Tier 3: Coleman Orientation

1. Coleman Mine Orientation

1.1 Coleman Mine Orientation



Coleman Mine Orientation

Tier Three - Site Specific Access

1.2 Disclaimer

Disclaimer

The format, information, ideas and concepts used in this presentation are copyrighted. Reproduction in whole or in part is strictly prohibited. This orientation is for the sole use of personnel of Vale and all divisions and subsidiaries of Vale, and any other use is strictly prohibited without the expressed written consent of Vale.

The information contained within this orientation is intended for controlled use within the Learning and Development Department for Ontario Operations. The content and structure of this orientation provides the learner with an overview of Sudbury Operations focusing on HR policies, Health, Safety and Environment and Operational Controls.

The information herein is intended as a training presentation and is not intended to be the sole source of reference information for this system.

The content of this document is current as of the latest release date. Any discrepancies found should be noted and reported to the Learning and Development Department for action.

1.3 How to navigate this Presentation

How to navigate this Presentation



This presentation has been designed to provide you with relevant information for working on Vale property.

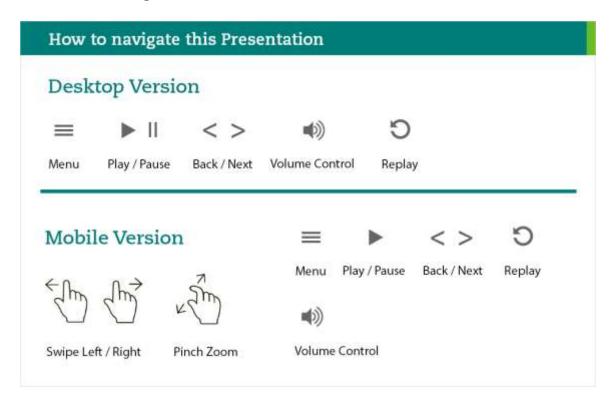


The learning environment has been enriched with additional tools to provide you with an interactive learning experience.



Each slide is narrated and videos and animations will launch automatically.

1.4 How to Navigate this Presentation



1.5 How to navigate this Presentation

How to navigate this Presentation

In addition, the following icons are embedded throughout this presentation to bring your attention to supplementary information or highlight key concepts.







These icons will provide information on Vale's SPIs, programs such as confined space, ZES and access to applicable legislation.

Click on the icon and the information will appear in a window, close the window to return to the presentation.

1.6 Untitled Slide

We are what we do.

Mission

To transform natural resources into prosperity and sustainable development.

Vision

To be the number one global natural resources company in creating long term value, through excellence and passion for people and the planet.

Values

- 1. Life matters most
- 2. Value our people
- 3. Prize our planet
- 4. Do what is right
- 5. Improve together
- 6. Make it happen

1.7 Life Matters Most

Life Matters Most

At Vale we believe **Life Matters Most** and that no job is worth doing if it cannot be done safely.



1.8 Course Requirements



1.9 Course Requirements

To reinforce the value 'life matters most', Vale has implemented a Contractor Site Entry Orientation, which is a graduated process to gain access to areas within a plant or site where work activity takes place. Knowledgeable in fundamental operational controls common to Sudbury Operations. Tier 2 – Surface or Underground Entry Requirements Can access a complex property but cannot access specific plants. Tier 3 – Site Specific Access Orientation Allows access to specific plants within a complex.

1.10 Untitled Slide



1.11 Course Objectives

Course Objectives

Upon completion of this module as a worker you will be able to:

- · Follow Plant Entry Procedure
- · Identify Site Specific Hazards and Controls for Coleman Mine
- · Follow Procedures in the event of:
 - Equipment Damage
 - Personal Injury
 - Process Upset (Emergency Preparedness)
- · Complete Plant Exit Procedure Checklist

2. Introduction

2.1 Introduction



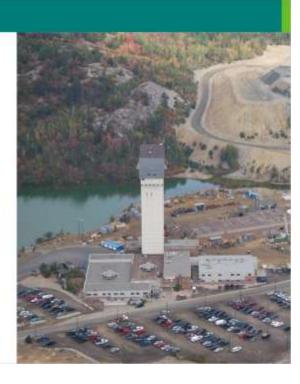
2.2 Coleman Mine Overview

Coleman Mine Overview

At Coleman Mine multiple mining methods are used including Narrow Vein Mining, Cut and Fill Mining as well as Bulk Mining.

Within the mine there are three distinctive mining zones which include the MOB Complex, 153 Ore body and the 170 Ore body, producing copper, nickel and precious metals.





2.3 Coleman Mine Overview

Coleman Mine Overview

Process Flow

Both nickel and copper are being mined, mainly via the Vertical Retreat (VR) mining method.

There are also some development areas being mined using the cut and fill mining method.

After being skipped to surface from (3220L) loading pocket, ore is sent by truck over to the train load out across from Levack Mine.

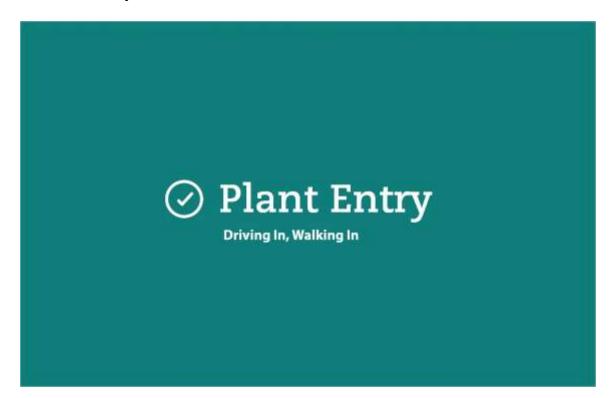
It is then loaded and transported by rail and truck to Clarabelle Mill for processing.





3. Plant Entry

3.1 Plant Entry



3.2 Approaching The Plant

Approaching the Plant To get to Coleman Mine from the Club, take Balsam Street to Greater Sudbury Regional Road 55. Use any lane to turn left onto Regional Road 34 ramp to Big Nickel Mine Road. Continue straight onto Big Nickel Mine Road. Turn left onto Elm St/Regional Rd 35 Continue straight onto Highway 144 Turn right onto regional Road 8, through Levack (Turn right at the stop sign, then left after the tracks) to the end of Coleman Mine Road.

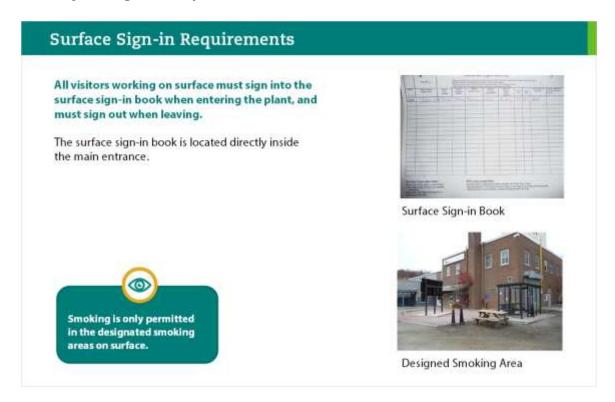
3.3 Approaching the Plant



3.4 Approaching the Plant



3.5 Surface Sign-in Requirements



3.6 Underground Sign-in Requirements

Underground Sign-in Requirements

Every occasional visitor traveling underground at Coleman Mine must sign in to the underground log in book before going underground, and must sign out when arriving on surface.

The underground sign-in book is located inside the First Aid office.

Plant Protection Services Personnel will issue a cap lamp. Cap lamps are to be signed out and returned upon arrival to surface.

If you have been given a locker, the cap lamp # you use will correspond to that locker #. (e.g. locker 456 uses cap lamp 456).



Underground Sign-in Book



First Aid

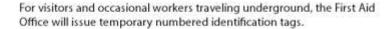
3.7 Underground Tagging Requirements

Underground Tagging Requirements

Every long term employee coming to Coleman Mine will be issued an identification tag.

These tags will include:

- · Photograph
- · Full Name
- · Employee Number
- · Phone Number



This number is to be recorded in the sign-in book entry.

This tag is to be used on the Coleman Mine underground tag in board.



3.8 Underground Tagging Requirements

Underground Tagging Requirements

When tagging in, remember the following:

- · You are required to tag in before going underground.
- Do not tag in until it is permitted to do so in the case of the board being blocked for blasting or clearing.
- · Tag into the correct area.
- Always remember to remove your tag and sign out when you return to surface.



3.9 Going Underground

Going Underground

On deck at Coleman there is only one location where you enter and exit the cage.

- Only lunch pails, bit bags and small hand supplies are allowed on regular scheduled personnel runs.
- Ensure you are wearing all required PPE at this time.
 Gloves are to be worn collar to collar.
- When in the head frame be aware of many tripping hazards e.g. tracks, cage floor, lunch pails etc...
- · Be sure to stay back from the cage, adhere to posted signs.



Any additional parts or tools needed underground are to be placed in the collar house and tagged for the level they need to go to. They will be delivered during the parts run.





4. Plant Hazards and Controls

4.1 Plant Hazards and Controls



4.2 Site Specific Hazards

Site Specific Hazards

Using the tools that you learned in Tier 1 Orientation, ensure you apply the necessary operation controls to mitigate risk associated with the identified hazards.



Be Aware

Be aware of your surroundings and the risks around you.



Follow Policies & Procedures

Our internal policies and procedures guide us in doing our work in a manner that reduces risk. The following section lists identified hazards that may be encountered in the work you're doing. Knowing if these hazards apply to your work can be found through:

- · Vale Contact Person
- · PHA/PHR (or other Risk Assessment Tools)
- SLAM

4.3 Site Specific Hazards

4.4 3370 High Traffic Area - Hazard

3370 High Traffic Area - Hazard

Almost every worker at Coleman Mine starts their day by getting off the cage on 3370 level, then boarding a man carrier or jeep to get to their work place.

This high level of interaction between equipment and pedestrians presents the high risk hazard of pedestrian and vehicle collision.







4.5 3370 High Traffic Area - Hazard

3370 High Traffic Area - Hazard

The following hazards exist every shift.

- · Boom trucks picking up supplies.
- · Forklifts moving material in the area.
- Interlocking Ventilation doors and swinging man doors.
- Personnel carriers loading and unloading on the main line.
- Personnel carriers leaving their parking area to head into the mine.







4.6 3370 High Traffic Area - Controls

3370 High Traffic Area - Controls

To mitigate the hazards, the following controls have been put in place:

- Cap Lamps must be worn as soon as employees exit the cage.
- To reduce the hazard of equipment turning around and backing up the Coleman Mine 3370 parking policy mandates equipment be parked facing away from the shaft.







4.7 3370 High Traffic Area - Controls



4.8 Seismicity - Hazard

Seismicity - Hazard

Coleman Mine is operating in deep areas. Mining leaves voids that generally alter the balance of forces in rock, at times causing rock bursts.

Coleman has a history of seismic activity, this activity can cause displacement of ground or other structures which could potentially injure workers in those areas.

As a result, workers must be aware of the following hazards;

- Falls of ground resulting in workers being struck or trapped.
- Loss of services such as ventilation, water, or pressurized air, or
- Obstructed or loss of egress via walkways, ramps or cage travel.





4.9 Seismicity - Controls

Seismicity - Controls

To mitigate the hazards of associated with seismic events Coleman Mine has ground support systems with key measures taken to eliminate or minimize any problems associated with ground instability.

In addition, Coleman Mine has implemented the following:

- There are sensors throughout the mine that record seismic activity, these sensors feed
 a data base that is available to all supervisors.
- Always be alert for the potential of seismic activity, it is a requirement for workers to report any suspected seismic activity to their supervisor.
- If warranted, there will be instructions broadcast on all channels – follow instructions.





4.10 Old Workings – Hazards and Controls

Old Workings - Hazards and Controls



Levack Drift

The Levack drift is in the exhaust portion of the mine ventilation.

Pumps and dams require inspection and maintenance regularly in this area.

In the event of a mine fire or contaminated atmosphere employees in this location are at risk of exposure to poisonous gasses.



To mitigate the risks to personnel in the Levack drift, Coleman Mine has implemented the following controls:

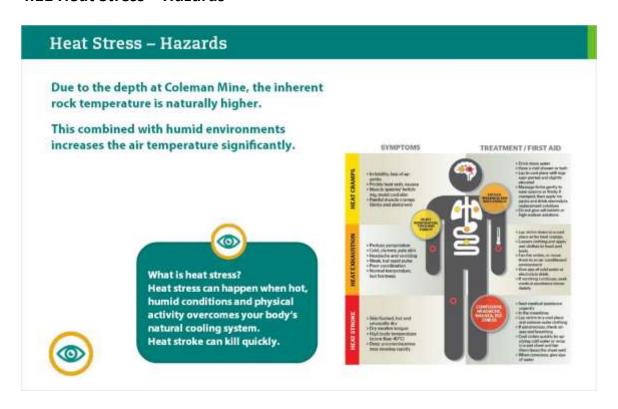
Workers require proper authorization from Vale plant contact prior to performing work in Levack drift.

Workers are to inform First Aid that they will be entering the drift. Then call First Aid when they come out.

Workers are to be with partners at all times.

Workers are to be on the "working alone" system even though they are with a partner.

4.11 Heat Stress - Hazards



4.12 Heat Stress - Hazards



4.13 Heat Stress - Controls

Heat Stress - Controls

To mitigate the hazard of heat stress, Coleman Mine has implemented the following controls:

- · Refuge stations are equipped with air conditioning units.
- · Supervisors are trained in thermal management to assess workplace conditions.
- · Work/rest regimes are in place for areas identified through workplace assessments.
- · Drinking water is available to workers and can be found at locations throughout the mine.





4.14 Mobile Equipment – Hazard

Mobile Equipment - Hazard

Mobile equipment presents a high risk hazard of collision with a vehicle or pedestrian.

The mobile equipment hazards at Coleman Mine include the following:

- Large scoops operating on different levels that have very limited visibility.
- · Several different ore bodies with different entry protocols.
- One access point for all the mines mobile equipment lending to congested mobile equipment areas.







4.15 Mobile Equipment – Controls

Mobile Equipment - Controls

To mitigate the risk of collision, Coleman Mine has implemented the following controls:

Designated Haulage Ramp Travel Procedure:

All personnel traveling on the designated haulage route must be familiar with the area and it's protocols.

Level entry protocols:

In order to enter any ore body or level, both pedestrians and vehicles must first get permission from the haulage equipment in that area.







4.16 Mobile Equipment – Controls

Mobile Equipment – Controls

To mitigate this hazard be aware of the following controls:

- Headlights and vehicle blue flashing lights are to remain on at all times when operating mobile equipment.
- All jeeps and small equipment are to have blue flashing lights on the roll bar and have spot lights pointed at a 45° upwards angle, and be on at all times.
- All employees driving underground at Coleman Mine must have a good working knowledge
 of the mine, and know proper channels for the orebody being entered.







4.17 Kiruna Ramp – Hazard

Kiruna Ramp – Hazard

Muck is trammed from the three different ore bodies at Coleman mine through the use of 50t electric Kiruna trucks.

The trucks receive their power through a 1000V trolley line that runs the length of the Kiruna ramp.





4.18 Kiruna Ramp – Hazard

Kiruna Ramp - Hazard

The high risk hazard of collision or electrocution is ever present, the following contribute to this hazard;

- The Kiruna trucks travel 20km an hour both up ramp and down ramp, these speeds are much greater than their diesel counterparts.
- Being electric these trucks are very quiet, the lights will come into view before you hear a sound.
- The 1000V trolley line is always live creating the hazard of electrocution if contacted.
- Kiruna truck drivers need to be focused on many things, maintaining contact with the trolley line, managing the radio calls looking for truck locations





4.19 Kiruna Ramp – Controls

Kiruna Ramp - Controls

To mitigate the hazards associated to Kiruna Ramp Travel, Coleman Mine has implemented the following:

- All personnel preparing to travel on the Kiruna truck ramp must have a working radio. If you are in an enclosed cab you must have a working base radio. Personal radios are not sufficient.
- All personnel traveling the ramp must have their radio tuned in to channel #3 for the duration of their ramp travel.
- Pedestrians walking on ramp must follow procedure as well.





4.20 Kiruna Ramp – Controls

Kiruna Ramp - Controls

To mitigate the hazard of associated to Kiruna Ramp Travel, Coleman Mine has implemented the following;

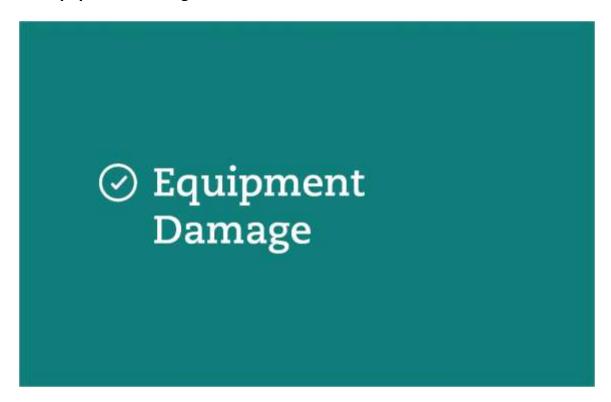
- Do not work within 10 feet of trolley line unless authorized by your supervisor and the trolley line has been locked, tagged and grounded out by a Vale electrician.
- If mobile equipment comes into contact with the energized trolley line, occupants are to remain inside vehicle until directed by authorized personnel.
- Do not drive on kiruna ramp unless you feel comfortable, and have reviewed procedures with your supervisor.



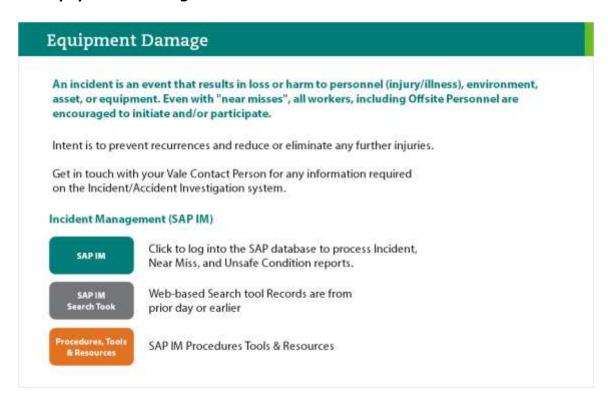


5. Equipment Damage

5.1 Equipment Damage



5.2 Equipment Damage



6. Personal Injury

6.1 Personal Injury



6.2 Personal Injury

Personal Injury

Coleman Mine Emergency Numbers

In the case of personal injury, contact your Supervisor and report immediately to First Aid.

In the event you cannot physically report to First Aid, contact First Aid for emergency response.

First Aid (PSP)705-966-4111/4555

SSL......705-966-4333

Note: If you are calling any Vale number from a Vale phone only the last 4 digits are required to be dialed.



7. Emergency Preparedness

7.1 Emergency Preparedness



7.2 Emergency Preparedness

Emergency Preparedness

The Mines Tier 2 Orientation provided guidance on the application of Emergency Preparedness including activating an emergency and how to classify one.

The following is a general overview of how to respond to an emergency at Coleman Mine.

It is necessary that you familiarize yourself with the fire procedure(s) that apply to your specific area(s) of work at Coleman Mine. Your Supervisor or plant contact should review this with you.



7.3 Emergency Reporting

Emergency Reporting

To report any emergency at Coleman Mine, notify your supervisor or plant contact immediately or contact First Aid.

Here is a list of Coleman Mine Emergency Numbers, as well as the radio channels in use.

Coleman Mine Emergency Number

First Aid (PSP)......705-966-4111/4555

SSL......705-966-4333

Note: If you are calling any Vale number from a Vale phone only the last 4 digits are required to be dialed.

Radio Channels

- 1. First Aid/Working Alone
- 2. Mines Services
- 3. Kiruna Trucks
- 4. 153 OB
- 5. Mobile Maintenance
- 6. Sandfill
- 7. MOB 1 & 2
- 8. MOB 3
- 9. Logistics
- 10.170 OB
- 11. Surface and Yard
- 12.Spare
- 13.Contractors (153/170)
- 14.Contractors (MOB's & Upper)
- 15. Electrical/Millwrights
- 16.Proprietary Shaft (Hoist)

7.4 Notification – Copper Cliff Mine

Surface Alarms - Emergency Notification

INVAC

Intermittent Alarm (High-Low)

All personnel are to stay inside and immediately report to the designated containment assembly area which is in the Amphitheatre.

OUTVAC

Fire Alarm (Continuous Bells)

All personnel are to leave the building by the closest route of exit and assemble together as a group in the designated evacuation assembly area.



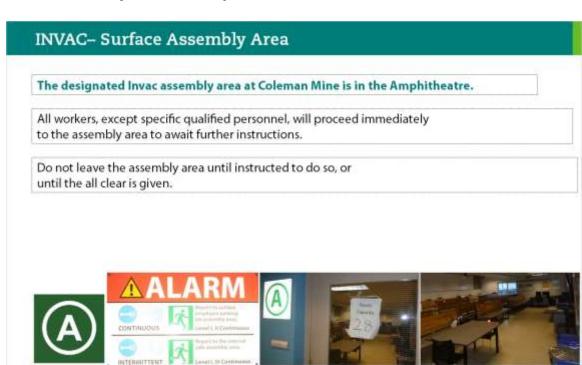
Go to the nearest Safe Assembly Area.



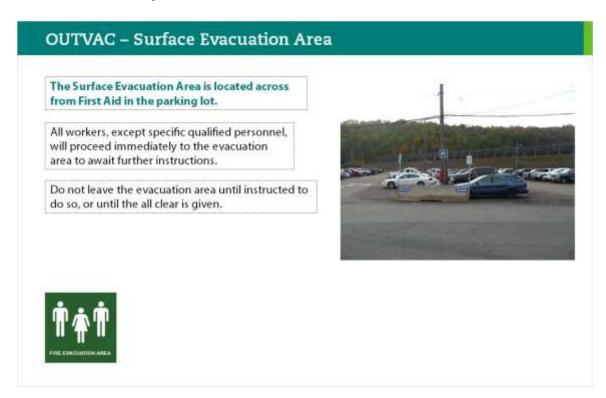
Leave the building by the nearest exit.

Alarm testing is conducted each Wednesday morning. Report any malfunctions immediately to your Supervisor to ensure that it is corrected in a timely manner.

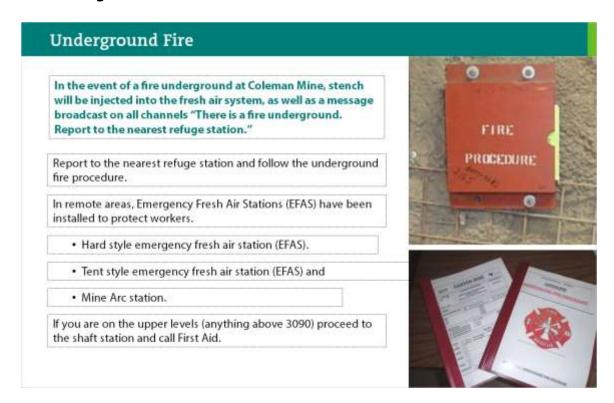
7.5 INVAC- Surface Assembly Area



7.6 OUTVAC - Surface Evacuation Area



7.7 Underground Fire



7.8 Emergency Fresh Air Station – Hard Style

Emergency Fresh Air Station - Hard Style

Emergency fresh air stations (EFAS) are located in more remote areas that do not house standard refuge stations.

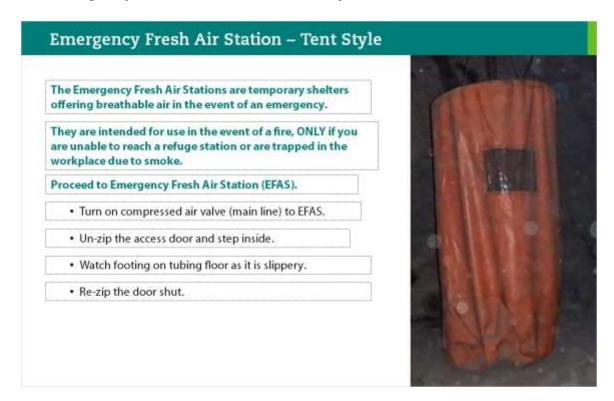
They are intended for use only if you are unable to reach a refuge station. They are equipped with compressed breathing air cylinders.

- For the EFAS containing cylinders outside, turn on the bottle valves before entering.
- Remove the door seal and crack open the compressed air valve inside the EFAS.
- If the compressed air line fails, follow the steps that are posted inside the EFAS to use the cascade system.
- Follow the procedure for the hard style EFASs as described in the underground fire procedure book.





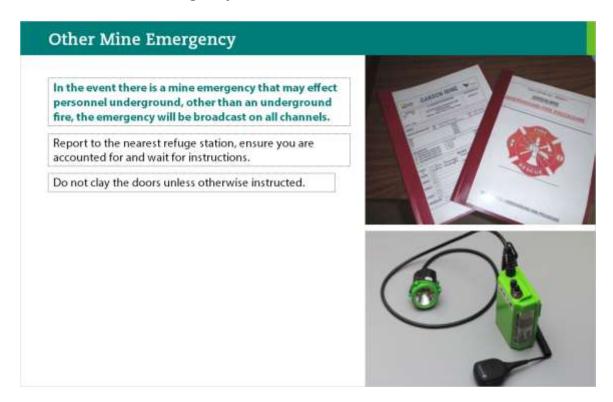
7.9 Emergency Fresh Air Station – Tent Style



7.10 Emergency Fresh Air Station – Tent Style

The Emergency Fresh Air Stations are temporary shelters offering breathable air in the event of an emergency. They are intended for use in the event of a fire, ONLY if you are unable to reach a refuge station or are trapped in the workplace due to smoke. Proceed to Emergency Fresh Air Station (EFAS). Ensure that the compressed air valve (inside roof) is open to pressurize the enclosure. Contact First Aid via radio, give the location, name and numbers of persons inside and verification the compressed air is on. Remain inside of enclosure until rescued or released by Control Group.

7.11 Other Mine Emergency



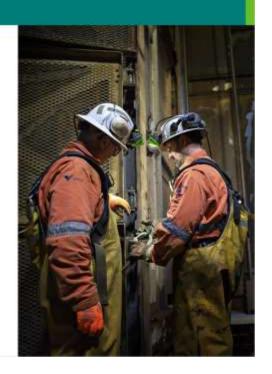
7.12 Underground Evacuation

Underground Evacuation

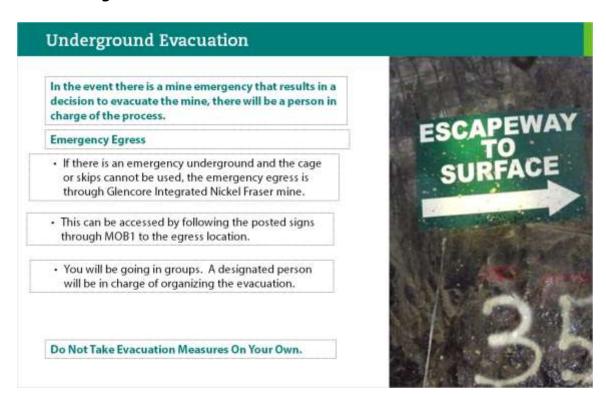
In the event there is a mine emergency that results in a decision to evacuate the mine, there will be a person in charge of the process.

Do not take evacuation measures on your own.

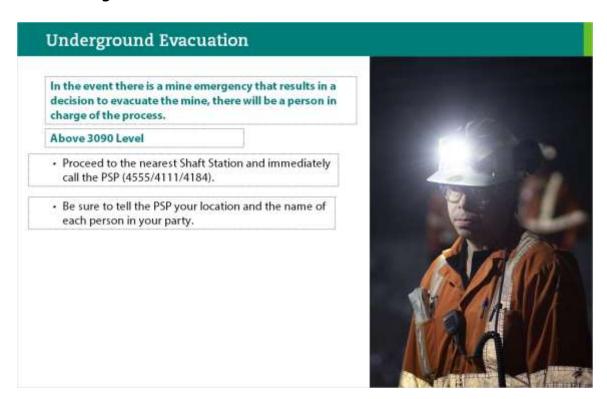
- If the cage is not in use the skips will be put on standby.
- This means that if there is an underground emergency persons will be able to go to the 3090 shaft station and be brought to surface in a skip (holds approx. 4 people).
- 3090 shaft station can be accessed through the conveyor ramp off the main line. It is mandatory to get permission from the conveyor operator before entering the ramp.



7.13 Underground Evacuation



7.14 Underground Evacuation



8. Plant Exit

8.1 Plant Exit



8.2 Arriving on Surface

Arriving on Surface

Upon arrival to surface, always be sure to;

- · Watch for footing in all track areas.
- Exit cage and make sharp turn right to the warm room area.
- Be aware of tugger cables and supply trucks or any work being performed on deck.
- Remove your underground tag from the tag-in board and sign out of underground book, if applicable.



8.3 Plant Exit

Plant Exit

Good work practices dictate that you close the loop on work you were doing to avoid creating risks or hazards for other work groups, cross shifts, or other work in the area. Here are some tasks to consider when getting ready to exit the plant to ensure your safety and that of those around you:

Housekeeping: Is your worksite cleaned up after your job?

Personal Lock and Tag: Has your personal protection been removed at the end of the shift?

Status Tagging: Is there ongoing work that needs a status tag placed or is there equipment in Bad Order that needs to be identified?

End States: Have you left the process in the proper state?

Waste Segregation: Have you disposed of materials in the appropriate waste receptacles/bin/area?

Control room: Do I need to let the control room know that I'm clear of an area?

Vale Contact Person: do they need an end of shift report from me?

Permits: do I need to close or hand in any permits?

Sign out: at the gate or other designated areas.

9. Conclusion

9.1 Conclusion



9.2 Conclusion

Conclusion

This concludes the material for Tier 3 Vale Coleman Mine Specific Orientation. You should now have a working knowledge and understanding of:

- · The Mining Plant Layout and Boundaries
- · Plant entry and tagging requirements
- · The high level general hazards and controls with regard to:
 - 8 3370 High Traffic Area
 - Seismicity
 - Old workings (Levack drift)
 - Heat Stress
 - Mobile equipment
 - Kiruna Ramp Hazards

9.3 Conclusion

Conclusion

This Orientation provided information to access Coleman Mine. In order to feel comfortable with the area, you should arrange a field visit with your Vale Contact Person or direct Supervisor to review hazards and controls specific to your work area(s).

Additionally, depending on the site or the work you're doing, you may require task-specific information through either the local Learning & Development Group or your Vale Contact Person.



9.4 Start The Module Quiz

