2018

Ontario Mine Rescue

District Competition

Mine Description

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1.0 FIRE PROCEDURES

1.1 *To Report a Fire*

Any person who discovers a fire in the mine that cannot be extinguished must call for "STENCH GAS". If located underground, the person discovering the fire must go to the nearest underground telephone and phone the #1 Shaft hoistman by dialling - **555** - and give the hoistman their name and badge number, the location, type and extent of the fire, and request that "STENCH GAS" be introduced. They should also give their location and, if possible, the phone number where they can be reached.

The person requesting the "STENCH GAS" must go to the nearest refuge station, contact a supervisor and report actions taken. Any employees encountered on the way to the refuge station must be informed of the fire and advised to go to the nearest refuge station.

1.2 *#1 Shaft Hoistman's Duties*

On being requested to introduce the "Stench Gas", the hoistman on duty will do the following:

A) Obtain and record the name, number and location of the caller, location and type of fire.

B) Inject "Stench Gas". To activate the "Stench Gas" proceed as follows:

- Unlock the switch on the console by turning the key clockwise
- Dial "600" on the underground phone
- Let the phone ring at least 4 times
- Turn the key "Off", and
- Remove the key.

C) Phone security on the surface telephone and inform them that there is a fire underground and request "Stench Gas" to be injected in the main fresh air raise.

D) Notify #2 Shaft cage hoistman that "Stench Gas" has been introduced into the mine.

E) When advised of the introduction of "Stench Gas", the cage hoists at both shafts must be manned.

1.3 *#2 Shaft Hoistman's Duties*

A) Prepare an SCBA

B) Wait for instructions from the control group or a mine rescue team.

C) Evacuate all personnel to the 2800 level

D) When all personnel have been evacuated the Cage Tender and Hoistman are to report to the 2800 Refuge Station.

1.4 *Cage Tender's Duties*

The #1 Shaft Cage Tender will return to surface immediately after being notified of a fire.

The #2 Shaft Cage Tender shall return to deck immediately after being notified of a fire. Upon arrival on deck, he shall prepare an SCBA and then notify the #2 Shaft Hoistman.

After receiving instructions from the control group or mine rescue team, the #2 Shaft Cage tender will begin evacuating personnel from all #2 shaft levels to the 2800 level Refuge Station.

No cage movement is permitted except on instructions from the control group or mine rescue team.

1.4.1 Employees' Duties

Employees, on receiving the stench gas warning, will go immediately to the nearest refuge station in fresh air.

1) Information pertaining to the fire must be relayed immediately to the supervisor.

2) All persons will remain in the refuge stations until instructed to leave by the supervisor in charge.

3) Persons brought up to surface must report to their department and be checked out before leaving the property.

4) Mine rescue men underground who report to surface must be cleared by their department before reporting to the mine rescue substation.

5) Mine rescue men on surface that are on shift will report to the mine rescue substation after having been cleared by their supervisor.

Employees unable to reach a refuge station due to smoke, etc. should not run around aimlessly. They must retreat from the smoke and consider building a barricade.

2.0 POINTS REGARDING BARRICADING

A) When the decision to build a barricade has been made and there is a telephone in the vicinity, if time allows, phone surface and give the names and numbers of employees and location of barricade site.

B) The supervisor or employee with the most construction experience should take charge.

C) Select a dead-end drift free of smoke that will provide a maximum quantity of air. The barricaded area should include as much area as possible, regardless of the number of men in the party. Make sure there are no other openings or connections with other workings through which gases can enter.

D) Air and water lines with valves should be in the barricaded area and checked before construction begins.

E) Turn Off the fan if the switch is readily available or disconnect the vent tubing as near to the fan as possible to stop smoke being pushed towards the barricade site.

F) All useful material nearby such as tools, timber, vent tubing, nails and lunch pails should be brought to the construction site.

G) Erect the barricade as quickly as possible, making it as air tight as possible.

H) Leave a note outside the barricade indicating the number of men inside.

I) If compressed air is available inside the barricade, the header should be cracked open immediately.

J) When the barricade is completed, rest as much as possible to conserve oxygen and spread out through the area.

K) Take turns at checking the barricade for air tightness and walking through the area to mix the air. Conserve food and water, battery lights should also be conserved. Smoking is prohibited. Signal by pounding on a pipeline.

L) Remain calm inside the barricade until a mine rescue team arrives.

3.0 USE OF COMPRESSED AIR

When there is not time or material available to construct an effective barricade, compressed air from a header or hose should be utilised. This can be done effectively by using oil coats or vent tubing to construct a "tent" around the compressed air outlet. With the head and shoulders covered and air slightly opened inside the tent, this will provide a fresh air zone.

4.0 SELF-CONTAINED SELF RESCUER

4.1 *Employees Duties*

All employees working at #2 shaft are equipped with Self Contained Self Rescuers. In the event of a fire these employees should don their SCSR and proceed directly to the #2 shaft station. The cagetender at #2 shaft will evacuate all workers and himself to the 2800 Level refuge station.

All employees who work at #1 shaft on levels without a refuge station are also equipped with SCSR's and are qualified to operate the cage.

In the event of a fire these employees should don their SCSR and proceed directly to the shaft station and evacuate to surface.

4.2 *Self-Contained Self Rescuer*

4.2.1 Procedure

- DO NOT TAMPER WITH IT.
- Keep your rescuer on your person at all times.
- If it is accidentally opened or damaged report it personally at the end of your shift to your foreman.
- Your self-rescuer is for one purpose:

To Enable You To Escape From A Smoke Or Contaminated Atmosphere.

If You Have To Use Your Self Rescuer:

- Get to a fresh air source or evacuation area as soon as possible.
- Do not talk while wearing the rescuer.

- Walk at a steady pace, do not rush or run you will find it harder to breathe.

- Do not take off your self-rescuer until instructed to do so.

- Know your evacuation route to a fresh air source or Refuge Station.

4.3 *Self-Contained Self Rescuer*

4.3.1 Rules for Use

When Do I Put On The Self Rescuer?

1. When told to do so by an Official
2. Sight ….. Smoke or Air Becoming Hazy
3. Smell ….. Burning
4. Sound ….. Explosion
5. Feel ….. A Sudden Rush of Air

Do Not Wait To Be Told

Better to wear your self-rescuer in doubt ....
Than to be carried out.

When Do I Take Off The Self Rescuer?

1. When it is safe?
    - Fresh air source
    - Refuge Station

2. When told to do so by an Official or Rescue Team

5.0 SUPERVISORS' DUTIES

All supervisors and any other management personnel, who are underground at the time, will go to the nearest refuge station and follow these instructions:

1) The senior mine supervisor will take charge.
2) Clear the refuge station of foul air by opening air valve.
3) Open airline to maintain a positive pressure and await instructions from headquarters. Open the regulator on the door as required.
4) Have all doors and cracks sealed with fire clay, at your discretion.
5) Account for all persons who are in your refuge station. Fill out the forms available in the refuge station. Make special note of all mine rescue personnel.
6) Keep the people in the refuge stations and the doors closed and sealed with the clay provided.
7) Count the persons present and inquire of missing persons; report all those present to the shifters' office by badge number when such information is required.
8) Wait on headquarters to establish phone communication.
9) Contact surface only in an emergency or to relay information pertaining to the fire.

6.0 SECURITY'S DUTIES

On being informed of an underground fire the security officer on shift will do the following:

A) Inject stench in the main fresh air raise

B) Notify Senior Management

C) Notify Mine Rescue Station

D) Notify Ministry of Labour

E) Call out Mine Rescue Teams

F) Notify Neighbouring Mines

G) Notify Medical Facilities

7.0 CONTROL GROUP

Location: Office of Mine Manager at #1 Shaft.

Base Director: Mine Superintendent.

The following are to report to the control group base:

- Mine Superintendent
- Mine Ventilation Engineer
- Safety Superintendent
- Chief Surveyor

The Base Director will assign a person to control access in and out of the base. Mine rescue and advisory personnel will be contacted at the Base Director's request.

8.0 DUTIES OF CONTROL GROUP PERSONNEL

1) Ensure that all persons underground have been accounted for.

2) Ascertain the location of the fire.

3) Obtain current ventilation plans.

4) Prepare mine rescue plans.

5) Co-ordinate and direct mine rescue operations including the locating of missing personnel, the control/extinguishing of fires, the restoration of ventilation and evacuation of personnel.

6) Keep a complete written log of events.

9.0 **ADVISORY GROUP**

Location: Safety Office at #1 Shaft.

Base Director: Manager of Mining

The following are to report to the advisory group base:

- Manager of Mining
- General Manager
- Manager of Engineering
- Manager of Maintenance Services
- Electrical Superintendent

The following personnel are to notify the Advisory Group of their location and are to place themselves on "Standby".

- Director of Materials Control
- Surface Services Superintendent
- Fire Chief

10.0 **POST BULK BLASTING CHECKOUT POLICY (REVISED ANNUALLY)**

The following policy will outline procedures to follow after a bulk blast has taken place.

10.1 ***PURPOSE:***

To ensure that gases produced by long hole blasts have been reduced to a safe level prior to the resumption of work.

To ensure that there has been no significant change in ground conditions in or about the work place after the blast.

10.2 ***APPLICATION:***

Where a blasting plan identifies, a post bulk-blasting checkout is required.

10.3 ***GENERAL:***

No persons shall enter contaminated areas following a bulk blast until the team responsible for checking the ventilation and ground conditions has given approval to the Mine Superintendent or his designate.

The inspection will be carried out by a qualified Team of trained Personnel consisting of a minimum of two persons one of which is a currently qualified mine rescue man the second person may be a qualified gas checker. The team will carry:

- One SCBA per man
- One MX6 per team
- One Jumbo cylinder and extension hose per team
- One SCSR per man

All equipment will be field tested prior to going underground, by competent Mine Rescue personnel.

Gases to be tested are carbon monoxide (CO) and nitrogen dioxide (NO_2). The maximum acceptable limits (TWAEV), before men are allowed to work in the area, are 25ppm (parts per million) for (CO) and 3ppm for (NO_2).

Oxygen content will be checked by the MX6.

10.4 ***Procedure:***

Following a bulk blast, supervision will promptly assess the possible hazards produced by the blasting gasses or ground conditions and will close access to potentially hazardous areas or level(s). These areas will not be opened until normal conditions are verified.

This critical information must be promptly communicated to the Cagetender and all crews affected before anyone is taken U/G.

The team will check for gas concentrations following a designated route of travel laid out by the team in conjunction with mine supervision. Locations of sample points will be arranged prior to going underground.

Testing will be done along a predetermined route of travel subject to the location of the blast. The team may perform limited physical work (e.g.: repair vent duct, open air headers,) in areas that exceed the TWAEV levels CO 25ppm, NO_2 3ppm provided that they are not exposed for longer than 15 minutes.

If at any time concentrations above the SHORT TERM EXPOSURE VALUES CO 100 ppm, NO_2 5ppm are encountered the team is to retreat immediately and notify supervision. If the area cannot be ventilated easily mine rescue teams will be called to perform the work necessary to ventilate the area.

The team will check in at designated phones on the route of travel, or communicate using leaky feeder.

The blasting box will be shorted by the inspection team at the level shaft station before a stope inspection takes place.

All regulators and vent doors will be returned to their normal positions or as prescribed in the blasting plan.

The team will report directly to the Mine Superintendent or his designate when the inspection is complete.

All hazardous conditions will be noted in the hazardous condition logbook.

All readings taken will be noted in the Gas Testing Logbook in the Shifter's office by the person who took the readings, or by the shifter in charge of the shift. All mine rescue equipment is to be properly cleaned and stored after each use.

After all checks are complete, the warning light at the tag-in board is to be turned off.

11.0 DESCRIPTION OF DISTRICT MINE (2018)

11.1 *Description of Workings*

The district mine is a multi-level base metal mine that began production in 1961. The mine is located 15 miles from town and neighbouring mines.

The #1 shaft loading pocket is at 3400 foot level with shaft bottom at 3600 foot level. The #2 shaft with a winze collar and hoist room on the 2800 level extends down to the 4600 level. The # 1-shaft connects with #2-shaft on the 2800 level and also by the ramp to the 3000 level. The internal ramp system begins on the 1200 level and connects all levels down to the 3000 level.

The mine is a combination track and trackless operation with several established and developing stopes. Vertical retreat mining methods are now being utilized. The active mining levels are from 600 level to 4400 level loading pocket.

12.0 MINE SERVICES

12.1 *Air and Water*

Compressed air is supplied from surface via the #1 shaft, with 4" lines throughout active sections of the mine.

Water is supplied from surface via #1 shaft, with 2" lines throughout the mine. Hydrants are located as necessary on each level.

12.2 *Electricity*

Electricity is supplied to the #1 shaft area via the #1 shaft to each level. Electricity is supplied to the #2 shaft area from #1 shaft on the 2800 level. There are two CAT C32 backup generators located on surface for the #1 and #2 shaft hoist drives, which are automatically activated in the event of a power disruption. Electrical substations are located on the level plans. Individual circuits can be shut off from the electrical substation. Main feed to a level can be shut off from the shaft station. Total electrical feed can be shut off from surface. Portable electrical transformers are located in working sections as required.

Electricity on ramps is supplied from each level down ramp to the level below.

12.3 *Ventilation*

Fresh air is supplied via the fresh air raise. The fresh air raise is located south of the #1 shaft. The #1 shaft up-casts the return air to the 400 level return air raise. Also, air downcasts through #1 shaft to the 400 level. The #1 B return air raise main fan is on 400 level. All other main ventilation fans are located on surface. The power to all the main ventilation fans is controlled from surface.

Fresh air down casts #2 shaft to all levels of #2-shaft. Return air up-casts through the stopes to the #2 return air raise on 2400 level.

Portable electric fans and tubing deliver air to the working areas as required. These fans can be shut off at electrical sub stations or at the fans.

Ventilation doors and control doors direct the air flow on each level. Old workings are sealed off by either one of a wooden bulkhead, a curtain, or a muck stopping.

12.4 *Conveyor Ways*

A conveyor way is in operation to move ore from #2 shaft bin to the #1 shaft ore pass. The conveyor drift is equipped with a sprinkler system above the belt as well as a FireFlex Dual Novec 1230 dry chemical fire suppression system installed on the drive end of the conveyor way, at #1 shaft.

12.5 *Refuge Stations*

Refuge stations are identified on level plans.

All refuge stations contain clay, water, compressed air line, telephone, first aid kit and stretcher. All refuge stations are of sufficient size to last 10 hours with 15 occupants if compressed air fails.

Refuge tents are installed throughout the mine on an as needed basis. These refuge tents are 4' x 4' x 7' (6-person) in size and constructed of 18 oz. fire retardant vinyl, complete with an internal storm flap zipper door and a pvc window. There is a portal on the roof that connects to an air-line creating a positive pressure area for the occupants. Engineering department updates these locations on the level prints as they are relocated.

12.6 *Tools and Supplies*

Tools and supplies are located on surface in the warehouse, in the underground shops and #2-shaft deck.

12.7 *Communication*

Pager telephones are located in surface offices, deck, shaft stations, hoistrooms, shops, refuge stations and winze hoist room. Radio communication is available in working areas of the mine.

12.8 *Ground Support*

Rock bolts and screen are used throughout mining sections and haulage ways. Timber sets are used in the #1 and #2 shaft areas extensively in the old square set and cut and fill areas.

12.9 *Fuel Storage*

Fuel is delivered as required with 500 litre tanks on wheels as needed to mining areas. A 2000 litre fuel bay is located on the 2200 level. All fuel bays have automatic dry chemical suppression systems that can be operated manually.

12.10 *Burning and Welding Permits*

Burning and welding permits are issued as required.

12.11 *Garages*

Garages contain burning and welding equipment, normal compliment of tools, oil, grease etc.

Garages are equipped with a manual activated dry chemical suppression system and automatic operated fire doors that can be operated manually.

12.12 *Hoist*

#1 Shaft is equipped with a conventional cage hoist. Standard signals are used and posted on surface, level stations and in the cage. The #1 Shaft skips are loaded and hoisted automatically.

The #2 Shaft has a winze hoist with the hoist room on the 2800 level. The installation of hoist automation has allowed #2 shaft hoist operations to be performed from surface, as required. Standard signals are used and posted on surface, level stations and in the cage. The #2 Shaft skips are loaded and hoisted automatically.

12.13 *Explosives*

Explosives are delivered Tuesdays and Fridays and stored in storage areas as shown on plans.

The magazines are locked and licensed for 2360 kg.

NONEL fuse is delivered Mondays and Wednesdays and stored in locked fuse magazines as shown on plans.

Blasting is done using a central blast method. However, the following precautions must be used if blasting during normal mining operations; i.e. mis-holes, hung up ore passes, oversize muck, etc.

(1) Before blasting,

(a) a worker shall be stationed at each entrance or approach and instructed to prevent inadvertent access to every place where,

(i) the blasting is to take place,

(ii) the safety of persons may be endangered by the blasting, or

(iii) a diamond drill hole intersection may connect with the blast;

(b) the worker doing the blasting shall,

(i) give or cause to be given due warning in every direction by shouting "FIRE", or give warning of a primary blast by siren where the extent of the operation makes shouting ineffective,

(ii) satisfy himself or herself that all persons have left the workplace or the vicinity except those required to assist him or her in blasting and guarding, and

(iii) take necessary precautions to ensure that all areas of the mine to be affected by the blasting operation are vacated. R.R.O. 1990, Reg. 854, s. 141 (1).

12.14 *Escape Way*

There are ladders located in #1-Shaft and #2-Shaft. The ramp is used from 3000 Level to 1200 Level. From 1600 Level to surface there is a ladder in the old #1 Return Air Raise.

12.15 *Hazards and Obstructions*

Poor ground conditions in old workings are identified on level plans.

12.16 *History of Gas*

Methane has been reported occasionally from diamond drill holes. No significant accumulations have been reported over the history of the mine. Secondary sulphide dust explosions occur occasionally during the blasting of vertical retreat stopes, which may produce sulphur dioxide gas.

13.0 **EMERGENCY PREPAREDNESS**

13.1 *Men Working*

There is a 145 man workforce with 65 men on day shift, 60 men on afternoon shift, and 20 men on graveyard shift.

13.2 *Mine Rescue Men*

A total of 26 men are trained at this mine.

13.3 *First Aid Training*

90 of 145 men in the workforce are trained to the standard level.

13.4 *Fresh Air Base*

The fresh air base is located at the discretion of the briefing officer.

13.5 *Fire-Fighting Equipment*

Hose and nozzles are located on surface. Hydrants with 50' of fire hose and nozzle are located at each fire point or station.

Extinguishers are located at electrical sub stations, garages, battery charging stations, warehouse, drill shops, crusher, on mobile equipment and shaft stations.

A 150 lbs Dry Chemical Wheeled Fire Extinguisher is kept on surface in the #1 Shaft headframe.

Additional water headers are located throughout the mine.

13.6 *First Aid Equipment*

First aid equipment and stretcher are located in each refuge station and surface.

13.7 *Fire Procedure*

Fire procedure is described in the attached Underground Emergency Procedures Manual

14.0 **MINE RESCUE EQUIPMENT**

14.1 *Sub-Station*

- 11 BG 4
- 2 Set of standard equipment
- 4 SSR 90 M
- 2 MX6
- 1 CAREvent
- 1 KED

14.2 *Headframe*

- Lifting Bag Controls
- 1 - 22 Ton Lifting Bag
- 2 - 11 Ton Lifting Bags
- 1 High Expansion Foam Generator
- 10 Pails Hi & Low ex foam

14.3 *#2-Shaft*

- 2 SCSR

14.4 *Crusher Station*

#1 Crusher Station	-	2 SCSR
#2-Winze	-	1 SCBA
Hoist Room	-	1 Jumbo Cylinder
	-	1 Gauge and Extension Hose
#2-Shaft	-	1 SCBA
	-	1 Jumbo Cylinder
	-	1 Gauge and Extension Hose

14.5 *Mine Rescue Truck Inventory*

- 6 BG 4
- 2 Sets of standard equipment
- 4 SSR 90 M
- 1 Set of oxygen bottles
- Lifting Bag Controls
- 1 - 70 Ton Lifting Bag
- 1 - 22 Ton Lifting Bag
- 2 - 11 Ton Lifting Bags
- 1 - AFFF tube, nozzle and eductor
- 1 CAREvent

- 1 Thermal Imaging Camera
- 1 - R 411E Ram
- 1 - SP 310E2 Spreader
- 1 - S 700E2 Cutter
- Milwaukee 18V Reciprocating Saw
- 1 - Test-it 6100

15.0 ENTRY INTO BARRICADED DRIFTS

15.1 *Objective*

To prevent inadvertent access into any drift that may contain one or any combination of the following hazards:

- Contaminated or oxygen deficient atmosphere (unventilated areas)
- Hazardous ground conditions
- Open hole conditions

15.2 *Scope*

- All technical staff and underground personnel.

15.3 *Responsibility*

- It is the responsibility of management to ensure that all relevant personnel know, understand and comply with this standard policy and procedure.
- It is the responsibility of the underground front-line supervisor to ensure that any closure of a drift under his jurisdiction meets the standards as outlined in this standard policy and procedure.
- It is the responsibility of the worker, once informed, to comply with the standards as outlined.

16.0 PROCEDURE

16.1 *Permanent Barricade*

A permanent barricade must meet or exceed the following minimum standards.

- Two upright posts with planking nailed horizontally to the posts with chain link screen nailed to the planks.

- Chain link screen bolted to the walls of the drift and must prevent inadvertent access.
- Permanent barricades must have a “Danger Keep Out” sign secured to the barricade.
- If it is known for certain that the barricaded area is unventilated, then a “Danger Keep Out – Unventilated Area” sign shall be posted

16.2 *Drift Closure*

Drifts maybe closed for any one of the following hazards:

- poor ground conditions
- unventilated areas
- open hole conditions
- abandoned workings

When a drift is to be closed for any of the above mentioned reasons the following procedure must be followed:

- install a permanent barricade in a suitable location
- secure either a “Danger Keep Out” or “Danger Keep Out – Unventilated Area” sign to the barricade
- record the date of installation, location and the type of barricade on the 200 scale barricade plans

16.3 *Gaining Access to Barricaded Drifts*

The attached “Restricted Access Entry Form” must be used by anyone wishing to access an area beyond a permanent barricade within a drift.

Fill in the appropriate blanks on the form and submit for approval to the Mine Captain

The Mine Captain will ensure that the form is routed to appropriate departments for their action or remarks

The Underground Superintendent or his designate must approve the access before entry is permitted

Any person entering beyond a permanent barricade is responsible for ensuring that the barricade is left in the same or better manner in which it was found before the entry.

File entry request form in permanent drift closure log

16.4 *Restricted Access Entry Form*

Note: This form is to be initiated by anyone wishing to pass through a permanent barricade. The signed original copy is to be left in the file cabinet in the shifters office and a copy is to be taken underground by the person initiating the access request.

Location: _____

Name of person(s) entering area: _____

Reason for entry: _____

Date of entry: _____

16.5 *Ground Control Department*

Potential hazards: _____

Inspection required: Y / N

Inspection results: _____

Ground Control Engineer: _____

16.6 *Ventilation Department*

Potential hazards: _____

Inspection required: Y / N

Test procedures: _____

_____

Ventilation requirements: _____

_____

Ventilation technician: _____

16.7 *Mining Department*

Other hazards: _____

Permission granted: Y / N

Mine Captain: _ _____

Underground Superintendent: _____