component is a thick gel-like mixture in which the reactants are intimately blended at the molecular level, together with emulsifiers that stabilize it and render it water-resistant.

Emulsion and ANFO contain similar amounts of nitrogen by weight, but emulsion is much less soluble. The prill, while not water resistant on its own, is completely encapsulated in the emulsion component, and is thus inaccessible to water.

- Dynosplit C is a small-diameter, water resistant, packaged watergel explosive. It is used in pre-shear blasting and makes up substantially less than 1% of Minto's explosive usage by weight.

On a typical production pattern, approximately 70% of the holes will be loaded with ANFO and 30% with site-mixed emulsion, depending on the number of holes containing water.

Blasting agents are stored on site at a controlled area managed by Dyno Nobel in accordance with a permit and related guidance provided by Natural Resources Canada, Explosives Safety and Security Branch.

The blasting agents are transported to the drill pattern by Dyno Nobel employees. Dyno Nobel is responsible for product sourcing, storage, quality control, and delivery to the blasthole. The Pelly blaster directs the loading of the product and is ultimately responsible for loading and firing each blast.

3.0 BEST MANAGEMENT PRACTICES

MintoEx works closely with both Dyno Nobel and Pelly Construction Ltd. to ensure that blasting activities are conducted with minimal environmental and health/safety risk.

Since both safety and environmental risks are related (risks are increased from deficient handling practices), standard operating procedures (SOPs) have been developed which address both issues jointly.

The first means of addressing explosive reagent safety and best practices related to environmental management is awareness. Blast crews and engineering staff are aware that nitrates and ammonia are generally the compounds of greatest concern for water quality

degradation. Nitrates can be directly toxic to aquatic life or they can indirectly affect aquatic life through decreasing dissolved oxygen levels in water or causing eutrophication. Ammonia toxicity is related to pH and temperature of the water.

The means by which blasting agents can escape into the environment must be identified and known by personnel. There are two mechanisms by which blasting agents can contaminate water around the mine: spillage during loading, and leaching of the blasting agents in wet blast holes.

The first of these is addressed by emphasizing to blast crews the importance of minimizing spillage and dealing properly with any that may occur. The second is addressed by requiring that holes loaded with water soluble products be lined if there is any possibility of wet ground in the area.

In addition, the following design and loading practices are in place to minimize ammonia / nitrate losses to the environment:

- Design considerations: blasts are designed to maximize efficiency of blasting agents.
- Blast hole liners: liners are used even when minimal amounts of water are present. If there is excessive water, blasters will use emulsion instead.
- Minimize sleep time: holes are not loaded with blasting agents until necessary in order to reduce the time elapsed between loading and detonation.
- Waste disposal: Disposal of blasting reagent packaging and related waste is done so in accordance with the BSSM Disposal Guidance document (see Appendix B).

These practices are documented in the mine's SOPs; these are attached for reference.

4.0 REVIEW AND IMPROVEMENTS

MintoEx will use the guidance outlined in this plan to minimize the impacts of using ammonium nitrate-based blasting agents. Practices used at site will be reviewed in conjunction with industry best practices and observed water quality. Improvements can and will be made as required. Currently MintoEx is designing a trial experiment wherein the site-mixed emulsion formulation will be changed from a 70/30 emulsion/prill ratio to one with a greater emulsion content: this will be evaluated in order to gauge improvements to blasting efficiency and water quality. If this practice is adopted, this plan will be modified and submitted to EMR accordingly.



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APPENDIX A

Minto Explorations Ltd. Drill and Blast Standards

Drilling and Blasting Standards

June 2011

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1. Drills, Drill Bits, and Hole Sizes

Pelly currently supplies the mine with drilling services using four drills, two of which are set up to drill 6 3/4" holes and two of which drill 9 7/8" holes. The former are used in 6.0m ore benches and the latter in 12.0m waste benches.

Generally speaking, the amount of stemming required in a hole is proportional only to its diameter: if less than 20x the hole diameter is used in stemming, a large portion of the explosive energy will be lost through the collar. Air blast, fly rock, and poor fragmentation will result.

A 9 7/8" hole (0.251m) should thus have, at a minimum, 5.0m of stemming. Given this, it is impractical to use such a large hole in a short bench; thus, 6.0m benches require smaller holes.

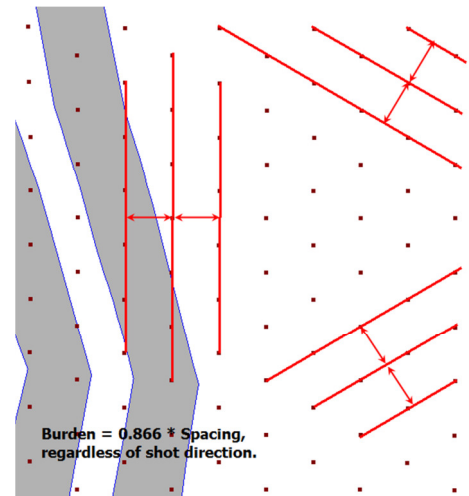
2. Pattern Design and Loading

Patterns are generally designed one bench at a time in Vulcan, then cut into individual blasts based on the immediate needs of the mine.

Drill patterns should always be equilateral: all holes are equidistant from one another, and burden is related to spacing by a factor of 0.866 ($\sqrt{0.75}$).

Equilateral patterns provide better energy distribution and thus better fragmentation than square or rectangular designs. Another advantage is that burden and spacing are maintained regardless of shot direction, as illustrated in the diagram to the right, freeing operations to cut off and shoot patterns in a wide variety of convenient shapes.

One disadvantage to equilateral patterns is that the driving width available to powder trucks and other vehicles on the pattern is equal to the burden, rather than the spacing. This may be a factor in tightly spaced ore blasts on 6m benches.



Standard Grid Spacing – 12.0m Waste Benches

The main way in which powder factor is varied is to adjust the grid spacing; ideally, it is adjusted to maintain consistent fragmentation as rock characteristics change in the pit. This is essentially a reactive process: where hard digging is encountered that cannot be explained by loading, design, or product problems, the grid should be tightened to increase powder factor.

Grid spacing can be increased, and powder factor thereby decreased, if fragmentation is consistently better than that required for efficient excavator operation.

The table below lists standard grid spacings for different pattern types. Also listed are theoretical powder factors for each grid spacing, in kg/BCM, for a hole loaded with Fragmax ANFO.

Waste Blasts – 12m benches, 9 7/8" hole diameter			
7.0m eq (6.06 burden)	1.0m subgrade	5.0m collar	0.82 kg/BCM
Overburden Blasts – 12m benches, 9 7/8" hole diameter			
7.0m eq (6.06 burden)	1.0m subgrade	5.0m collar	0.82 kg/BCM

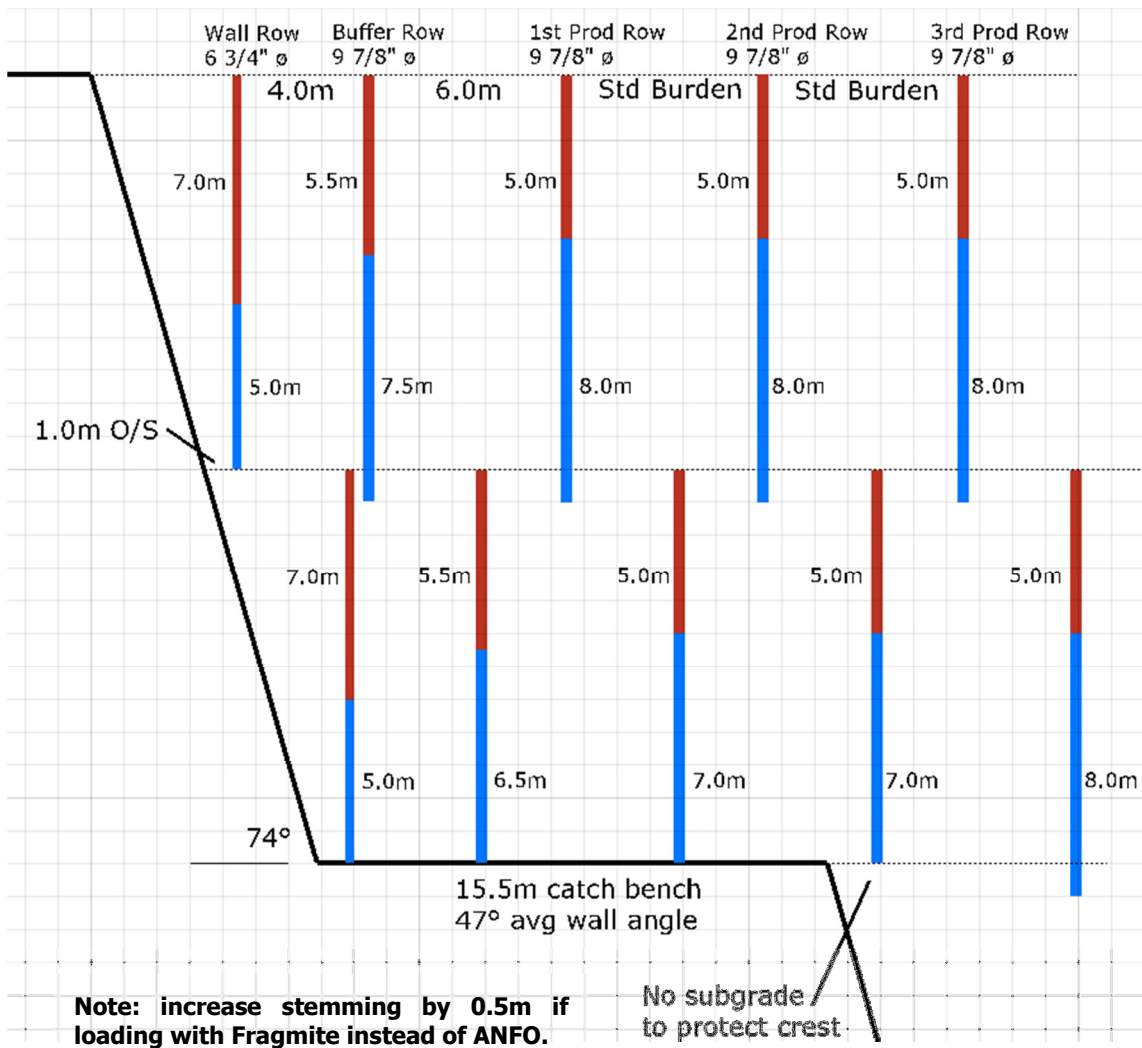
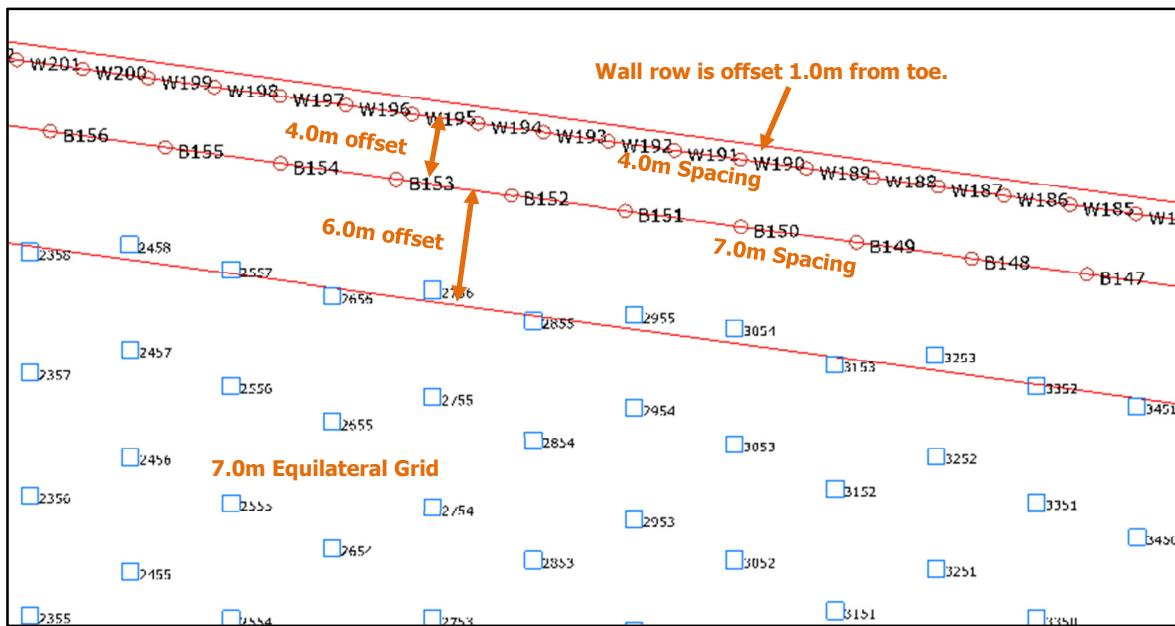
Overburden blasts were drilled to the same specifications as waste blasts. If, in the future, large quantities of overburden are to be mined, an effort should be made to find a grid spacing that minimizes powder factor while maintaining acceptable digging.

Wall and Buffer Rows – 12.0m Waste Benches

The row closest to the wall, besides the pre-shear, is termed the wall row. It is drilled with the 6 3/4" diameter bit, with no subgrade, and is loaded with 5.0m of powder and a reduced stemming load. The spacing between holes is 4.0m, as is the burden to the next row.

The next row is termed the buffer row, and is drilled with the 9 7/8" bit, no subgrade if there is to be a catch bench and regular subgrade if there is not, and loaded slightly lighter than regular specifications (5.5m collar instead of 5.0, full stemming).

Following this, spaced 6.0m away, the equilateral pattern melds into the buffer row, adjusted to maintain a well-balanced grid.



The following table lists hole parameters and the resulting powder factors for each hole type:

Production Holes		Buffer Row		Wall Row	
Hole dia	0.25	Hole dia	0.25	Hole dia	0.17
Stemming	5.00	Stemming	5.50	Stemming	7.00
Subgrade	1.00	Subgrade	0.00	Subgrade	0.00
H	12.00	H	12.00	H	12.00
Charge Length	8.00	Charge Length	6.50	Charge Length	5.00
Expl Density	1050	Expl Density	1050	Expl Density	1050
Powder Charge (kg)	416	Powder Charge (kg)	338	Powder Charge (kg)	121
Burden	6.06	Burden	6.00	Burden	4.00
Spacing	7.00	Spacing	7.00	Spacing	4.00
Vol/hole	509	Vol/hole	504	Vol/hole	192
Resulting B/S ratio	0.87	Resulting B/S ratio	0.86	Resulting B/S ratio	1.00
Resulting PF (kg/BCM)	0.82	Resulting PF (kg/BCM)	0.67	Resulting PF (kg/BCM)	0.63

Pre-Shear Drilling

Pre-shear is a technique in which closely-spaced small diameter holes, drilled to follow the final contour of the wall, are loaded with a decoupled charge. All holes are fired simultaneously, encouraging the formation of a fracture plane between them. Much of the strain energy from production / buffer blastholes, upon meeting this discontinuity, will be reflected back, instead of continuing into the wall where it would result in backbreak.

The decoupled charge – that is, one in which the charge diameter is substantially smaller than the hole diameter – is meant to reduce the magnitude of the peak strain around the blasthole, preventing damage to the wall in its immediate vicinity.

Pre-shear drilling significantly improved the quality of highwalls at Minto after its introduction in the main (Area 1) pit.

When laying out holes, no offset from the toe is needed. The holes are angled to follow the wall contour: the drill has the ability to point the mast away from the machine and thereby drill the hole underneath itself. Standard spacing is 2.0m. Pre-shear holes are always done for an entire 12.0m high section of wall, even if the bench contains ore and will actually be mined in 6.0m cuts.

The holes are loaded with Dynosplit C, which is a packaged watergel (similar to an emulsion). The 1.5" / 40mm diameter size is used at Minto. Tie-in is done using detonating cord: all holes in a pre-shear blast fire simultaneously.

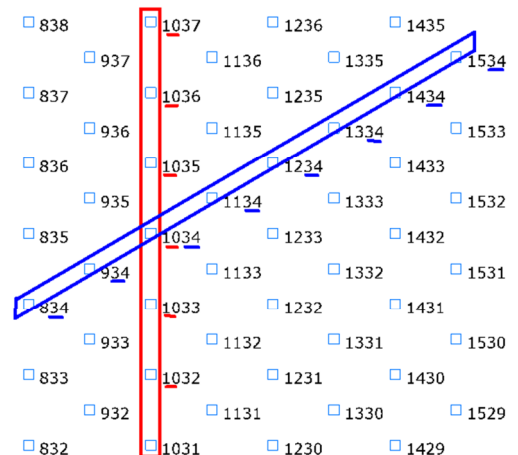
Hole Numbering

Production Holes

Hole numbers should be thought of as a concatenation of a row and a column number. Numbering on an equilateral pattern should look like the image shown to the right. The first two digits will represent the row number, while the last two will represent the column number.

This will allow a blaster to navigate a pattern with less time spent referencing a map. Blasters will also be better able to infer hole numbers when stakes are lost or unreadable.

The screenshot below demonstrates how Vulcan can be configured to generate this style of numbering:



The row name comes first. This should be started at 5, so that numbers below this are reserved for buffer rows and trim.

The "hole number" here refers to the last two digits of what will eventually be the hole name; essentially, the 'column' descriptor.

Enabling this check box is necessary to ensure that rows line up properly.

This will avoid confusing hole names like '51', replacing them instead with '501.'

A note: when deleting holes, you will be asked if you would like Vulcan to check remaining hole names or leave them undisturbed. You may select **either** option: if using row-by-row naming, Vulcan will not ruin the grid if a hole is deleted.

Buffer and Wall Rows

Hole numbering should typically start at 100. Wall holes receive a "W" prefix while buffer holes should have a "B" prepended to their names.

Cutoff Design

Larger blasts are more productive in the sense that less time is spent evacuating the pit, setting up guards, etc. Cutoff size should take into consideration blasted muck inventories in the pit, the input of the blaster, hole conditions (caving / redrills), and the need to make cutoffs of appropriate shape.

Gaps

When a pattern is drilled next to another that has not yet been shot, a three-row gap must be left adjacent to the drilled-but-unshot pattern. Holes drilled closer to the unshot pattern would cave or bridge due to vibration from blasting.

3.Explosives

ANFO

ANFO is a mixture of ammonium nitrate prill (94%) and fuel oil (6%). AN is fully water soluble and therefore this product is only usable in completely dry holes, or in holes that can be pumped dry and then lined.

The ANFO used at Minto is a mini-prill product called Fragmax with a higher bulk density than typical ANFO: 1050 kg/m³ vs. more common values of 840kg/m³.

As of June 2011, Fragmax costs ~\$0.82/kg.

Wet Product

The product used at Minto is a pumpable emulsion / prill blend in a 70/30 ratio, sold under the name Fragmaite. The emulsion is pre-sensitized using micro-balloons rather than gassed in the truck, as is more common, and the prill component uses Fragmax mini-prill.

The use of a pre-sensitized emulsion makes loading easier (gassed products must be left to stand for ~20 minutes before stemming the hole) and eliminates the need to stock and mix separate gassing compounds.

Fragmaite is fully water resistant and is loaded directly into unlined wet blastholes. Care must be taken when loading to ensure that water is not entrained in the product column; thus, standard practice is to lower the hose to the bottom of the hole and retract it at the same rate at which the hole fills. This keeps the hose in the product all the way up, pushing water out of the hole.

As of June 2011, 70/30 Fragmaite costs ~1.50/kg.

Fragmaite is available in mixtures from 60% to 100% emulsion; it is mixed in the truck and the ratio can be varied.

De-Watering vs. Wet Product Use: Costs

Blasters can either attempt to pump / bag a hole or simply load it with wet product; this is left to their discretion.

Due to the higher density of Fragmaite vs. Fragmax (ANFO), upgrading a hole to emulsion loads an additional 99kg of explosive into the hole. The product is also 83% more expensive on a per-kg basis. At the aforementioned costs, a dry hole costs \$341 while a wet hole costs \$772: wet loading is more expensive by a factor of 2.25.

Clearly, the combination of dry product and a liner is significantly cheaper than changing the product type to wet; where possible, pumping and bagging should be encouraged. Generally, holes that have standing water (as opposed to an inflow of water) can be pumped.

Product Density and Collar Adjustments in Wet Holes

The bulk density of Fragmaite is approximately 1300 kg/m³. Its use thus results in higher powder factors than an equivalent volume of ANFO. This suggests that patterns could be expanded or collars dropped when using wet products.

Indeed, the collars could be dropped substantially if one sought to keep powder factors equivalent between wet and dry holes: from 5.0m in an ANFO-loaded hole to 6.5m in a Fragmaite-loaded hole. This would likely give poor results, however.

One consideration is that emulsion-heavy products tend to release more of their energy as shock, rather than gas, making them better suited to fracturing hard rock, but resulting in less heave of the muck pile. Given equal powder factors, this makes for tighter digging, and is one of the reasons why emulsion cannot always be substituted for ANFO on a per-kg basis.

That said, a small adjustment to the collars should be tried, and the effects evaluated: collars should be reduced by 0.5m in wet holes.

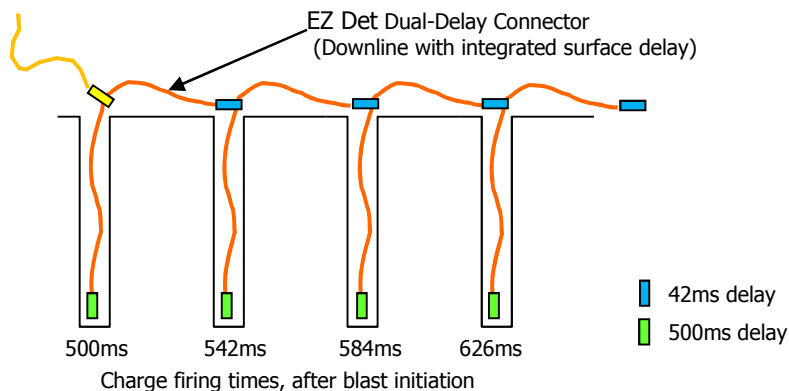
Mini-prill vs. Heavy ANFO

Many mines achieve similar powder factors in dry and wet holes by using heavy ANFO products in dry holes (30% emulsion / 70% prill, not water resistant, augured instead of pumped, 1240 kg/m³ bulk density). Minto instead uses mini-prill due to emulsion storage constraints as well as the substantially higher cost of emulsion.

Blasting Accessories

Tie-ins at Minto are done using dual-delay detonators sold under the name EZ Det. These contain a 500ms delay element in the hole, like a standard downline, but have at their other end a shorter surface delay element.

The figure below illustrates how these are connected within a row of blast holes. The first hole, on the left, would be initiated by a lead-in line (shown in yellow). The orange shock tube would propagate the 'signal' to the green delay element (500ms) and the blue delay element (42ms). The next shock tube would thus be initiated 42ms later, and it has its own 500ms delay element, so its charge would detonate at 542ms.



The long in-hole delay element ensures that the much shorter surface delays have time to fire before the ground starts moving: by the time 500ms delays have finished and the powder column is initiated, the surface delay elements are burning several rows further back. This prevents cut-offs, which are incidents in which ground movement tears apart the network of tie-ins before it has had a chance to initiate all of the holes in the pattern.

Connections between rows are done using EZTL-brand trunk-line connectors: these consist of a short delay element on one end and a J-hook connector on the other.

EZ-Dets are available with 17, 25, and 42ms surface delays; we currently stock only the 25ms units. EZ-TLs are available in 9, 17, 25, 33, 42, 67, 100, and 109 ms delays; we stock all but the 9 and the 67ms units.

Tie-in and Shot Direction

Tie-ins are generally not designed by engineering, but rather by the blast crew.

The first row in a waste blast is always fired next to blasted muck or a free face. The latter is preferable: when material is free to move, fragmentation will generally benefit and a looser and more easily diggable muck pile will result. Such a muck pile is ideal for smaller excavators and especially loaders.

All subsequent rows shoot "in to" that first row.

Ore blasts, on the other hand, are shot as sinking cuts. A sinking cut is usually used to describe the first blast into a new bench, in which there is no free face to use for relief. Instead, a row in the middle is shot first, and subsequent rows use the void created there for relief. Sinking cuts tend to require higher powder factors and they may result in tighter digging.

The direction of movement is toward the center of the blast rather than toward a free face: as a result, overall material displacement is smaller. This tendency to pile material up in the middle of the blast is useful for ore control: ore is not thrown across the bench.

Since current ore control practice is to lay out post-blast ore boundaries based on pre-blast blasthole assays, minimizing material movement is important to the successful separation of ore from waste. Many mines accomplish this by choke blasting; that is, blasting into a semi-free face of blasted muck rather than into a proper free face. The small dimensions of Minto's ore benches make this strategy impractical; there is generally not sufficient blasted inventory.

Double Priming

Double priming is done at the blasters' discretion, usually on holes where broken ground or rehandle near the collar increases the chances of a large rock falling down the hole during stemming and cutting the downline.

Cap scatter on a 500ms down-hole delay is sufficiently large that the powder column will almost always fully burn before the second primer would initiate. Therefore only one of the primers will be used, and if one is placed near the top of the charge, half of the double-primed holes, on average, will burn from top to bottom. This is unfavorable from an energy distribution / propagation perspective; therefore, top-priming should be avoided and both primers should be placed near the bottom of the hole.

Stemming the Collar

Drill cuttings should not be used to stem a hole. This is particularly important at Minto, as Pelly's hammer drills make fine cuttings pile that will not properly confine a charge. Stemming wet holes with cuttings would result in a muddy mixture at the top of the hole; this provides no useful confinement.

The ideal stemming material is crushed stone, 2-4cm in diameter. Stemming contributes only a very small volume to a blast – approximately one tenth of a percent – and therefore concerns over dilution are unwarranted. Ore need not be used as stemming material.

4. Firing of Blasts

This section is not meant to be a comprehensive set of instructions for the safe firing a blast: that information is documented formally in the SOP for blast clearance.

Clearance Maps

The area to be cleared is a 500m radius around the blast.

When the cutoff for a blast is determined, the survey department will prepare a map showing the blast polygon, a circle outlining a 500m radius around it, a boundary showing the mill clearance zone, the mine's road network, and numbered guard positions at each intersection of a road and the clearance circle.

This map is provided to the Pelly foreman or clerk, who will distribute it widely on the day of the blast.

Mill Area Involvement

Past procedure at Minto was clear the mill building and surrounding areas: personnel retreated to safe locations underneath double roofs during any blast, and movement around mill buildings was restricted.

As of May 2011, this procedure is required only for blasts in which the mill area falls into the clearance zone. The blast map will clearly indicate when this is the case.



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APPENDIX B

Dyno Nobel Disposal Guidance

Explosives And Packaging Disposal

1.0 APPLICATION

This part of the Blast Site Policy applies to all wholly-owned DYNO NOBEL INC. operations and all joint ventures in which DYNO NOBEL INC. is a party.

THE INFORMATION, PREVENTION MEASURES AND PRECAUTIONS SET FORTH HEREIN ARE TO BE USED AS GENERAL GUIDELINES ONLY AND DO NOT CONSTITUTE MINIMUM COMPLIANCE STANDARDS. FURTHER, THESE GUIDELINES ARE NOT INTENDED TO PROVIDE ANY BASIS BY WHICH ANY LEGAL OBLIGATION, DUTY OR LIABILITY MAY ARISE OR BE IMPOSED.

2.0 INTRODUCTION

The proper disposal of wastes that are sometimes generated at a blast site is a federal and state requirement. When explosive waste and packaging waste are involved, particular care must be exercised to maintain compliance with applicable regulations. The following sections will provide guidance for the proper management of both hazardous and non-hazardous explosive and packaging wastes.

3.0 PURPOSE

The purpose of this document is to provide specific guidelines for proper management of the following:

Non-hazardous Explosive Related Waste

Non-hazardous Packaging Waste

Hazardous Explosive Waste

Hazardous Packaging Waste

4.0 Non-Hazardous Explosives Related Waste

Appropriate efforts should be made to use raw materials and manufactured products for their intended use. If it has been determined that material and/or products must be disposed of, and the material/product cannot be classified as a hazardous waste, arrangements must be made with properly authorized disposal facilities. A material that is either corrosive, ignitable (including oxidizers), reactive, or toxic is not non-hazardous. If there is any uncertainty as to the proper classification of the material/product, contact the Corporate Environmental Manager or a qualified environmental consultant.

The types of non-hazardous explosive related waste typically found on a blast site include: scrap Nonel tubing, scrap copper wire, and blasting agents or precursors heavily contaminated with soil. The blasting agents or precursors can only be classified as non-hazardous if they cannot detonate due to the amount of contamination; otherwise they should be placed into the bore hole and utilized for their manufactured/intended use.

Municipal or industrial landfills are typically used to disposal of non-hazardous explosive related waste. Never use a landfill unless they are permitted by either the state environmental authority or the Environmental Protection Agency. Federal law attaches liability for disposed waste to the generator of the waste. It is recommended that an industrial landfill be used because of the higher degree of protection against liability issues.

Landfill operators must know the types and quantities of waste they are receiving from generators to confirm they are in compliance with their permits. Arrange with the landfill operator for the disposal of non-hazardous explosive related waste in advance of transporting the waste to the landfill. If any questions arise over the documentation that the landfill operator is requesting, contact the Corporate Environmental Manager or a qualified environmental consultant.

5.0 Non-Hazardous Packaging Waste

Figure 1 provides a flow diagram to assist in the process of determining if the container can be managed as a hazardous or non-hazardous waste.

Before disposing of non-hazardous containers, boxes should be broken-down and bags should be cut open to provide for the highest degree of product removal, and to address any potential confusion over management of the former container as a DOT packaging. To facilitate product removal to the highest degree, tap the outside of the bag with a stick. All material removed from the packaging is to be recovered and used for its manufactured use. It is required that the shipping name, identification number, and hazard warning labels on the debris be removed or obliterated. The removal or obliteration of these items serve to: address the concerns of a landfill operator or recycler; avoid undue concern of emergency responders at the scene of an incident; avoid intentional misuse of these items by criminals; and so forth. The non-hazardous debris would not be considered a DOT hazardous material and recycling of the packaging can be performed, or disposal at the type of landfills identified in Section 4.0 should be secured.

6.0 Hazardous Explosives Waste

Appropriate efforts should be made to use raw materials and manufactured products for their intended use. If it has been determined that material and/or products must be disposed of, and the material/product demonstrates it is corrosive, ignitable (including oxidizers), reactive, and/or toxic it is classified as a hazardous waste. If there is any uncertainty as to the proper classification of the material/product, contact the Corporate Environmental Manager or a qualified environmental consultant.

The types of hazardous explosive related waste typically found on a blast site include:

Reactive - Class 1 explosives, if discarded are hazardous waste because of their reactivity. They are given an EPA waste code of D003 Explosives.

Ignitable - All raw materials used in the industry labeled as DOT oxidizers are hazardous waste. Oxidizers include ammonium nitrate prill, ammonium nitrate solution greater than

65%, calcium nitrate, nitrites, and perchlorate compounds. These materials are given an EPA waste code of D001 Oxidizers.

Acids/Bases - These materials are corrosives. If not listed individually by EPA, they have the waste code of D002.

Generators of these types of materials fall into one of three categories: 1) A conditionally-exempt small quantity generator (CESQG), a small quantity generator (SQG), or a large quantity generator (LQG). CESQG's generate less than 220 pounds per month of hazardous waste. The amount of waste materials generated at a blast site typical fall into the CESQG category. A SQG produces between 220 to 2200 pounds of hazardous waste per month, and a LQG produces 2200 pounds per month or more of hazardous waste.

Three requirements that CESQG's must comply with are: 1) to characterize the waste; 2) follow DOT shipping requirements; and 3) provide for disposal at a facility that is permitted by the state environmental authority or Environmental Protection Agency.

It would be unusual for a blast site to generate more than 220 pounds per month. In the event that an amount greater than 220 pounds per month is generated, the Corporate Environmental Manager must be contacted to assist in complying with an extensive set of state and/or federal regulations.

7.0 Hazardous Packaging Waste

Figure 1 provides a flow diagram to assist in the process of determining if a package can be managed as a hazardous or non-hazardous waste. Packaging waste must be regarded as hazardous waste if it contains oxidizers or explosives in an amount of one inch or more on the bottom or inner liner, or more than 3 percent by weight of the total capacity of the package remains in the package or inner liner. Packaging waste may also become a hazardous waste if it demonstrates the characteristic of an oxidizer or explosive.

Generally, the limited amounts of remaining material on the packaging would not demonstrate the characteristic of an oxidizer or explosive. A good example is an empty ANFO bag, and as such, the procedure provided in Section 5 would be followed instead. Examination of the packaging and the removal of any oxidizers or explosives found during this process will assist in preventing the generation of hazardous waste. The small amounts of oxidizers and explosives found during the examination are to be used for their manufactured purpose (e.g., placed in a bore hole to utilize their explosive strength).

Hazardous packaging waste can potentially demonstrate the characteristics of an oxidizer and/or an explosive. Hazardous waste that demonstrates the characteristic of an oxidizer carries the EPA waste code of D001; the characteristic of an explosive carries the EPA waste code of D003. To determine if these waste codes apply, a representative sample of the waste would be subjected to the following tests: 1) the Bureau of Mines gap test; 2) the Bureau of Mines internal ignition test; and 3) the DOT oxidizer test procedure provided within Appendix F to 49 CFR Part 173. Generator knowledge can also be used

to determine if a waste has these hazardous characteristics. The use of generator knowledge is often challenged by regulators and questioned by HSE personnel to ensure the hazardous waste determination is reasonable and consistent with their understanding of particular wastes.

If it is determined that the packaging is a hazardous waste, and containers can be defined as a DOT packaging, a conditionally exempt small quantity generator can transport these packagings in the same manner as when it previously contained a greater quantity of that hazardous material. If the same packagings are broken down and they no longer meet the definition of a "packaging", the resulting debris would have to be properly classified as per DOT or an exemption would be needed. This process can be time consuming if an explosive characteristic is present. It is suggested that regulatory provisions offering exemptions or becoming party to particular exemptions be pursued to ease the regulatory burden associated with obtaining specific classification and shipping requirements. The removal or obliteration of the shipping name, identification number, and hazard warning labels must be performed on these broken down packagings.

Generators of these types of materials fall into one of three categories: 1) A conditionally-exempt small quantity generator (CESQG), a small quantity generator (SQG), or a large quantity generator (LQG). CESQG's generate less than 220 pounds per month of hazardous waste. The amount of waste materials generated at a blast site typical fall into the CESQG category. A SQG produces between 220 to 2200 pounds of hazardous waste per month, and a LQG produces 2200 pounds per month or more of hazardous waste.

Three requirements that CESQG's must comply with are: 1) to characterize the waste; 2) follow DOT shipping requirements; and 3) provide for disposal at a facility that is permitted by the state environmental authority or Environmental Protection Agency.

It would be unusual for a blast site to generate more than 220 pounds per month. In the event that an amount greater than 220 pounds per month is generated, the Corporate Environmental Manager must be contacted to assist in complying with an extensive set of state and/or federal regulations.

8.0 Open Burning

In order to treat a hazardous waste by open burning, an extensive set of regulations must be complied with and either interim status or a formal permit must be secured unless the immediate response provision is exercised to address a non-routine and infrequently generated hazardous waste. EPA published clarifying language in the military munitions rule that Resource Conservation and Recovery Act (RCRA) generator, transporter, and permit requirements do not apply to immediate responses to threats involving explosives, but the provision is only to address an immediately needed response to a discharge or imminent and substantial threat of a discharge of a hazardous waste under 40 CFR 264.1(g)(8), 265.1(c)(11), and 270.1(c)(3). In addition, implementation of the immediate response provision must be done by a person that is trained in explosives emergency responses. Guidance from the EPA to IME dated November 30, 1988, indicates that

DYNO NOBEL NORTH AMERICA BLAST SITE SAFETY MANUAL

damaged or unusable explosive waste that cannot be stored or transported off-site qualifies for implementation of the immediate response provision.

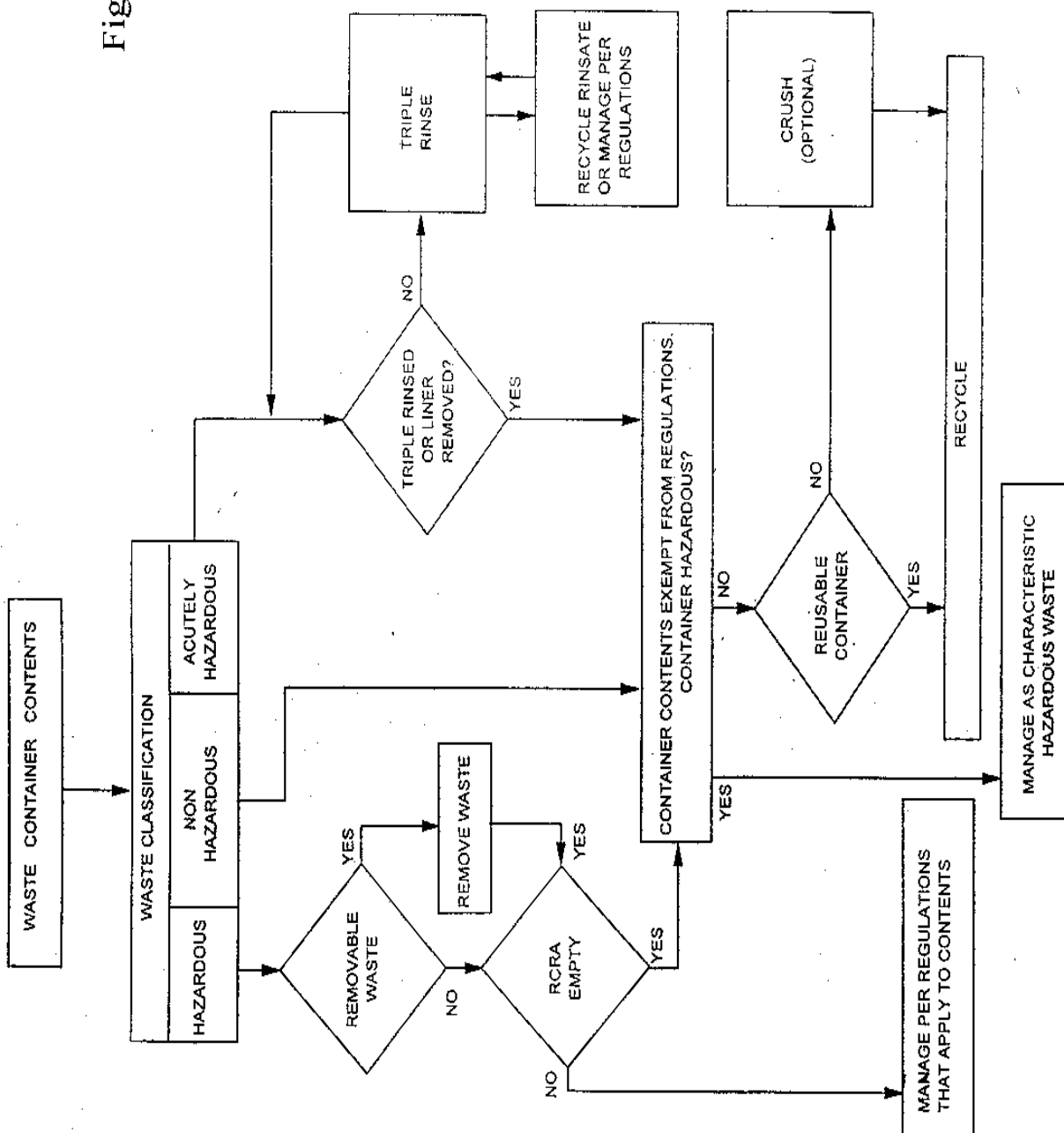
In order to effectuate their open burning standard at a "use site", OSHA requires coordination with environmental agencies to secure the proper permits for the treatment of contaminated explosives packagings or implementation of the emergency response provision of RCRA. Whether or not the packagings are hazardous or non-hazardous waste, employee protection laws require that explosive contaminated packagings that present a safety concern be open burned at an approved isolated location when they are generated at a "use site". At a minimum, coordination with the environmental agencies would be needed to secure an open burning variance from the air quality division, and if it is a hazardous waste, notification to the hazardous waste division for implementation of the emergency response provision.

Over the years, EPA has secured a prohibition on open burning in all states through their approval process of granting states the authority to administer Clean Air Act regulations. Open burning is permissible only if approval is secured by the agency in charge of administering the Clean Air Act regulations for the state, the burning would eliminate a threat to public safety, and the safety concerns cannot be addressed by other means. It is important to review any secured approval to ensure the approval captures Clean Air Act regulations promulgated by the state in which the open burning will be performed. For example, it is likely that an approval from the local Fire Marshal will not provide Clean Air Act approval.

A potential option to avoid these requirements is to decontaminate non-hazardous materials since this activity would not require a RCRA hazardous waste permit. If hazardous waste is involved, and the immediate response provision is not an option, an extensive amount of activity is needed to secure a permit from the environmental agency for what they consider to be a hazardous waste management unit performing thermal destruction.

If open burning is available under the immediate response provision of RCRA, it will require the cooperation of the use site's operator/owners since the open burning will need to take place on their property. Unless it is authorized by a person that is trained in explosives emergency response (reference the regulatory definition), the open burning must take place at the use site due to the safety issues brought forth in qualifying for the immediate response provision.

Figure 1





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A Subsidiary of Capstone Mining Corp.

APPENDIX C

Dyno Nobel Environmental Considerations

DYNO NOBEL INC.

Blast Site Policy

Environmental Considerations

February 1998

1.0 APPLICATION

This part of the Blast Site Policy applies to all wholly-owned DYNO NOBEL INC. operations and all joint ventures in which DYNO NOBEL INC. is a party.

THE INFORMATION, PREVENTION MEASURES AND PRECAUTIONS SET FORTH HEREIN ARE TO BE USED AS GENERAL GUIDELINES ONLY AND DO NOT CONSTITUTE MINIMUM COMPLIANCE STANDARDS. FURTHER, THESE GUIDELINES ARE NOT INTENDED TO PROVIDE ANY BASIS BY WHICH ANY LEGAL OBLIGATION, DUTY OR LIABILITY MAY ARISE OR BE IMPOSED.

2.0 INTRODUCTION

It has been recognized that at or near some locations where commercial explosives are being used, the potential to contaminate surface or ground water with ammonium nitrate exists. It is also understood that the actual levels of contamination at these locations would be variable and a direct consequence of ammonium nitrate becoming associated with water either before, during or after the blasting process. Considering these facts, the potential to contaminate surface or ground water with ammonium nitrate, which is used as an ingredient in commercial explosives, can be controlled through the implementation of a responsible blast loading plan. Adoption of such a plan as a standard operating procedure will eliminate or minimize the potential for ammonium nitrate to dissolve in or become associated with water.

In addition, mining and quarrying practices that handle and dispose of waste water in a manner that ensures it receives the proper treatment prior to its discharge prevents ammonium nitrate contamination from becoming an undue risk to human health or the environment.

3.0 PURPOSE

The purpose of this document is to provide specific guidelines which are to be included into the current standard operating procedures for blast planning, blasthole drilling and blasthole loading. Their addition should provide a comprehensive plan that will minimize or negate the potential to contaminate surface or ground water with ammonium nitrate. The specific guidelines to be included can be grouped into the following five (5) basic categories:

- Education/Training of Explosive Users
- Explosives Loading and Handling
- Selection of Appropriate Explosives
- Attention to Technical Matters

Adhering to the Standard Operating Procedures on Blasting

4.0 EDUCATION/TRAINING OF EXPLOSIVE USERS

Both the owners/operators of the location where explosives are being used and the personnel working with commercial explosives will be well informed of all applicable regulations as well as the consequences of having ammonium nitrate becoming associated with water. The Clean Water Act, or the equivalent of such at the State level, regulates both the ammonia portion and the nitrate portion of ammonium nitrate to prevent an undue risk to human health or the environment. In addition, the Resource Conservation and Recovery Act, becomes applicable if the explosives fail to detonate.

5.0 EXPLOSIVES LOADING AND HANDLING

5.1 All excess product in augers or hoses is to be recovered and used either in the next blasthole or recycled in the mixer/holding tank.

5.2 Explosive spillage around the blasthole collar is to be controlled and any such spillage should be placed into the blasthole before stemming

5.3 Water contacting explosives during cleanup is to be contained and managed in accordance with applicable regulations

5.4 Minimize the amount of time that explosives are exposed to wet conditions within the blasthole. The blast shall be initiated as near the time the loading is completed as safety and operational procedures allow.

5.5 Avoid having explosives exposed to precipitation.

5.6 To assure complete detonation of explosives placed into the ground, sufficient boosters must be used. At least two (2) primers will be used in each blasthole. One near the top and one near the bottom of the explosive column.

6.0 SELECTION OF APPROPRIATE EXPLOSIVES

Selecting the proper explosive is critical to the prevention of ammonium nitrate contamination.

6.1 ANFO (ammonium nitrate - fuel oil) is not water-resistant and should be avoided if contact with water is likely.

6.2 Various types of commercial explosives are available to withstand exposure to water. Water-resistant explosives include the cartridge forms of gelatinous nitroglycerin, watergels and emulsions and the bulk forms of emulsions which are:

- Site Mixed Emulsion (ammonium nitrate - fuel oil - emulsifier) is a water-resistant explosive, semi-solid. This is manufactured on site and detonated while still warm assuring complete detonation.

- Repump Emulsion (ammonium nitrate - fuel oil - emulsifier) is a water-resistant explosive, semi solid, manufactured off site, transported and pumped into the borehole as needed.

7.0 ATTENTION TO TECHNICAL MATTERS

7.1 The actual physical conditions into which explosives are being placed must be accounted for.

7.2 Personnel responsible for loading explosives into the boreholes should be in continuous communication with the drillers of those boreholes or supplied with adequate drill logs, so that any knowledge regarding fractures, crevices or cavities is obtained.

7.3 Where Bulk ANFO or Emulsion is used in fractured, creviced or cavitied boreholes, plastic borehole sleeves and/or positioned inert stemming decks will be used to ensure total detonation of the explosives and avoidance of excessive charges.

7.4 Choosing and placing the correct drilling patterns which results in the optimal use of explosives with all the explosives undergoing complete detonation.

7.5 Quality assurance/quality control measures to maintain drilling accuracy which prevents the detonation in one blasthole from impacting the proper detonation in a nearby blasthole.

7.6 Selecting the appropriate drilling equipment so that adequate borehole quality is maintained.

7.7 Correct selection of delay timing for each blasthole to ensure detonation of the entire pattern, and the prevention of cut-off blastholes.

8.0 ENVIRONMENTALLY GOOD PRACTICES IN A MINING OPERATION BY A MINING COMPANY

8.1 Obtain or complete a regional geology and hydrogeologic study to obtain data and evaluate if groundwater quality has been impacted by previous users or owners and or nearby landowners.

8.2 Determine soil classification, topography, and drainage conditions.

8.3 Obtain potable well survey, include casing depth. (1/4 mile radius minimum of proposed operation)

8.4 Determine aquifer depth

8.5 Determine depth of mining operation to access possible changes that may affect present neighboring groundwater condition.

8.6 To monitor the effectiveness of groundwater contamination prevention measures, it is proposed that monitoring wells be installed by a reputable environmental firm that can assure the installed wells comply with local, regional and/or state environmental agency guidance. The general purpose of the proposed monitoring wells would be as follows:

- Downgradient of actual mining operations to assess the impact those operations may have on groundwater.
- Upgradient of the mining operations to access the condition of groundwater entering the mining property.
- Adjacent farmland to measure the extent that nitrates have impacted groundwater due to farming and/or fertilizing practices, and to access future impact from mining operations.



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APPENDIX D

Dyno Nobel Best Loading Practices (Fragmite, Fragmax)

Dyno - Suggested Best loading practices

Fragmite

Ensure that adequate preparation has been done on blast area before staking/drilling

Stage delivery unit such that it can reach the blast holes.

(Delivery unit needs to be situated at the bore hole to enable lowering the loading hose)

Dyno delivery units are inspected for leaks or potential problems each day before use.

Any spillage occurring during the loading process is contained and cleaned up before travelling to blast area.

-Loading hose on delivery truck should be saddled with the end of hose in catch bucket when travelling, moving between holes, or when waiting on drills.

-When loading emulsion products, the hose needs to be lowered to the bottom of the hole before starting the pump, and slowly raised with the column rise, to avoid water being entrained into the explosive product.

-No holes being loaded with emulsion should be top loaded, as this can affect the sensitization of the product, and poses a risk of water irrigation into the explosives column.

-Booster should be pulled up approx. 1 meter. through the product, from the bottom of the bore hole to ensure that the booster is fully encased in the explosives column.

-Double priming is recommended for deeper bore holes.

-Place hose end in catch bucket before moving delivery unit to the next hole,.

When loading is complete, blow down the loading hose to clear product.

Blow down should only be done down the bore hole, at the blasters direction.

-Place hose end in catch bucket when not actively loading holes.

Dyno - Suggested Best loading practices Fragmax Bulk (AN/FO)

Ensure that adequate preparation has been done on blast area before staking/drilling Stage delivery unit such that it can reach the blast holes easily.

Dyno delivery units are inspected for leaks or potential problems each day before use. Any spillage occurring during the loading process is contained and cleaned up before travelling to blast area.

- Place a small catchment bucket under suspended loading snorkel.
 - Lift auger from cradle and position over snorkel. Fasten snorkel to auger with chain attachments.
 - Swing auger out to loading position over bore hole. Empty catch bucket down hole and place back on truck.
 - Load hole as required.
 - NOTE* If water is detected in bore holes they must be dewatered and a liner used. Double priming is suggested to ensure complete detonation of a lined hole.
 - Have the blaster beat on the snorkel tube to loosen any residual product that may have adhered to the snorkel wall.
 - Move delivery unit to next hole to be loaded.
- (NOTE* On rough ground, have the blaster steady the snorkel when the truck is moving)

When loading operation is complete:

- Place catchment bucket below snorkel cradle.
- Swing auger in to position to cradle the snorkel.
- Tap firmly on the snorkel tube to remove any residual product into catch bucket..
- Secure the snorkel and disconnect the attachment chain.
- Lift and swing the auger to the cradle position for travel.
- Empty catch bucket into bore hole as designated by the blaster in charge.
- Place catch bucket under the suspended snorkel whenever truck is parked.