



Safety Focus Update

Storage, Transportation, Use, Handling and Care of Explosives

Philip Dirige, PhD, PEng

Senior Specialist, Ground Control

Coordinator, WSN Ground Control Committee

705-670-5707 ext. 336

philipdirige@workplacesafetynorth.ca



Storage, Transportation, Handling, Use and Care of Explosives

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Workplace Safety North
690 McKeown Avenue, P.O Box 2050 Station Main
North Bay, Ontario P1B 9P1
Toll free: 1-888-730-7821 (Ontario)
Fax: 705-472-5800
www.workplacesafetynorth.ca

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Forward

Threats of theft and vandalism were the main reasons Canada's storage standards for explosives were changed. The Explosive Regulatory Division (ERD) of Natural Resources Canada noted that the explosives and accessories storage standards had inherent design flaws that could no longer be defended. The ERD began working with the RCMP, and in 2001 developed the standards outlined in *Storage Standards for Industrial Explosives* to create theft-resistant, bullet-proof magazines. As per the Natural Resource Canada's Storage Standards for Industrial Explosives, changes were required by May 1, 2006. The construction, design and housekeeping standards set out in *Storage Standards for Industrial Explosives* can be inspected at a provincial level by the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) or at a federal level by the ERD.

The Ministry of Labour, Immigration, Training, and Skill Development (MLITSD) receive a number of reportable incidents regarding workers, and occasionally the general public finding blasting caps, b-line, explosives, nonel fuses outside of assigned storage areas and magazines, and even apprehension of stolen explosives and accessories. In one incident the explosives found were more than 30 years old. It is often during the transportation, care, and handling of explosives and their accessories that they become inadequately stored, lost or improperly disposed of.

This reference document is intended to assist Ontario mining operations understand their obligations under the Occupational Health and Safety Act (OHSA) and its regulations, and in developing their internal programs for the storage, transportation, use, handling and care of explosives. The document was prepared by the Workplace Safety North's (WSN's) Technical Advisory Committee in Ground Control (GC TAC). WSN gratefully acknowledges the contributions of all members.

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Dave Counter (Chair)	Glencore, Kidd Operations
Brad Simser (Vice Chair)	Glencore, Sudbury Integrated Nickel Operations
Mike Yao	Vale - Corporate
Anneta Forsythe	Vale -Sudbury Operations
Siavash Taghipoor	KGHM - Sudbury Operations
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Jerry Ran	Kinross Gold Corp.
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Felicity-Jayne Borysenko	Kirkland Lake Gold Corp., Macassa Mine Complex
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Jacob Francoeur	Alamos Gold Inc. - Young Davidson Mine
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Reza Nooraniasi	Impala Canada Ltd. Lac Des Iles Mine
Garett Snell	New Gold - Rainy River Mine
Maximiliano Moraga	Pan American Silver - Bell Creek Mine
John Hadjigeorgiou (Technical Advisor)	University of Toronto, Mining Department
Steven Gaines	CANMET
Philip Dirige	Workplace Safety North

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Storage, Transportation, Use, Handling and Care of Explosives

1. Introduction

The purpose of this the project is to update the Safety Focus on explosives that was prepared by Workplace Safety North (WSN) - Mining (formerly Mines and Aggregates Safety and Health Association, MASHA) in 2007. The update is focused on the storage, use, handling, and care of explosives in surface and underground mines. The intent of the document is to assist workplace parties in understanding their obligations under the Occupational Health and Safety Act (OHSA) and its regulations, and to ensure compliance to pertinent regulations.

The storage, use, and handling of explosives can result to potential serious or fatal injury, and significant property damage is always present. The safe use of explosives requires that these are only used for their intended and designed purpose. Workers must be properly trained before being assigned to use and handle explosives safely. Explosives and accessories must be securely stored and accounted for at all times, both on surface and in underground mines. Misuse of mine explosives and accessories had been reported in the past, and a number of reportable incidents had been associated with storage, use, and handling of explosives.

WSN and WSN's Ground Control Technical Advisory Committee (GC TAC) recognize that individual companies must develop health and safety policies and programs which apply to their workplaces and comply with appropriate legislation. The objective of the project is to prepare a document that will be available as a resource to surface and underground mines to comply to both federal and provincial regulations on the storage, use, handling, and care of explosive in surface and underground mines. The document serves as a reference to assist Ontario mining operations in developing their internal process.

2. Scope of the reference document

This document is an update to the Safety Focus on Explosives prepared and published in 2007 by MASHA, now WSN. The information contained in this reference material is distributed as a guide only to assist Ontario mining operations to:

- Comply with all regulatory requirements in Regulation 854 (Mines and Mining Plants) Part VI EXPLOSIVES (Sections 121 to 154).
- Promote risk assessment and management processes as an inherent part of the operations, and not only as a moral or legal obligation, to address hazards associated with storage, use, and handling of explosives. The processes help to:
 - Develop a risk assessment and management program for hazards associated with the storage, use, and handling of explosives, as required under Sections 5.1, 5.2 and 5.3 of Regulation 854;
 - Create awareness of ground control hazards and risk;
 - Identify who may be at risk (e.g., employees, cleaners, visitors, contractors, the public, etc.);

-
- Determine whether a control program is required for a particular storage, use, and handling of explosives related hazard;
 - Determine if existing control measures are adequate or if more should be done;
 - Prevent injuries associated with storage, use, and handling of explosives;
 - Prioritize hazards and control measures to ensure safe storage, use, and handling of explosives; and
 - Meet legal requirements where applicable.
- Develop a checklist that can be used by operations to assess the effectiveness of mine policies, procedures, programs associated with the safe storage, use, and handling of explosives, to ensure compliance to both federal and provincial regulations (**Appendix A**).

3. Explosive storage (or magazine) standards

3.1 Surface storage

The main reasons changes were made on Canada's surface storage standards for explosives were due to reports and threats of theft and vandalism. It had become apparent that with an all-terrain vehicle (ATV) and a few power tools, contents of surface magazines could be easily accessed. Regular reports of vandalism from hunting ammunition were also presenting a problem.

Drawbacks with the standards came to a head in the late-1990s, when the Explosive Regulatory Division (ERD) of Natural Resources Canada (NRCan) noted that the standards had inherent design flaws that could no longer be defended. The ERD began working with the Royal Canadian Mounted Police (RCMP), and in 2001 developed the standards outlined in Storage Standards for Industrial Explosives to create theft-resistant, bullet-proof magazines. Of the ten types of magazines that were approved under the old standards, four of these designs were phased out in Ontario in May 2006. The remaining six (6) types, if built before May 1, 2001, required upgrades to walls, doors, door frames or locks by May 1, 2006 (see Table 1). In the new National Standard of Canada, Standard CAN/BNQ 2910-500/2015 entitled Explosives - Magazines for Industrial Explosives (Bureau de normalisation du Québec (BNQ)), there are four (4) explosive magazine types remaining that can be licensed under the Explosive Act of Canada and the Explosives Regulations, 2013 of Canada and other applicable regulations (see Table 1).

The new standards, unless specified in the National Standard of Canada Standard CAN/BNQ 2910-500/2015, materials shall conform to the National Building Code of Canada. It also requires that magazine walls are designed to withstand the force of hunting ammunition. Figure 1 shows an explosive magazine with appropriate signage. "We received numerous reports during hunting season that magazines were being used for target practice. The Explosives sign on the magazine would have a bullet hole in the centre of the 'o' and the 'i' would be dotted," explains Hanley. "The wall design had to be upgraded to prevent a bullet from coming in contact with sensitive explosives like dynamite, which if hit, could detonate everything in the magazine."

Explosives signage, directly on the magazine itself, has since been removed. **Figure 2** show Types 4 and 9 magazines.

Magazine Type	Requirements for Magazines Built before May 1, 2001 and to be Completed by 2006	Requirements for Magazines as per CAN/BNQ 2910-500/2015 Standards
	Steps Required	Steps Required
Type 1 (Poured concrete or block wall)	Construction updates required	Updates required
Type 2 (Stud frame)	Phased out in 2006	
Type 3 (Stud frame)	Phased out in 2006	
Type 4 (Steel)	Construction updates required	Updates required
Type 5 (Modified trailer/rail car)	Phased out in 2006	
Type 6 (Bin/box/cupboard)	Construction updates required	Phased out in 2015
Type 7 (Metal plate 2 compartments)	Phased out in 2006	
Type 8 (Reinforced concrete)	Construction updates required	Phased out in 2015
Type 9 (Steel, for highly mobile storage facilities)	Construction updates required	Updates required
Type 10 (Aluminum)	Construction updates required	Phased out in 2015
Type 12 (Portable or permanently located structure)		Design should be appropriate to the situation and may be approved as permanently located or moveable.

The construction, design and housekeeping standards set out in National Standard of Canada Standard CAN/BNQ 2910-500/2015 can be inspected at a provincial level, by the Ministry of Labour, Immigration, Training, and Skills Development (MLITSD) or at a federal level by the ERD. As required under **Section 123** under Part VI - Explosives of Regulation 854 (Mines and Mining Plants), the MLITSD inspections include looking at construction requirements as well as housekeeping and storage issues based on the updated standards. The Ministry generally looks at the doors to ensure they are up to standard, as well as cleanliness and ensuring the proper fire breaks and berms are in place. The Ministry would also check paperwork to ensure they have given notice of their magazine to the ERD and explosives are marked and in the proper containers.

Threats of theft and vandalism can also be avoided by simply not storing explosives on site. Mining operations are avoiding the complications of compliance by not storing explosives at their sites. “Explosive companies can deliver on an as-needed basis, which would cut down the liability and risk for the mining company.”

An inspection checklist to assess the safe storage of explosives and accessories in surface mines to ensure compliance to both federal and provincial regulations is provided in **Appendix A**.



Figure 1 - Explosive magazine with appropriate signage (source: <https://www.bnq.qc.ca/en/standardization/protection-and-safety/magazines-for-industrial-explosives.html>)



Figure 2 - Types 4 (left) and 9 (right) magazines (source: Protexplo)

3.2 Underground storage

The likelihood of serious or fatal injury and significant property damage to occur is present when explosives and accessories are stored in underground mines. The requirements for the storage or magazine of explosives and accessories in underground mines including location, competency, housekeeping, and electrical installation are specified under Part VI - Explosives of Regulation 854 from **Sections 125 to 129**.

Section 125. (1) specifies that ‘explosives in an underground mine shall be kept or stored in a magazine but where less than 160 kilograms of explosives are kept or stored in the underground mine they may be kept or stored in suitable storage containers at locations removed from drilling and blasting operations.’

Magazines used to store explosives in Ontario’s underground mines are inspected at a provincial by the MLITSD. Besides the construction, design and housekeeping standards set out in **Section 125** of Regulation 854, magazines used to store explosives should meet the following requirements:

- Protected against weather conditions.
- Protection from physical damage.
- Fire protection.
- Protection against theft.

An inspection checklist to assess the safe storage of explosives and accessories in underground mines to ensure compliance to both federal and provincial regulations is provided in Appendix A.

3.3 Keeping the lights on in storage magazines

Storing explosives near electrical currents clearly is not the best match. However, sometimes magazines require electricity for lights or fans, or a heating system, and any magazine located outside is potentially at risk of a lightning strike. **Section 129** of Regulation 854 requires that electrical equipment and wiring follow the same standards as outlined under **Section 6.8** (Electricity) of the new National Standard of Canada, Standard CAN/BNQ 2910-500/2015 entitled Explosives - Magazines for Industrial Explosives. **Section 129** also states that explosive storage areas must be protected against lightning and electrical surges.

Section 6.8 of the CAN/BNQ 2910-500/2015 Standard specifies that explosive magazines protection by grounding shall meet the requirements of Code CAN/CSA B72 - Installation code for lightning protection systems, and the surge protection shall be of Type 1 and in accordance with the recommendations of Guide IEEE C62.41.1 - IEEE Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits.

3.4 Storage magazine location

The best way to prevent lightning strikes on storage magazines is to choose a proper location for the magazine. To minimize the risk of lightning strikes, Storage Standards for Industrial Explosives states the magazine must be at least fifteen (15) metres away from overhead transmission lines. The CAN/BNQ 2910-500/2015 Standard specifies that if additional lightning protection at the magazine is to be included, then it shall be installed according to Code CAN/CSA B72. A master emergency cut-off electrical switch and ground rod must be installed on or before the last pole of the transmission line. If electricity is required in the magazine, the transmission line must approach the magazine from underground.

The CAN/BNQ 2910-500/2015 Standard also specifies that the supply of electricity to magazine that contains explosives shall be controlled by a single disconnecting means, which shall be installed a minimum of fifteen (15) metres away from the magazine. It shall disconnect all underground conductors of the supply. The last fifteen (15) metres from the disconnect to the magazine shall be buried underground.

In underground mines, the storage should be located in safe areas, at least 60 m (100 ft.) away from underground infrastructures such as a shaft, hoist room, main access ramp, refuge station, transformer vault, or fuel storage/transfer area. Explosive and accessories storage should also be designed and maintained with a high level of security and up-to-date inventory management control. Storage locations must be marked with the appropriate signage “**DANGER EXPLOSIVES**” as required by Section 126 of the Regulation, to ensure ignition sources are kept at safe distances away. Separate storage is required for explosives and detonator systems, located at least 8 m apart, in order to significantly reduce the likelihood of accidental detonation. **Figure 3** shows a typical layout of an underground mine explosive magazine and appropriate signage is included on the drawing as required by **Section 126** of the Regulation.

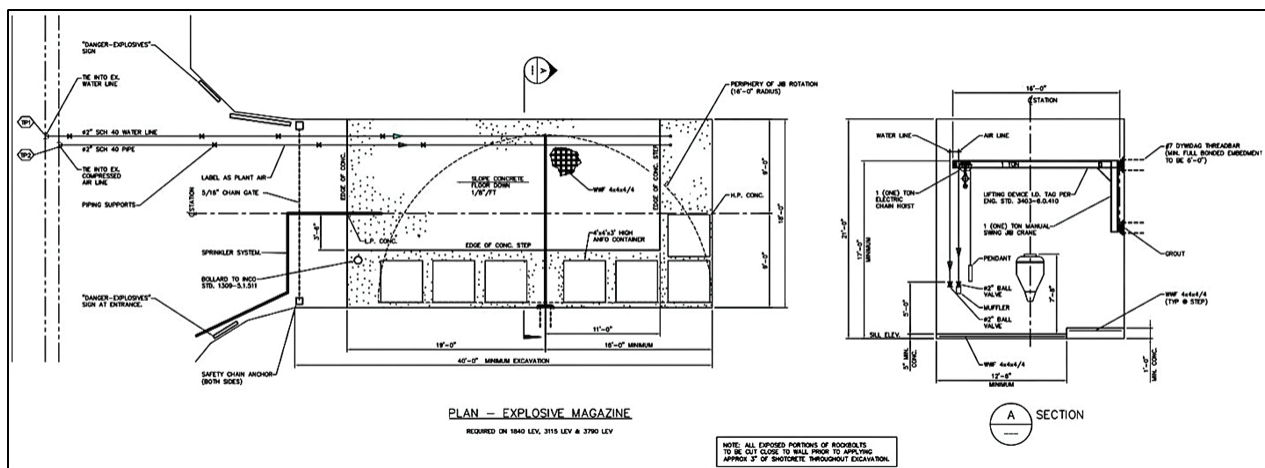


Figure 3 - Typical layout of an underground mine explosive magazine (source: https://minewiki.engineering.queensu.ca/mediawiki/index.php/Explosive_magazines)

3.5 Storage magazine wiring

Wiring in storage magazines has to match up with standards outlined in Ontario Electrical Safety Code (OESC), Division II, Class 2, Hazardous Locations. This classification assumes the explosives storage area will be an area where combustible dusts are not normally in suspension; this is typically true if explosives are packaged and in a ready-to-use format. If companies feel there is a chance that combustible dust or vapours may be present in their storage magazine, upgrading to Division 1, Class II electrical standards should be considered.

When possible, Storage Standards for Industrial Explosives calls for wiring to be located within the wall structure, and switch boxes should be located on the outside of the magazine. The wiring circuit must have a ground fault interrupter. The acceptable permanent wiring methods

within magazines as specified under **Section 6.8** - Electricity of the CAN/BNQ 2910-500/2015 Standard shall be in a threaded rigid metal conduit or armored cables approved for hazardous materials.

3.6 Acceptable heating temperatures

The risk with heating a storage magazine is overheating a storage magazine, especially with explosives that are stored in an in-process state. The thermal stability of all products stored in the magazine must be determined when they are in a natural state as well as in the event of a spill, equipment malfunction or physical damage to the wiring system. Once this is determined, the storage magazine can only be heated to 80 per cent of the thermal stability of the most volatile product. **Section 128. (7)** of Regulation 854 specifies that explosives shall not be heated above the ambient temperature of their storage place.

4. Handling, transportation, use and care of explosives and accessories

The emphasis with explosives is usually focused on the process of blasting and setting up a blast. However, the risks of transporting and handling explosives should not be overlooked. Procedures for getting explosives to the blast site and then removing unused explosives must be followed closely to avoid potentially critical incidents. **Appendix B** shows an example of a procedure for handling, transporting and storing explosives underground.

Over the years, the MLITSD received a number of reportable incidents regarding workers, and occasionally the general public finding blasting caps, b-line, explosives, and nonel fuses outside of assigned storage areas and magazines. In one incident the explosives found were more than 30 years old. It is often during the transportation, care, and handling of explosives and their accessories that they become inadequately stored, lost or improperly disposed of.

Regulation 854 states requirements that must be followed in order to safely store and move explosives around a mine site. **Section 125 (4) (a)** of Regulation 854 specifies that the employer shall, in consultation with the Joint Health and Safety Committee (JHSC) or the Health and Safety representative, if any, establish a procedure for; identify the location of explosives that are being kept in explosive storage areas other than magazines.

An inspection checklist to assess the proper handling, transportation, use and care of explosives and accessories in surface and underground mines to ensure compliance to both federal and provincial regulations is provided in **Appendix A**.

4.1 Handling

Before moving explosives, planning must take place to ensure no handling delays occur on route. The most direct and safe route must be taken, without side trips, or any other work tasks involved. In the underground, arrangements must be made to ensure the motor vehicle or train has the right-of-way. Planning and communication should ensure that moving explosives away from the shaft collar, entrances to underground workings, or the shaft station is a top priority.

Explosives that are not used cannot remain unattended in a mine. They must be returned to a proper storage area or magazine. Planning should consider how to return unused explosives to a safe location. **Section 128 (5)** of Regulation 854 specifies that explosives that are unattended shall not be left in or about any working place but shall be returned to storage. In efforts to reduce unattended explosives, which can end up in garbage bins or muck piles, new regulations require companies to have procedures to identify the location of explosives that are stored in and outside of magazines at the worksite.

4.2 Transportation

On surface, vehicles that carry explosives must first be in good working condition and free of other work materials - explosives cannot be transported with other goods or materials. The vehicle must be equipped with visible red signals or flags on the front, back and sides (**Figure 4**); all metal parts on the vehicle that could come in contact with containers of explosives must be covered with a non-sparking material such as wood or tarps; and a functioning BC Fire Extinguisher must be on board.



Figure 4 - Vehicle transporting explosives on surface shall have clearly visible explosive signage and red flag.

Once this is done, explosives can be loaded into the vehicle and secured in a manner that prevents the load from becoming dislodged. Up to 5000 detonators can be stored with the explosives, provided the detonators are in a separate and secure container. Once explosives are loaded in, the vehicle must be attended to at all times. Enroute, the vehicle can only carry the number of people necessary for handling the explosives.

Explosives transported underground by means of a motor vehicle or a train are covered under **Section 135** of Regulation 854. **Section 135 (1) (e)** specifies that when explosives are transported underground by means of a motor vehicle or train, the motor vehicle or train shall display and operate a flashing red light whenever explosives are being transported (**Figure 5**).

Explosives inside motor vehicles and train cars must be stored in suitable containers and speeds cannot exceed 10 km/h (**Section 135 (a)**).



Figure 4 - Vehicle transporting explosives on surface shall have clearly visible explosive signage and red flag.

4.2.1 Transporting explosives in bulk

The laws governing transport of bulk explosives in underground mines are specified in **Section 135.0.1** of Regulation 854 - bulk explosives vehicles transport and delivery of bulk explosives such as ANFO (ammonium and fuel oil), water gel and emulsion explosives to the underground (a vehicle transporting stick powder does not qualify). **Section 135.0.1** also specifies for: designated parking spaces, fire suppression systems and regular washing of bulk explosives vehicles.

4.2.2 Designated parking spaces

Bulk explosives vehicles, when not in use, now must be parked in a designated parking area. Mine site plans must indicate where these parking spots are located. The parking spaces must be located at least sixty (60) metres (approximately 200 ft.) from the following locations:

- Main access into or from a mine
- Any mechanical or electrical installations that are required to remain in service during a mine emergency
- Refuge stations or other areas where miners gather
- Fuel storage areas

A magazine cannot be used as a parking area. Exceptions to parking space regulations apply when a mine is in a development or exploration phase. However, great caution should still be taken as to where to park a bulk explosives vehicle.

4.2.3 Power washing

Build-ups of grease and oils can present fire hazards, something to avoid any day, but especially if transporting bulk explosives. In consultation with the JHSC or Health and Safety representative (if applicable), a schedule and procedure must be developed to regularly power wash bulk explosives vehicles. Before a vehicle heads to a garage for maintenance, regulations require all explosives and detonators to be removed, and that the vehicle is thoroughly power washed to remove any explosive residue, grease or oil from the vehicle.

4.2.4 Fire suppression systems

All bulk explosive vehicles must have fire suppression systems as specified in Section 135.0.1 (2) of Regulation 854.

4.3 Use and care

Once safely stored in a magazine, care must continue to be taken with explosives to ensure the safety of all workers. Magazines must be inspected by a competent person on a weekly basis, and remain clean and dry at all times. Regulations require explosive and accessories stock rotation in a first-in, first-out basis to ensure that the oldest explosives in the magazine are used first. Detonators and caps cannot be stored with explosives, they must be in a separate container at least eight (8) metres (approximately 26 ft.) from explosives as specified in Section 128. (6) of Regulation 854.

Company procedures, established with the JHSC or Health and Safety representative (if applicable), should clearly outline when and how to dispose of defective explosives as specified in Section 128. (4) of Regulation 854.

4.3.1 Mis fired holes

Before any work is conducted in a working place in surface and underground mine following a blast and blasted materials are mucked out and rock faces cleaned, the exposed faces should be examined for misfires and unsafe face conditions. Sections 136 and 137 of Regulation 854 specifies steps to be taken for any explosive charge that has misfired or cut off for both soft and hard rock underground mines. Written procedures should be established for handling misfires or misfired holes.

4.3.2 Frozen hole and cut

4.3.2.1 Frozen holes

‘Frozen holes’ are blastholes loaded with sensitized explosives such as emulsion that were desensitized due to the effect of squeezing of the blastholes as a result of high stress ground, which did not detonate during the blasting process. Emulsions, stick or bulk, are sensitized

explosives using either micro balloons or by aeration to make them sensitive to detonation. When emulsion explosive is loaded in blastholes drilled in high stress ground and the holes are squeezed while the explosive is in the hole prior to blasting, the micro balloons or air used to sensitize the explosive either pops or the air escapes from the hole causing the emulsion explosive to revert to its unsensitized state, rendering the emulsion hard to detonate.

Any activity such as cleaning and reloading or drilling may be done only if it is done in accordance with methods and procedures developed by the operation and the workers involved in the task and agreed on by the JHSC or Health and Safety representative (if applicable) for the workplace.

4.3.2.2 Frozen cut

As per Section 136. (10) of Regulation 854 states that ‘frozen cut’ means the first holes blasted in a development round that do not break the rock as intended, but rather shatter and cover over with no explosives visible.

Section 136. (8) of Regulation 854 also states that ‘if a frozen cut is encountered, drilling may be done only if it is done in accordance with methods and procedures developed by the employer and the workers involved in the task and agreed on by the JHSC or Health and Safety representative (if applicable) for the workplace.’

Should drilling is a method or procedure developed and agreed by the employer and the workers involved in the task, Section 136. (9) of Regulation 854 specifies that ‘no collaring may be done within 300 mm (12 in) of a frozen cut or if there is a possibility of intersecting any portion of a frozen cut, unless the methods and procedures developed and agreed by the employer and the workers involved in the task, are used.’

Appendix A
Workplace Safety North - Surface and Underground Explosive
and Accessories Storage, Transportation, Use, Handling and Care
Inspection and Management Checklist

Workplace Safety North - Surface and Underground Explosive and Accessories Storage, Transportation, Use, Handling and Care Inspection and Management Checklist

Location: _____	Inspected by: _____	Date _____
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Full - Compliance throughout **Partial** - Few minor deficiencies **No** - Major deficiencies throughout
N/A (Not Applicable) - This question is not relevant to the operation

No.	Surface Magazines Physical Inspection Checklist	Compliance				Comments
		Full	Partial	No	N/A	
1	Notifications/Licenses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Capacity/quantity (Type 1, Type 4, Type 9, Type 12) and including evidence and records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Housekeeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Stock rotation (evidence and records)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Electrical hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8	Fire Suppression system (where required)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	Compatibility of product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10	TACN (Tetraamine Copper Nitrate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Underground Magazines Physical Inspection Checklist	Compliance				Comments
		Full	Partial	No	N/A	
1	Construction/Location (as per Section 126 of Regulation 854) - 60 m from: Main access to the mine (shaft or ramp); Key mechanical and electrical installations; Refuge station or other areas of congregation; Areas of fuel and other potential source of fire (battery charging station); Future development; Security Surrounding area; Access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Magazines and storage areas inspection by competent employees as per Section 127 of Regulation 854 - Housekeeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Capacity/quantity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

5	Electrical hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Ventilation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8	Stock rotation (evidence and records)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	Detonators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10	Fire Suppression system (where required)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11	Product compatibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12	TACN (Tetraamine Copper Nitrate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	Are storage areas designed and built with the appropriate standards ensuring all sources of possible inadvertent initiation have been identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	Are all electrical equipment and wiring installed or used in a magazine or in an explosives storage area that is not a magazine is in compliance with the requirements of the Ontario Electrical Safety Code with respect to Class II, Division 2 hazardous locations as per Section 127 (1) (a) (i) of Regulation 854, and National Standard of Canada Standard CAN/BNQ 2910-500/2015?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Underground Magazines Weekly Inspection Reports/Records	Compliance				Comments
		Full	Partial	No	N/A	
1	Are underground mine magazines inspected weekly by competent person as per Section 127 (2) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Are the condition of the magazine and the explosives inspected weekly as to as per Section 127 (2) (a) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Are magazines inspected weekly as to the quantities of explosives stored therein as per Section 127 (2) (b) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

4	Are weekly inspection reports kept for a period of at least six (6) months as per Section 127 (3) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	Are every magazine and storage container kept clean, dry and free from grit at all times as per Section 128 (1) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Are floors and shelves of a magazine where nitroglycerine explosives are kept treated with a neutralizing agent to remove any traces of nitroglycerine as per Section 128 (2) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Stock rotation - when explosive is issued or removed from a magazine, the explosive longest in the magazine, if not defective, shall be used first as per Section 128 (3) of Regulation 854.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8	Are unattended explosives that are left in or about any working place returned to storage as per Section 128 (5) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	Are detonators and capped fuse stored in a separate, suitable, closed storage container located at least eight (8) metres from any other explosive as per Section 128 (6) of Regulation 854	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10	Are checklists used for inspections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11	Are deficiencies recorded and corrected in timely fashion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12	Is there a classification system for identified deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	Are there special storage requirements for trial products?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	Is there a program in place to prevent unauthorized use of trial products?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Inventory and Control - Explosive Products and Equipment	Compliance				Comments
		Full	Partial	No	N/A	

1	Is there an inventory of all equipment that is used with detonator and explosives products?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Is there a formal procurement policy for the purchase and commissioning of equipment related to explosives and their use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Are records kept for explosives received and issued?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	When explosive products are received, are checks made to ensure purchase order specifications are met?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	Have any issues with compatibility between new and existing product been identified prior to a product being introduced on surface or underground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	When establishing trials for explosive products has a formal risk assessment been completed identifying the scope and time frames associated with the testing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Have all personnel been made aware of the testing of new product including end user's maintenance, emergency response and supervision?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8	Have mill, dry/custodian, security, maintenance personnel been made aware of reporting/handling procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Disposing of old and /or Damaged Explosive/ Detonator Products	Compliance				Comments
		Full	Partial	No	N/A	
1	Has a risk assessment been done on the hazards of disposing of old or discarded detonators and damaged explosive products as per Section 5.1 of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Has a procedure been developed regarding the safe disposal of damaged explosive products in consultation with the JHSC or the HSR, if any, as per Section 128 (4) of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

3	Is the procedure communicated and enforced?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Is maximum accumulation of damaged explosive permitted in a magazine or storage place, and how frequently damaged explosive shall be disposed of, established before the damaged explosive must be disposed of as per Section 128 (4) 2. i. and iii. of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	What means of disposal shall be used as per Section 128 (4) 2. ii. of Regulation 854 ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Maintenance of Explosives Related Equipment	Compliance				Comments
		Full	Partial	No	N/A	
1	Is there a preventative maintenance program in place for equipment related to explosives and blasting as per Section 131. of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Are written procedures established for the following:					
	a. Kept them in sound mechanical condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Conspicuously marked by red signals or flags easily visible from front, rear and both sides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Have all metal parts that could come in contact with containers of explosives covered with wood, tarpaulin or similar non-sparking material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. Not be used to transport other goods or materials at the same time as explosives are being transported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	e. Be equipped with a type BC fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	f. Not be loaded in excess of its rated carrying capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	g. Have explosives secured or fastened so as to prevent any part of the load from becoming dislodged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	h. Transport detonators with other explosives only if the detonators are, (i) in a suitable container in a separated compartment, and (ii) 5,000 or less in number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	i. Be attended at all times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	j. Carry only those persons necessary for handling explosives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Has a procedure been developed for the pre-inspection of equipment to be serviced on site or sent off site for service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Is there a formal program in place to ensure all supplier notifications are shared with appropriate user and maintenance personnel?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	Is there a formal maintenance program for the central blast system that includes isolation from detonating cables, power lighting and communication cables and pipes, rails and other continuous metal circuits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	What means of disposal shall be used as per Section 128 (4) 2. ii. of Regulation 854 ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Transportation and Handling	Compliance				Comments
		Full	Partial	No	N/A	
1	Are written procedures established for employees transporting explosive material: On surface; In the shaft; and Underground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Are written procedures established for the guarding of blasts for: Surface; and Underground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Is there a written procedure for post-blast examination following all blasts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

4	Is there a formal maintenance program for the central blast system that includes isolation from detonating cables, power lighting and communication cables and pipes, rails and other continuous metal circuits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	What means of disposal shall be used as per Section 128 (4) 2. ii. of Regulation 854?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Standard Operating Procedures for Surface and Underground Blasting	Compliance				Comments
		Full	Partial	No	N/A	
1	Are written procedures established for the following:					
	a. Preparation of face/bench	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Drilling in face and/or bench	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Secondary blasting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. Misfires or misfired holes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	e. Frozen holes (cap detonated but the not the explosive column)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	f. Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	g. Barricades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	h. Fly rock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	i. Remote drilling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	j. Squeeze slashes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	k. Construction projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	l. Air traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
m. Wind direction/speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2	Are written procedures established for secondary blasting at the following location:					
	a. Chutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Crushers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Passes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. Hang-ups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	e. Grizzlies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	f. Drawpoints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	g. Oversize muck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	h. Storage bins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Are written procedures established for blasting in the vicinity of diamond drill holes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Is there a written standard established that controls and/or restricts the use of radio transmitters around detonators, magazines and blast sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	Have workers been provided instruction on the dangers of handling explosives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Is there a program established for the monitoring of lightning and electrical storms for?					
	a. Surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Underground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Training Requirements	Compliance				Comments
1	Have appropriate employees received formal training involving the use of explosive materials including:					
	a. Transport/handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Loading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. Inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	e. Fly rock- prevention of damage to surroundings, protection of blaster and site personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Is refresher training provided to employees involved in the handling and use of explosive materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Have all personnel/public, who may be at risk of exposure, been identified and trained in hazard identification related to explosive products?					

	a. New workers, young workers and temporary/contractual workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Maintenance personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Emergency Preparedness	Compliance				Comments
1	Has an emergency preparedness risk assessment been completed, looking specifically at explosives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Has the findings of this risk assessment been formalized in the policies and procedures at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Have the workers/staff/emergency responders received training on emergency measures to be taken in case of fire/flood/fall of ground, etc., such as location of fire extinguishers and instructions as per use, explosive fire how will a fire be handled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Has the emergency response plan been communicated to other responders, Mutual Aid Agreements etc. Surface Fire Brigades?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No.	Investigation / Reporting Requirements	Compliance				Comments
1	Have standards been established to comply with explosive legislative requirements including: Notices; Inspections; Licenses; and Signage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Are incidents involving explosive materials formally investigated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Is there a process to ensure that recommendations arising from an investigation are dealt with in an established time frame?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Are appropriate agencies notified when incidents occur?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

5	Is there a system in place to ensure identified deficiencies are corrected in a timely manner?					
	a. Notices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Licenses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Explosive legislative requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. Training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	e. Inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	f. Transporting of explosives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	g. Blasting vicinity of diamond drill holes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	h. Radio transmitters around detonating materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	i. Incident investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	j. Storage requirements - surface and underground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	k. Purchasing/delivery of explosives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Is there a system to regularly report on reasons why deficiencies are not corrected in the time frame established?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Is there a system to implement recommendations made in various program activities including?					
	a. Incident investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. Formal training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	c. Refresher training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	d. f. Transporting of explosives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e. Engineering standard modifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8	Is there a system to regularly report on the reasons why JHSC recommendations may not be implemented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	Are audits conducted of the "explosives" program element at least every two years as part of your Management Health and Safety Program?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Appendix B
Example procedures for Handling, Transporting and Storing of
Explosives

Handling, Transporting and Storing of Explosives Underground

1. Purpose

The intent of this guideline is to provide the process for handling, transporting and storing of explosives.

2. Scope

This guideline applies to all workers and supervisors involved in the handling and transporting of explosives to and from magazines underground.

3. Definitions

- 3.1 **Explosive:** Any material that can undergo a rapid chemical reaction to produce heat and high pressure.
- 3.2 **Explosive vehicle:** Any vehicle approved for the transport of explosives.
- 3.3 **Site explosive representative:** The contact or delivery person from the explosive supplier.
- 3.4 **Authorized person:** Any employee that is trained and competent in the handling of explosives.

4. Handling

- 4.1 Only authorized and experienced persons are permitted to handle explosives.
- 4.2 No smoking nor open flame is allowed within eight meters of any explosive nor within any magazines.
- 4.3 No activated two-way radios are allowed within eight meters of any explosive nor within any magazines.
 - 4.3.1 No activated cell phones are allowed within one meter of any explosive nor within any magazine
- 4.4 Explosives transported at a mine shall be in suitable closed containers and have detonators, blasting caps and capped fuses kept separate from other explosives. (Capped fuses may be transported with other explosives without placing them in a container if they are kept separate from other explosives.)
- 4.5 **At no time ever a worker is to carry explosives in his coveralls**

5. Delivering to #2 Headframe and Transporting to the Station

- 5.1 Powder requisition sheets shall be delivered to Mine Services, Ore Flow and the Senior Supervisor. These sheets will detail the quantity to be delivered and the level to which the explosives are to be delivered.
- 5.2 It is the responsibility of the shift supervisors to know the designated time of explosive delivery and to assign competent persons to supervise the movement of explosives.
- 5.3 The site explosive representative will deliver the explosives to the #2 Headframe at the designated time.
- 5.4 The cagetender or deck attendant will accept delivery of the explosives.
 - 5.4.1 Delivery will only be accepted if the packing slip is clearly marked with the Consignee/Receiver as one of the following:
 - 5.4.2 Any discrepancies in delivery count will be marked on the packing slip by the person accepting the delivery.
 - 5.4.3 The employee receiving the shipment will print their name and payroll number on the packing slip and then sign the packing slip. This will identify the employee as an Glencore representative.
- 5.5 When explosives are delivered and as soon as all personnel are lowered underground, the cagetender or deck attendant shall transport explosives until the headframe is clear of explosives.

Handling, Transporting and Storing of Explosives Underground

- 5.6 No other materials shall be transported with the explosives in the cage.
- 5.7 No other materials shall be transported in the cage until the headframe is clear of explosives.

6. Removing from the Station

- 6.1 The explosives must be supervised by a person present or by means of an operator using a video camera. An employee must deliver them without delay to the approved explosive storage magazines with priority given to smaller handheld explosives and secondary priority for larger emulsion bins.
- 6.2 When more than one trip is required to remove the explosives from the station, the explosives remaining at the station must be effectively isolated by a 'B' barricade which identifies "No Entry - Explosives" and a worker placed as a guard or by means of an operator using a video camera
- 6.3 If the delivery will be interrupted, the person(s) assigned to move the explosives from the shaft must contact their supervisor immediately. An alternate method must be used to remove the explosives from the shaft without delay.

7 Transporting with the Trolley

- 7.1 The speed of the train shall not exceed ten kilometers per hour.
- 7.2 The explosives shall be in suitable containers.
- 7.3 The train shall display and operate a flashing red light whenever explosives are being transported.
- 7.4 The motor shall be at the front end of the train.
- 7.5 The car carrying explosives shall be separated from the motor vehicle by an empty car or spacer of equivalent length.
- 7.6 No explosives shall be carried on the motor vehicle.

8. Transporting with Vehicles

- 8.1 The speed of the vehicle shall not exceed ten kilometers per hour.
- 8.2 The explosives shall be in suitable containers.
- 8.3 The motor vehicle shall display and operate a flashing red light whenever explosives are being transported.
- 8.4 Transportation must take place by the most direct and safest route.

9 Storing in the Magazine

- 9.1 Every magazine and every storage container shall be kept clean, dry and free from grit at all times.
- 9.2 Use older inventory first.
- 9.3 Do not take explosives to the workplace until ready to load. When explosive is issued or removed from a magazine, the explosive longest in the magazine, if not defective, shall be used first.
- 9.4 All unused explosives are to be returned to the proper storage areas without undue delay.
- 9.5 Assure amount of explosives being put in or removed, is written in magazine inventory log.
- 9.6 Assure magazine is locked when leaving.

10. Related Documents

- KMN-08-BE-PRO-00003 Magazine Inventory Management Procedure
- KMN-08-BE FRM-00011 Magazine Inventory Management Log

11. Reference Documents

- Mines and Mining Plants (Reg. 854 -- 134)
- KMN-08-BE-GDL-00228 Destruction of Explosives Guideline
- KMN-08-BE-PRO-00205 Transporting Explosives on Surface Procedure



About Workplace Safety North

An independent not-for-profit, Workplace Safety North (WSN) is one of four sector-based health and safety associations in Ontario. Headquartered in northern Ontario, WSN administers the provincial mine rescue program and provides province-wide Ministry-approved workplace health and safety training and services for the mining and forest products industries.

With health and safety specialists and mine rescue officers located across the province, WSN and its legacy organizations have been helping make Ontario workplaces safer for more than 100 years. A leading provider of health and safety training and consulting, businesses call upon WSN for expert advice and information. For more information, visit workplacesafetynorth.ca.