

## Tier 3: CCM South Mine Project General Underground Orientation - 52

### 1. Copper Cliff Mine South Side

#### 1.1 Copper Cliff Mine Project



## **1.2 Copper Cliff Mine Project**

# **Copper Cliff Mine Project Phase 1 Orientation**

## **Tier Three – Site Specific Access**

DM# 1265753 – Revision 4.0 date Jan 28, 2018

## **1.3 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 Copper Cliff Mine Project
- Follow Procedures in the event of:
  - Equipment Damage
  - Personal Injury
  - Process Upset (Emergency Preparedness)
- Complete Plant Exit Procedure Checklist

## 2. Introduction

### *2.1 Introduction*

# Introduction

Copper Cliff Mine Project  
Overview

## 2.2 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Project represents an expenditure of \$760 million dollars spread out over four years, with completion scheduled for 2020.

Phase 1 is focused on re-activating and expanding Copper Cliff Mine South, and involves work on the south shaft, hoists and headframe.

It also involves underground development to access new mining fronts between Copper Cliff and the South shaft down to approximately 1,585 metres (5,200 feet) below surface.

At the peak of construction, the project is expected to employ approximately 400 - 450 people. Phase 2 of the project is currently in the final stages of a pre-feasibility study.

#### Copper Cliff Mine Project – Leadership Team

Ben De Jager	Development, Construction & Logistics Manager
Chantel Lewis	Engineering Manager
Jack MacIsaac	Maintenance/Electrical Lead
Mark Moffat	Development Lead
Tim Hunt	Chief Mine Engineer
Jason Leader	U/G Construction Lead
Derek Fredette	Safety and Health Lead
Claude LaRochelle	Mobile Lead
Kathryn Milner	Project Controls Manager

## 2.3 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:





## 2.4 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Preparation of temporary surface facilities (i.e. tents, trailers, fencing, etc.).



## 2.5 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Surface facility upgrades (i.e. office/dry complex, ventilation fans, fuel station, transformers, etc.).



## 2.6 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

15,000 ft. lateral development and 15,000 ft. of raising.



## 2.7 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Complete shaft rebuild.



## 2.8 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Replacement of both hoists on surface.



## 2.9 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Refurbishment of the 4000L ore handling system.





## 2.10 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Repair or replace underground services as required.



## 2.11 Copper Cliff Mine Project Scope

### Copper Cliff Mine Project Scope

The Copper Cliff Mine Phase 1 Project commenced in early 2017 and anticipated completion of all project work is scheduled for mid-2020.

The project scope of construction includes the following:

Underground infrastructure construction (i.e. garages, refuge stations, switch rooms, sumps, etc.)



## 3. Plant Entry

### *3.1 Plant Entry*

# Plant Entry

Driving In, Walking In

### 3.2 Approaching The Plant

## Approaching The Plant

Copper Cliff Mine Project has one point of entry into the plant which is accessed via Power Street off of Municipal Road 55.

The road is a single laned roadway with strict restrictions from passing any vehicles.

The road traverses two sets of railway tracks.

Be aware of large trucks hauling various products to and from the Power Street roadway

Always be aware of your surroundings and proceed with caution.



Due to increased pedestrian and mobile equipment activity, beyond the Power St Gate, Site speed limit is reduced from 25Km/hr to 15km/hr.

### 3.3 Approaching The Plant

## Approaching The Plant

### Approaching the plant during an Emergency

Emergency warning lights will be activated during any Level event occurring within the Electrowinning Gate perimeter; as well as during any Level III event occurring elsewhere.

*If you are approaching an area during a plant emergency you must comply with the following instructions:*

- Do not enter the plant or property and keep entry routes clear for Emergency Response vehicles.
- Remain in your vehicle, close the windows and shut off ventilation.
- Follow any instruction from Vale Emergency Response or Plant Protection personnel.
- If it's safe to do so, drive off the site until the emergency condition is controlled, if you're unable to do so, remain parked in your vehicle.
- Inform your supervisor of your current location due to entry restrictions and remain in contact until the emergency is resolved.
- Return to site once the emergency has been declared "all clear".



## Surface Sign-in Requirements

The surface sign-in book is located outside of the First Aid office, next to the vending machines.

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The surface sign-in book is located outside of the First aid office, next to the vending machines.

**All visitors must check in with their sponsor prior to commencing any work at CCM Project.**





### 3.6 Surface Tag-in Requirements

## Surface Tag-in Requirements

Every long term employee coming to the Copper Cliff Mine Project will be issued an identification tag. Visitors traveling on surface will sign the surface visitors sign in booklet, which will be located near the First Aid and Security Office.

Prior to proceeding to any worksite on surface, the Copper Cliff Mine Project tag-in board will be used.

Employees that have not had their personal identification tag issued to them yet must obtain a temporary visitors identification tag from the First Aid and Security Office for use on the Tag-In board.



Surface Tag-in Board

## 4. Surface General Hazards

### *4.1 Surface General Hazards*

# Surface General Hazards

## 4.2 PPE Policy at CCM South Site

### Surface General Hazards

#### PPE Policy at CCM Project

##### Hearing Protection:

Hearing protection must be worn as marked by signage in the industrial environment.

##### Protective eyewear (SPI-SAF 01):

All employees must wear suitable protective eyewear in compliance with SPI-SAF-01 and be fit tested to ensure proper protection.

- Wire or steel frames are NOT allowed.
- Contact lenses are also NOT allowed.

## 4.3 PPE Policy at CCM South Site

### Surface General Hazards

#### PPE Policy at CCM Project

##### Protective eyewear (SPI-SAF 01):

The following areas are *exempt* from eye protection:

- Refuge stations underground.
- Underground offices.
- Surface offices and dry.

**Note:** Protective eyewear must be worn when performing work, even in the exempt areas.

#### 4.4 PPE Policy at CCM South Site

## Surface General Hazards

### PPE Policy at CCM Project

#### Hand Protection:

All personnel are to wear gloves at all times once they leave the warm room.  
IF YOU NEED GLASSES, YOU NEED GLOVES!

#### Protective Footwear (SPI-SAF 02):

All personnel must wear steel-toed footwear with metatarsal protection at all times when in industrial areas.

#### 4.5 PPE Policy at CCM South Site

## Surface General Hazards

### PPE Policy at CCM Project

#### Protective headwear (SPI-SAF 07):

Hardhats must be worn whenever performing work at the CCM Project site.

**Hard hats must also have employees names clearly displayed on the front**, mounted ear muffs installed except for welders in the process of welding, shaft crew employees with authorization from your Vale contact person and those with a doctor's note.

In all cases, portable muffs must instead be carried with the worker.

Mini strobe lights must be installed on all hardhats and turned on from station to station or portal to portal while on foot.

#### 4.6 PPE Policy at CCM South Site

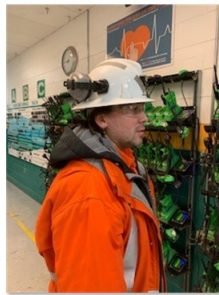
## Surface General Hazards

### PPE Policy at CCM Project

#### Adornment:

Personnel working in industrial environments are not allowed to wear exposed jewelry that can become entangled, caught in or pose unnecessary risk to the employee (i.e. dangling chains or hooped earrings).

**No hoodies are to be worn under coveralls, jackets or hardhats while on site.**



#### 4.7 PPE Policy at CCM South Site

## Surface General Hazards

### PPE Policy at CCM Project

#### Protective headwear (SPI-SAF 07):

The following areas are *exempt* from wearing protective headwear:

Surface:	Underground:
Control room	Refuge stations including outside in immediate washing area
Office building	Lunch room
Parking lot	Vehicles with enclosed cabs
Vehicles with enclosed cabs	Underground offices
Surface offices	
Hoist cubicle	

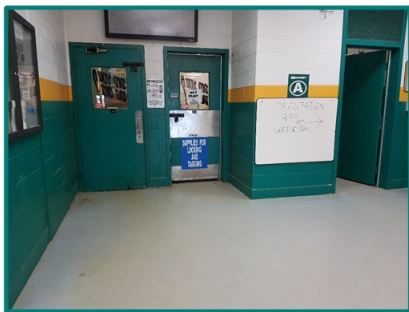


## 4.8 ZES Locking and Tagging Supplies

### Surface General Hazards

#### ZES Locking and Tagging Supplies

- Locking and Tagging supplies are stored in lockers located in the Sub-Collar.
- The lockers are marked indicating that they contain ZES supplies.
- If supplies are running low or if you can't find a particular device or type of tag, notify your supervisor immediately.



## 4.9 Additional Directives and Procedures

### Surface General Hazards

#### Additional Directives and Procedures

##### Mobile Equipment:

- No workers are permitted to work from a Scoop Bucket.
- All vehicles in the CCM Project Construction area whether operating on Surface or Underground are required to carry and use Wheel Chocks (*Stationary or Manual*).
- No mobile equipment or electrical distribution equipment is to be used on site unless it is inspected and approved by the CCM Project Electrical/Maintenance department.
- While operating mobile equipment, plan job tasks to reduce or eliminate operating in reverse as much as possible.

## 4.10 Additional Directives and Procedures

# Surface General Hazards

### Additional Directives and Procedures

#### Mobile Equipment:

- A mobile equipment spotter is required when:
  - Entering or exiting a building or workshop.
  - View of mobile equipment is obstructed.
  - While operating mobile equipment in close proximity to buildings and pedestrian walkways when in reverse.



## 4.11 Smoking at CCM Project

# Surface General Hazards

### Smoking at CCM Project

Smoking is only permitted in the designated smoking area on surface. No smoking is permitted anywhere else in the facility, whether surface or underground.

No worker is permitted to bring cigarettes, cigars, e-cigarettes or butane lighters underground.



Designated Smoking Area



## 4.12 Storm Warning/Lightning Protocol

# Surface General Hazards

### Storm Warning/Lightning Protocol

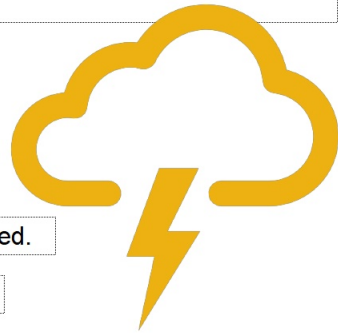
**Number 1 First Aid will notify the on-site PSP when a storm warning is issued.**

An announcement initiating the Storm Warning Protocol will be broadcast over the PA and Radio systems.

#### *Upon activation of the Storm Warning Protocol:*

- All elevated work is stopped.
- All work above ground level and inside confined spaces is stopped.
- All personnel working outside are to seek shelter immediately.

Once the storm has passed, the all clear will be given over the PA and Radio systems.



## 5. Underground Entry Procedures

### *5.1 Underground Entry Procedures*

# Underground Entry Procedures

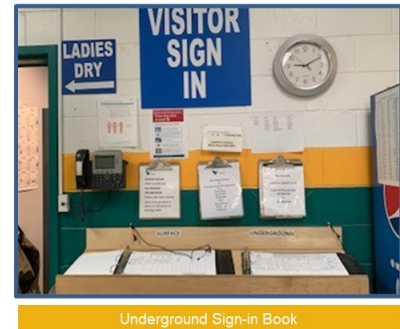
## 5.2 Underground Sign-in Requirements

### Underground Sign-in Requirements

Every occasional visitor traveling underground at Copper Cliff Mine Project 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 outside 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.



Underground Sign-in Book

## 5.3 Underground Tagging Requirements

### Underground Tagging Requirements

Every long term employee coming to Copper Cliff Mine Project will be issued an identification tag.

These tags will include:

- Photograph
- Full Name
- Employee Number
- Phone Number



For visitors and occasional workers traveling underground, the First Aid Office will issue temporary numbered identification tags.

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



## 5.4 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 event the board has been blocked for blasting or clearing.
- Tag in to the correct area and shift.
- Always remember to remove your tag and sign out when you return to surface.

**Note:** CCM Project maintains their own underground tag in board for the same shared work area.



## 6. Underground Hazards and Controls

### *6.1 Underground Hazards and Controls*

# Underground Hazards and Controls

## 6.2 Site Specific Hazards

### Site Specific Hazards

Using the tools that you learned in Tier 1 Orientation, ensure to use operational controls to mitigate risk associated to 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
- PMRA/PHR/JHA (or other Risk Assessment Tools)
- SLAM / FLHA

## 6.3 Site Specific Hazards

### Site Specific Hazards

At Copper Cliff Mine Project, workers need to be aware of site specific hazards and their related controls. These include but are not limited to:

- Ramp Travel
- Ground Water Management
- Dust/Airborne Contaminants
- Ventilation
- Noise
- Heat Stress
- Mobile Equipment
- Mine Expansion
- Getting Lost
- Seismicity
- Mould Awareness





## 6.4 Driving Underground - Hazard

### Driving Underground - Hazard

Designated contractors will eventually travel underground and be picked up at the front of the administration building at 7:10 am.



## 6.5 Driving Underground - Control

### Driving Underground - Control

Any personnel required to drive a vehicle underground on the CCM Project must first receive site specific ramp travel training.



Tasks outside of the scope of this Orientation will be provided with task-specific training by the Learning and Development Department.





## 6.6 Road Conditions - Hazard

### Road Conditions - Hazard

A rough roadway surface puts unnecessary stress on equipment components as well you the operator. Workers must be aware of the hazardous conditions caused by rough road conditions, which include;

- Loss of Control of the vehicle.
- Equipment Damage.
- Personal Injury.
- Falls of material / loss of load.



## 6.7 Road Conditions - Control

### Road Conditions - Control

To mitigate this hazard, Copper Cliff Mine Project has implemented the following controls:

- Follow the Ramp Speed of 25 km/hr.
- Always wear your seatbelt in moving vehicles.
- Ensure all loads are properly secured.
- At the first sign of problems, raise your concerns with supervision.



## 6.8 Managing Ground Water - Hazard

### Managing Ground Water - Hazard

The Copper Cliff Mine Project is considered a wet mine.

Workers need to be aware of site specific hazards (slippery conditions, run of muck) and their related controls.

If ground water is not controlled and allowed to accumulate, there is a risk that it can become impounded, which can result in an uncontrolled flow of material.



Pay close attention  
Flooding can happen very quickly  
if drain holes and pumps  
are not maintained.

## 6.9 Managing Ground Water - Control

### Managing Ground Water - Control

To mitigate this hazard be aware of the following controls:

- The Water Management Plan including:
  - Drain holes and sumps are inspected and maintained on a daily basis.
  - Dams and bulkheads.
  - Report any excess water to your supervisor.



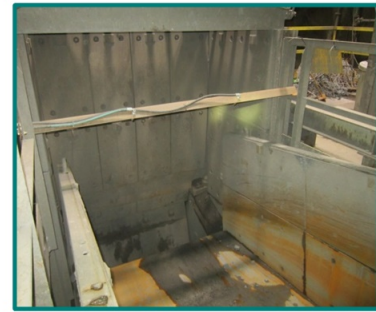
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are not maintained.

## 6.10 Dust / Airborne Contaminants - Hazard

### Dust / Airborne Contaminants - Hazard

During Copper Cliff Mine Project mining activities, (eg drilling, tramming or shotcreting) dust and/or other airborne contaminants can be created that can pose long term health hazards.

- Airborne chemicals are breathed in through the mouth or nose.
- The size of particles or droplets can affect where the chemical settles in the respiratory tract.
- Where the chemical settles in the respiratory tract determines what symptoms or diseases will develop.



## 6.11 Dust / Airborne Contaminants – Hazard

### Dust / Airborne Contaminants - Control

To mitigate the hazard of being exposed to dust or airborne contaminants be aware of the following controls:

- Signs posted throughout the mine informing workers if respirators are required.
- Conditioning the muck with water will greatly reduce the amount of air born dust.
- Calcium applied to road, when required.
- Reporting dusty conditions to your supervisor.
- Occupational exposure testing of workers.





## 6.12 Ventilation - Hazard

### Ventilation - Hazard

Copper Cliff Mine Project has a very large footprint. At times it would be easy to surpass the ventilation requirements for equipment use which presents the hazard of workers being exposed to contaminated air.

Airborne contamination in the mine includes Dust, Carbon Dioxide and Diesel particulates.



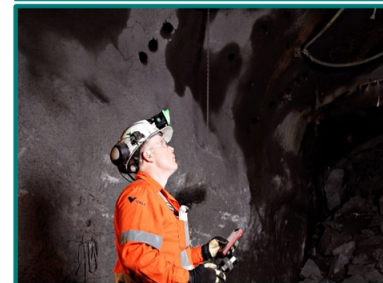
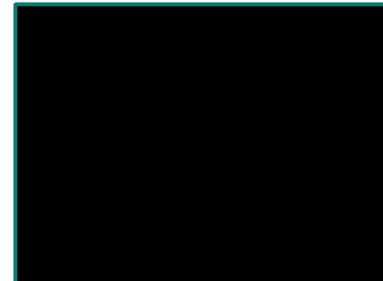
## 6.13 Ventilation - Hazard

### Ventilation - Hazard

Methane is a common gas that may accumulate in pockets in the rock. It is sometimes noticed escaping from drill holes and making a hissing sound.

Water from the hole may be seen to be bubbling, or the sense of smell may be alerted by a rotten-egg odor if methane is accompanied by hydrogen sulphide gas.

Methane, at certain accumulations, is highly explosive and should always be considered dangerous.



## 6.14 Ventilation - Control

### Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

- Emissions testing of mobile equipment.
- Regular maintenance of mobile equipment.
- Protocols for staging equipment in the ore bodies are in place to ensure there is no exceedance of the CFM requirements.
- Weekly audits of ventilation flows
- Ventilation prints are posted in all refuge stations underground.



## 6.15 Ventilation - Control

### Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

- Employees are required to report any damage or deficiencies to the ventilation system to ensure it is being maintained and repaired when necessary.
- Report of location and position of vent doors. Do not change position of a door unless authorized to do so.

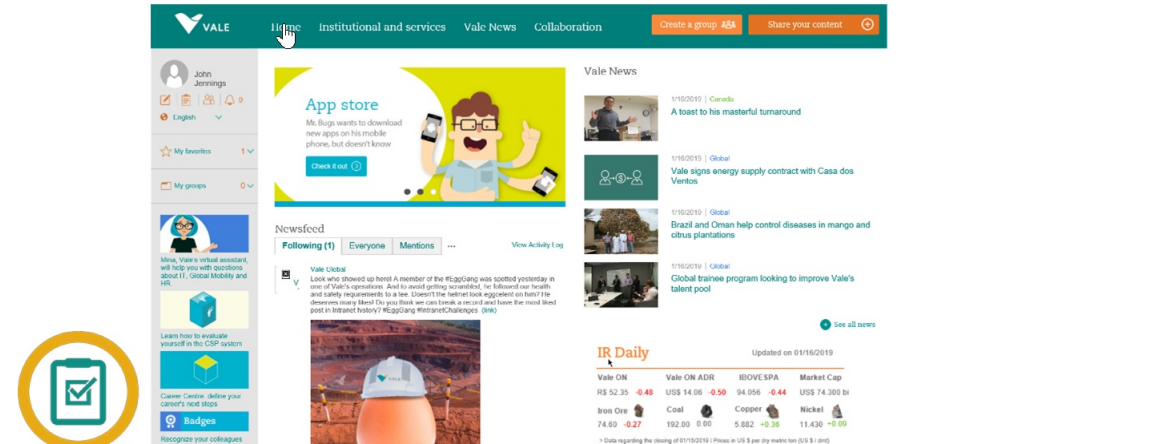


## 6.16 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

Copper Cliff Mine Project Ventilation Weekly Audit Reports can be accessed from the Vale intranet as shown below.

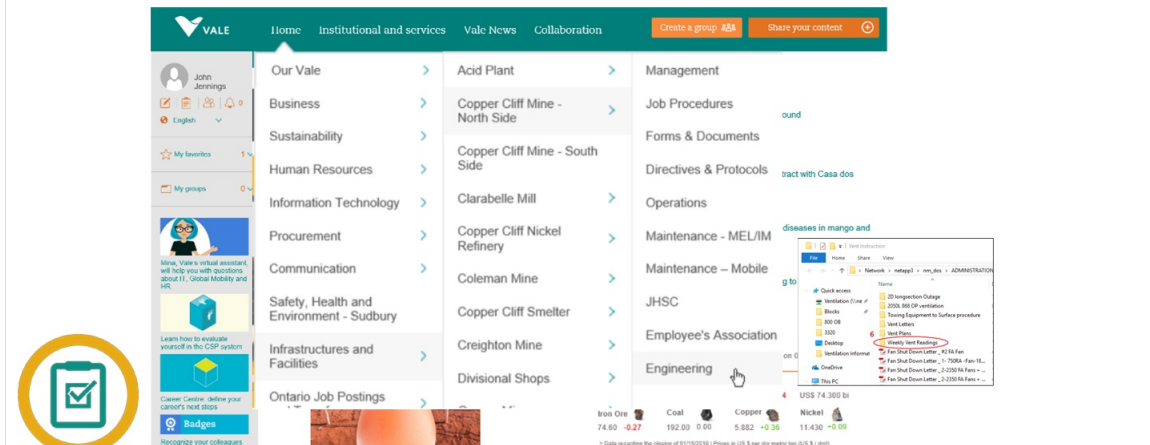


## Untitled Layer 1 (Slide Layer)

# Ventilation - Control

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## 6.17 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

Audit Reports are updated weekly, emailed to Project Stakeholders and posted in the following locations:

- The warm room.
- All active Refuge Stations.
- Number 2 Conference room Copper Cliff Mine Project.

Contact the Ramp dispatcher for vent controlled zones.

Contact CCM Project Vent Department or your supervisor for specific concerns.



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# Ventilation - Control

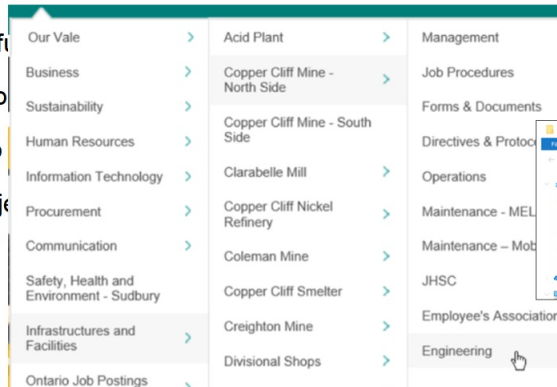
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## 6.18 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

CCM Project is currently in the process of installing signage at all vent stations this will provide an ID for personnel to refer to.

This will allow workers to contact their supervisor and request the ventilation flow rate at the respective vent station.



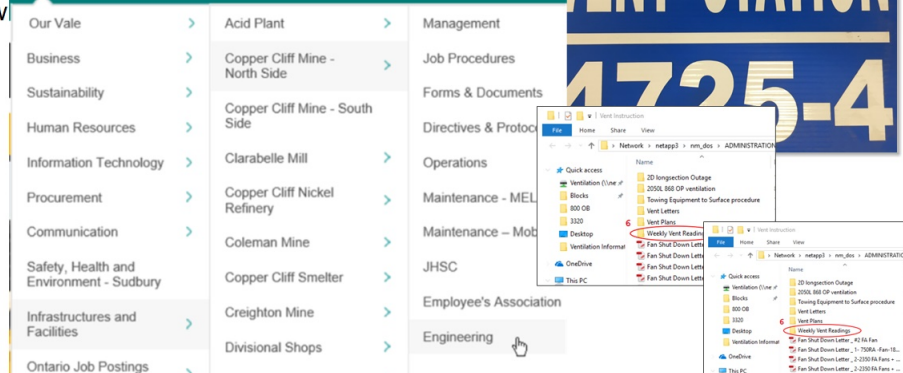
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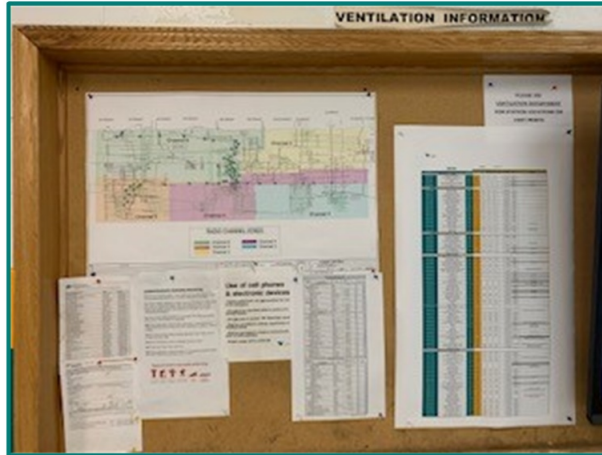


## 6.19 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

A list of all the Diesel Equipment that has been inspected and approved to operate underground is also posted in the warm room and all active refuge stations.

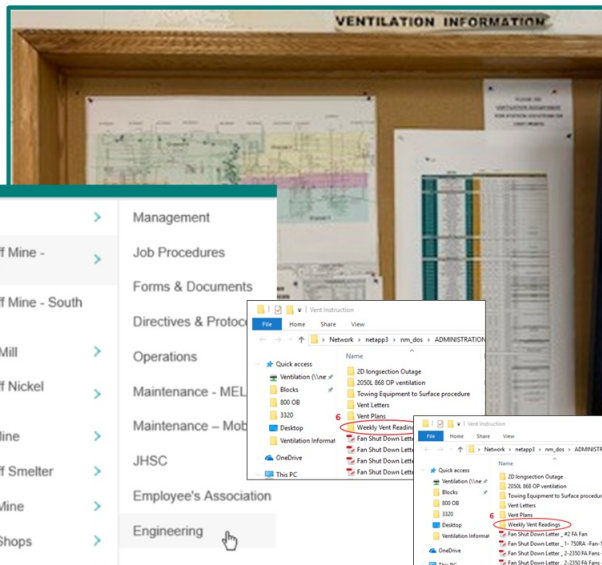


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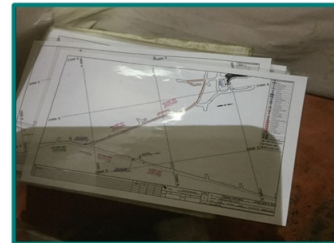
## 6.20 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

### Refuge Station Prints:

- Refuge station prints (D size 34" x 22") include a refuge station level print along with 2 levels above and below. All flows indicated on the print are updated for 6 month period.
- Flows, escapeways and AED locations can be found here.



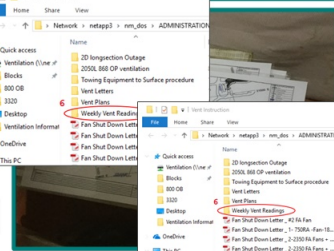
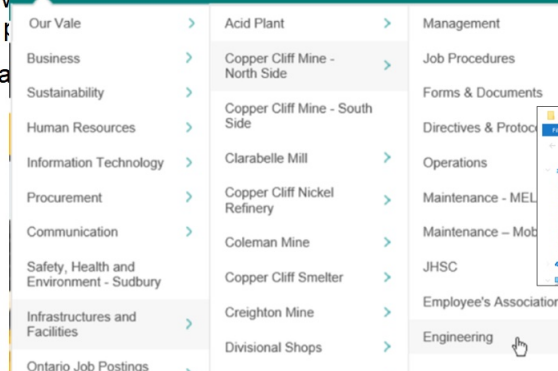
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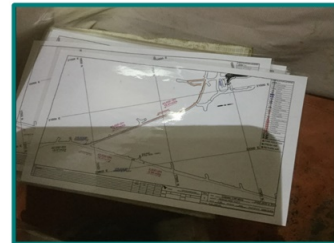
## 6.21 Ventilation - Control

## Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

## Emergency Prints

- Emergency prints (D size 34" x 22") of all levels available in conference room number 2 CCM Project. All flows indicated on the print are updated for a 6 month period.



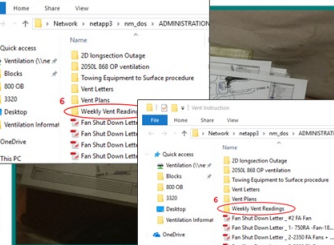
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## Ventilation - Control

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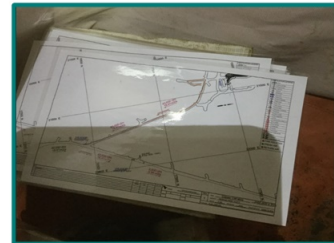
## 6.22 Ventilation - Control

# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

### Mine Rescue Prints

- Mine rescue prints (B size 17" x 11") all levels available in conference room number 2 CCM Project and are also available electronically. All flows indicated on the print are updated for a 6 month period.



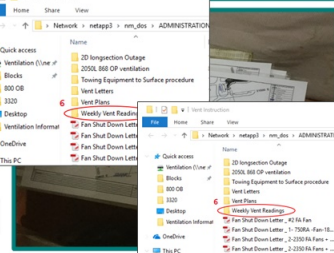
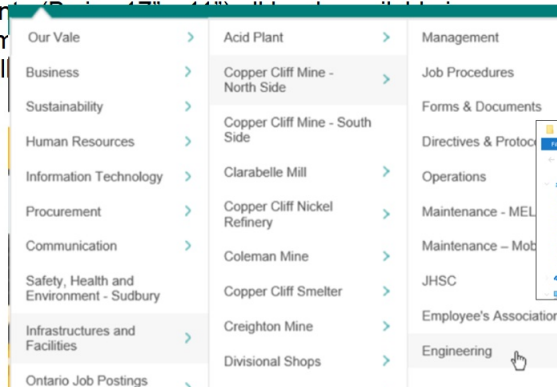
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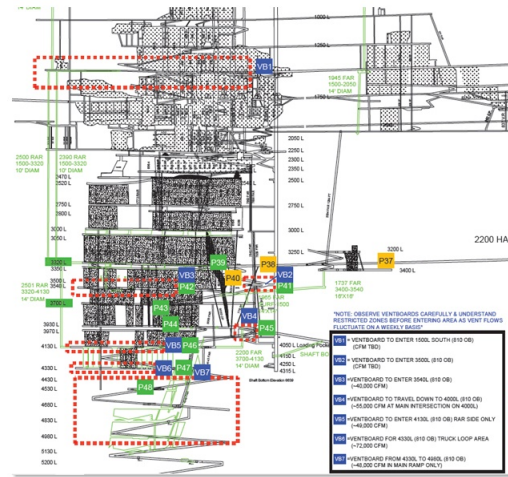
# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

There are 7 tag boards in use.

Everyone must use them for the Ventilation Control System to operate efficiently.

Respecting ventilation limits is an effort we must all contribute to.



## Untitled Layer 1 (Slide Layer)

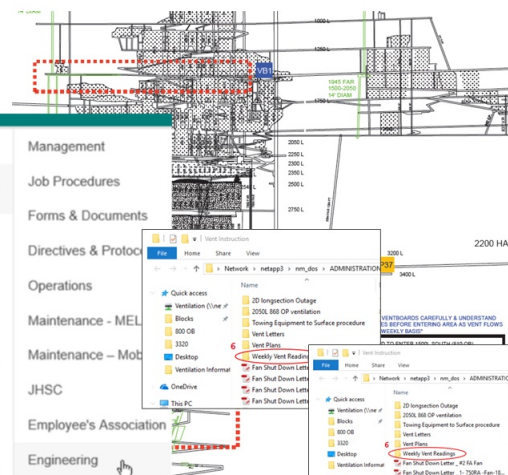
# Ventilation - Control

To mitigate the hazard of workers being exposed to contaminated air, Copper Cliff Mine Project has implemented the following controls:

There are 7 tag boards in use.

Everyone must use them for the Ventilation Control System to operate efficiently.

Respecting ventilation limits all contribute to.





## 6.24 Noise - Hazard

### Noise - Hazard

Mining activities such as drilling/tramming or shotcreting operate at a noise level that can potentially cause long term hearing loss.

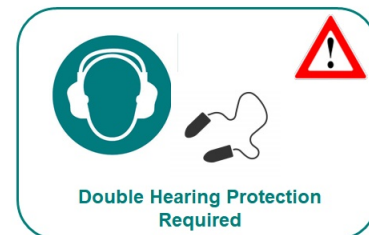
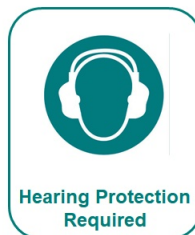


## 6.25 Noise - Control

### Noise - Control

To mitigate the hazard of workers being exposed to noise, Copper Cliff Mine Project has implemented the following controls:

- Minimum single hearing protection required.
- Double hearing protection to be worn as posted.
- Risk Assessment for the work being performed.
- OEMP noise monitoring.



## 6.26 Heat Stress - Hazard

### Heat Stress - Hazard

Due to the depth at CCM Project, the inherent rock temperature is naturally higher.

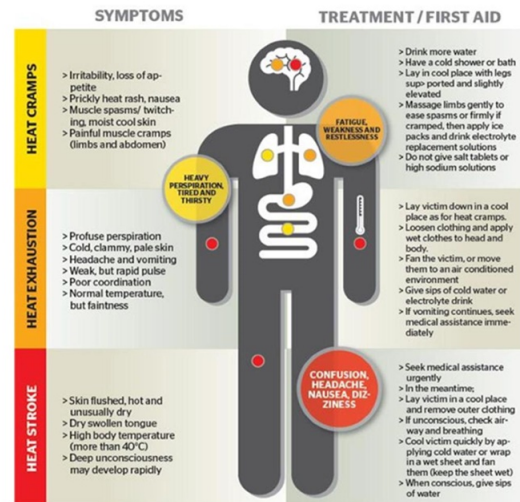
This combined with humid environments increases the air temperature significantly.



#### What is heat stress?

Heat stress can happen when hot, humid conditions and physical activity overcomes your body's natural cooling system.

Heat stroke can kill quickly.

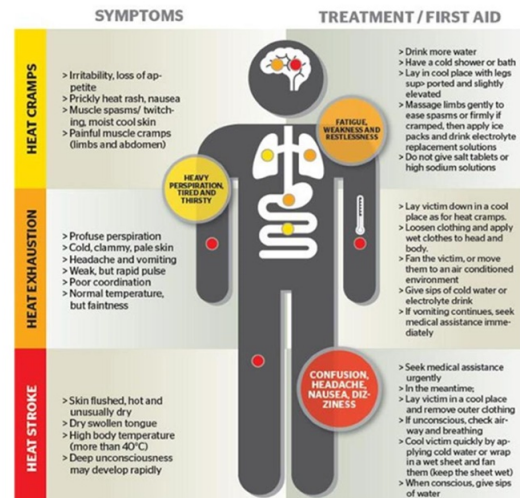


## 6.27 Heat Stress - Hazard

### Heat Stress - Hazard

Working in these conditions creates a hazard of heat stress. Signs or symptoms of heat stress include;

- Cramps
- Fainting
- Serious heat exhaustion and/or
- Heat stroke



## 6.28 Heat Stress - Control

### Heat Stress - Control

To mitigate the hazard of heat stress, CCM Project has implemented the following controls:

- Drinking water at Copper Cliff Mine Project can be found in the form of 5 gallon bottles of water both on surface and underground.
- The drinking water on surface is available in the warm room and in the sub-collar along with ice.
- The drinking water underground is located in refuge stations, either in the fridge or in a storage rack.
- Work/rest regimes are in place for areas identified through workplace assessments.



## 6.29 Mobile Equipment - Hazard

### Mobile Equipment - Hazard

Mobile equipment presents a high risk hazard of collision with vehicles or pedestrians.

The mobile equipment hazards at Copper Cliff Mine Project include the following:

- Diesel haulage trucks, boom trucks and other small mobile equipment are also hauling on this ramp.
- Service vehicles such as boom trucks and other small mobile equipment are continuously operating throughout the mine.
- Large scoops operating on different levels that have very limited visibility.



### 6.30 Mobile Equipment - Control

## Mobile Equipment - Control

To mitigate the risk of collision, Copper Cliff Mine Project has implemented the following controls:

**Designated Traffic/Travel procedure:**

Follow the Copper Cliff Mine Project Traffic Plan (22OP0055)

**Level entry protocols:**

When a scoop tram is operating on the level, indicated by a large blue flashing light or gate.



### 6.31 Mobile Equipment - Control

## Mobile Equipment - Control

To mitigate the risk of collision, Copper Cliff Mine Project has implemented the following controls:

- Headlights and vehicle blue flashing lights are to remain on at all times when operating mobile equipment.
- Pedestrians will have an orange blinking light attached to the back of their hardhat.
- Hi-vis clothing apparel for all personnel.
- Trained and authorized equipment operators.
- Pre-use check of equipment.
- Safety bays are located every 100 feet on ramp.





## 6.32 Mine Expansion - Hazard

### Mine Expansion - Hazard

Since 2007 the Copper Cliff Mine Project mine has been under care and maintenance. Potential hazards that you may encounter due to this are:

- Existing infrastructure (screen, air and water lines, chutes, gangways, roll up door, rail, track switches, etc.) must not be considered safe until physically inspected by qualified individuals.
- Corroded support system – pipe, hangers, screen, structural steel.



## 6.33 Mine Expansion - Control

### Mine Expansion - Control

To mitigate hazards associated with the Copper Cliff Mine Project expansion be aware of the following controls:

- *Always* practice the 9 Rules of Scaling.
- *Stop and Correct* when any unsafe condition is discovered.
- *Remove and replace* deteriorated piping.
- Do not operate equipment unless *qualified and authorized* to do.



Upon discovering any unsafe condition, barricade and apply proper signage identifying the hazard and report to your supervisor using the SLAM / FLHA process..

## 6.34 Mine Expansion - Control

### Mine Expansion - Control

To mitigate hazards associated with the Copper Cliff Mine Project expansion be aware of the following controls:

- Copper Cliff Mine Project and North Operations communicate on a daily basis to review both interfering plant activities for the day.
- As underground ventilation is shared by two separate work groups, the vent restrictions/requirements are communicated daily.
- Copper Cliff Mine Project and North Operations have jointly developed Fire Procedures to reflect the two separate working groups.



## 6.35 Getting Lost - Hazard and Control

### Getting Lost - Hazard and Control



Copper Cliff North Side and Copper Cliff Mine Project underground workings are connected, as these mines have been inactive for several years, access to old workings are prevalent.

To mitigate this hazard be aware of the following controls:



Travel with a mine ventilation or ground control person when going into old workings of the Mine.

Multiple locations where guardrails and barriers are installed to prevent people from entering restricted areas.

Guardrails and barricades may have deteriorated or fallen over time - Confirm their condition before entering.

All refuge stations have ventilation prints available as per legislation.

Directional signs are maintained throughout the mine to identify locations and destinations.

Follow the Copper Cliff Mine South Side Traffic Plan (22OP0055)  
*If you Don't Know - Don't Go.*

## 6.36 Seismicity - Hazard and Control

### Seismicity - Hazard and Control



The Copper Cliff Mine Project is operating in deep areas. Due to this, along with other geological factors, could encounter seismic activity.

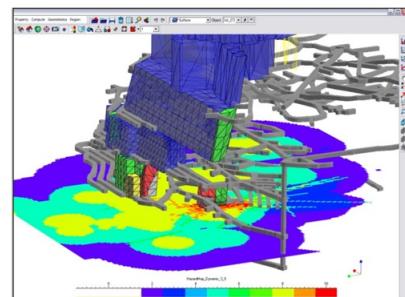
To mitigate this hazard be aware of the following controls:



There are sensors throughout the mine that record seismic activity. *(These can also be monitored by the Ground Control Dept.)*

Always be alert and report any suspected seismic activity to your supervisor.

If warranted, there will be instructions broadcast on all channels – follow instructions.



## 6.37 What is Mould?

### Mould - Hazard

#### What is Mould?

Moulds (and mildew) are microscopic fungi, a group of organisms that include mushrooms and yeasts.

Fungi grow and reproduce rapidly, producing spores and mycelia.

Moulds produce spores that are poorly visible or not visible at all to the naked eye and that in many species are specialized to become airborne.





## 6.38 Mould Contaminated Material

### Mould - Hazard

#### Mould Contaminated Material

Mould contaminated materials are divided in three groups on the basis of their *porosity*.

**Porous material:** permeable to mould growth, materials with mould growth will extend significantly below the immediate surface.

These types of materials *cannot* be effectively cleaned. (e.g. cardboard boxes, paper, plywood back boards, information boards).



## 6.39 Mould Contaminated Material

### Mould - Hazard

#### Mould Contaminated Material

**Non-porous material:** not permeable to mould growth, materials with mould growth will remain on the immediate surface.

These types of materials can always be cleaned unless introducing water would create an additional hazard (e.g. electrical cables, rubber hoses, plastic bins, tools, vent tubing).





## 6.40 Mould Contaminated Material

### Mould - Hazard

#### Mould Contaminated Material

**Semi-porous material:** semi permeable to mould growth, only certain materials will allow growth to extend below the immediate surface.

These types of materials can often be cleaned and left in place if the structural integrity has not been compromised.

The size of mould growth and type of material affected will determine if cleaning or removal is required. (e.g. concrete, shotcrete, rock, structural beams, skids, wood, timbers, cable wheels).



## 6.41 Health Effects Of Mould Exposure

### Mould - Hazard

#### Health Effects Of Mould Exposure

The most important considerations for employees conducting mould removal and cleaning is the potential risk of mould exposure when mould is disturbed during cleanup or removal.

Inhalation exposure to live or dead mould(fungi), fungal spores, fragments or components, and other dampness-related microbial agents, requires that the spores be initially airborne and/or disturbed from mould contaminated materials.



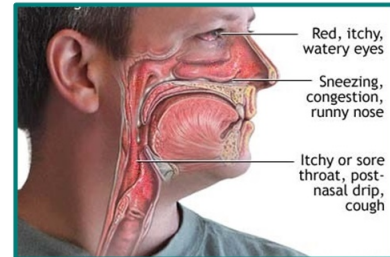
## 6.42 Health Effects Of Mould Exposure

### Mould - Hazard

#### Health Effects Of Mould Exposure

##### Mould inhalation can lead to:

- respiratory symptoms,
- eye, nose and throat irritation,
- coughing and phlegm build-up,
- wheezing and shortness of breath
- potentially other allergic reactions.



## 6.43 Health Effects Of Mould Exposure

### Mould - Hazard

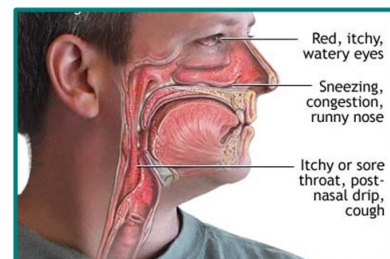
#### Health Effects Of Mould Exposure

People have different sensitivities to mould, so not all people will react when exposed. For the majority of persons, undisturbed mould is not a substantial health hazard.

Mould is a greater hazard for persons with conditions such as impaired host defenses, mould allergies, asthma or respiratory disease.

Health effects are typically acute and stop following the disturbance of mould from the area.

However, no health-based standardized methods exist to measure the magnitude of exposure to mould. Health Canada does not have any numerical exposure limits for mould.



## 6.44 Health Effects Of Mould Exposure

### Mould - Control

#### Mould Discovery

If you find or suspect mould at work – contact your supervisor.

Your supervisor will contact the Occupational Health Department who will conduct a visual inspection and provide recommendations for clean-up or removal.

If you feel you are suffering from a mould related illness contact your supervisor and see First Aid.



## 7. Equipment Damage

### *7.1 Equipment Damage*

# Equipment Damage



## 7.2 Equipment Damage

# Equipment Damage

**An incident is an event that results in loss or harm to personnel (injury/illness), environment, asset, or equipment.**



Incident Management (SAP IM)



Click to log into the SAP IM database to process Incident, Near Miss, and Unsafe Condition reports.



Web-based Search tool  
Records are from prior day or earlier



SAP IM Procedures  
Tools & Resources

## 8. Personal Injury

### *8.1 Personal Injury*

# Personal Injury

## 8.2 Personal Injury

# Personal Injury

### Copper Cliff Mine Project 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.

#### Copper Cliff Mine Project Emergency Numbers



- First Aid (PSP).....705-682-5034 or  
705-682-5055

## 9. Emergency Preparedness

### *9.1 Emergency Preparedness*

# Emergency Preparedness



## 9.2 Emergency Preparedness

### Emergency Preparedness



## 9.3 Emergency Reporting

### Emergency Reporting

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

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

#### Copper Cliff Mine Project Emergency Numbers

First Aid - PSP

682-5034 or 682 - 5055



#### Radio Channels



1. Project Radios (South)
2. CCM North First Aid
3. Division 1 - 3400 and Up
4. Division 2 – Below 3400
5. CCM South Lower Ramp Dispatch - Surface to 5200
6. CCM South Upper Ramp Dispatch - Surface to 3250
7. CCM South Div 2 Chat
8. CCM South Shaft SSL
9. CCM South Shaft Ops
10. CCM South Maintenance
11. CCM South Spare
12. CCM South Special Ops
13. CCM South Commissioning
14. CCM South – Div 1 - Chat
15. CCM South – UG/Link
16. CCM South – First Aid

## 9.4 Notification – Copper Cliff Mine

### Surface Alarms - Emergency Notification

#### INVAC

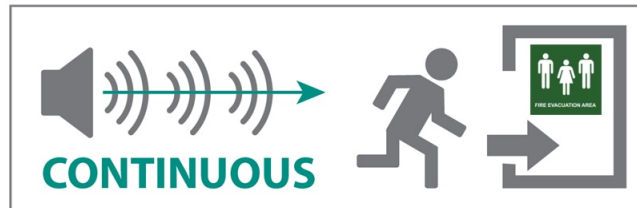
Surface Audible Alarm followed by PA announcement indicating INVAC. All personnel are to immediately report indoors to the designated assembly area.



Go to the nearest Safe Assembly Area.

#### OUTVAC

Surface Audible Alarm followed by PA announcement indicating OUTVAC. 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.



Leave the building by the nearest exit.

Alarm testing is conducted each Monday at 1:30 pm. Report any malfunctions immediately to your Supervisor to ensure that it is corrected in a timely manner.

## 9.5 INVAC - Surface Assembly Area

### INVAC - Surface Assembly Area

The invac assembly area for Copper Cliff Mine Project is the warm room directly across from First Aid sign in area.

All workers, except specific qualified personnel, will proceed immediately to the assembly areas to await further instructions.

Do not leave the assembly area until instructed to do so, or until the all clear is given.



The CCM Project can be affected by a Level 3 from the Smelter (noxious gases) or the Nickel Refinery (carbonyl or ammonia)



## 9.6 Outvac - Surface Evacuation Area

### Outvac - Surface Evacuation Area

The evacuation area for Copper Cliff Mine Project is located in the old guard shack/ parking lot.

All workers, except specific qualified personnel, will proceed immediately to the evacuation area to await further instructions.

Do not leave the evacuation area until instructed to do so, or until the all clear is given.



## 9.7 Surface Fire Procedures

### Surface Fire Procedures

All surface and underground workers must know the fire procedure specific to their work area.

#### Small Fires;

*If you discover a fire:*

- Extinguish immediately if possible
- Notify South PSP at 705-682-5034 and Our PSP on site will contact North and Power St. Gate PSP.





## 9.8 Surface Fire Procedures

### Surface Fire Procedures

All surface and underground workers must know the fire procedure specific to their work area.

If you discover a fire:

*Larger Fires;*

If the fire is out of control immediately notify South PSP at 705-682-5034 and Our PSP on site will contact North and Power St Gate PSP.

Provide the following information:

- Name and phone number.
- Location and extent of fire.
- Any other relevant information.
- Retreat from the fire area sounding any available alarms.
- Take others with you as you go.



## 9.9 Underground Fire Procedures

### Underground Fire Procedures

In the event of a fire underground at Copper Cliff Mine Project, stench will be injected into the fresh air system and a message will be broadcast to all cap lamp radios if this occurs while you are underground.

- Report to the nearest refuge station (*follow the underground fire procedure*).
- If you are driving a vehicle, park it in a safe location – *never on the Ramp*.
- Notify and bring anybody you encounter along the way.
- Report to emergency recorder in refuge station. If you are the first person in the refuge station then you become the recording person.





## 9.10 Underground Fire Procedures

# Underground Fire Procedures

In the event of a fire underground at Copper Cliff Mine Project, stench will be injected into the fresh air system and a message will be broadcast to all cap lamp radios if this occurs while you are underground.

- All hoists will be shut down and will not be operated until notified to do so.

- 4000L has a separate alarm and flashing light in addition to Stench.

**Note:** There are currently no cascade systems in the mine.

### Refuge Stations

#### 810 OB

- 2250L
- 3500L
- 3930L
- 4330L

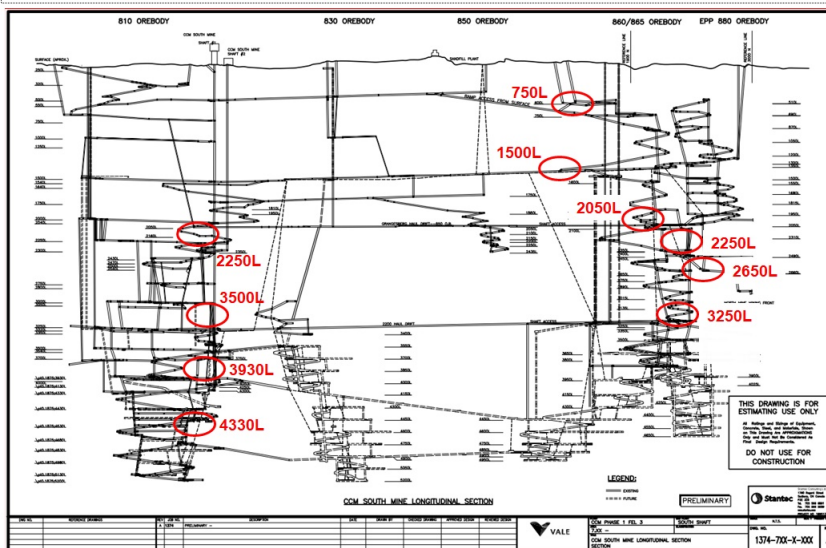
#### 865 OB

- 750L
- 1500L
- 2050L
- 2650L
- 3250L

## 9.11 Underground Fire Procedures

# Underground Fire Procedures

### CCM Project Active Refuge Stations



## 9.12 Underground Fire Procedures

# Underground Fire Procedures

Be sure to follow the Do's and Don'ts for underground fire situations.

### Do:

- Report directly to a refuge station.
- Follow the procedure located in the refuge station.
- Conserve all water/food that may be in the refuge station.

### Do Not:

- Use the phone unless you're being contacted.

**NEVER REFUSE ANYBODY ENTRY INTO THE REFUGE STATION**



## 9.13 Underground Level 3 Procedure

# Underground Level 3 Procedure

- All underground personnel are to proceed to the nearest refuge station.
- The Galloway will drop personnel off on the nearest active level and return to surface to be parked.
- The hoist operator is to report to the Amphitheatre.
- If you are traveling on the Ramp from 500L to surface, Turn around and report to 750L refuge station.



In the event of Level 3 on surface – Power to the Fresh Air fans will be disconnected.



## 9.14 Other Mine Emergency

# Other Mine Emergency

In the event there is a mine emergency that may effect personnel underground, other than an underground fire, the emergency will be broadcast on all channels.

Report to the nearest refuge station, ensure that you are accounted for and wait for instructions.

Do not clay the doors unless otherwise instructed.



## 10. Plant Exit

### *10.1 Plant Exit*

# Plant Exit



## 10.2 Arriving on Surface

### Arriving on Surface

Regular personnel runs returning to surface may unload either on collarhouse deck or at sub-collar.

- Always watch for footing in all track areas.
- If on collarhouse deck, exit cage and make sharp right turn to return to 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.



## 10.3 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 your area.

Here are some tasks to consider when getting ready to exit the plant to ensure your safety and the safety 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 any 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.

## 11. Conclusion

### *11.1 Conclusion*

# Conclusion

## 11.2 Conclusion

### Conclusion

This concludes the material for Tier 3 Vale Copper Cliff Mine Project Specific Orientation.

You should now have a working knowledge and understanding of:

- The Mining Plant Layout and Boundaries
- Plant entry and tagging requirements



## 11.3 Conclusion

### Conclusion

The high level general hazards and controls with regards to:

- Ramp Travel
- Ground Water Management
- Dust/Airborne Contaminants
- Ventilation
- Noise
- Heat Stress
- Mobile Equipment
- Mine Expansion
- Getting Lost
- Seismicity
- Mould Awareness



## 11.4 Conclusion

# Conclusion

This Orientation provided information to access Copper Cliff Mine Project.

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





## 12. Copper Cliff Mine Orientation Review

### 12.1 *Untitled Slide*



For a world with new values.

## 12.2 Start The Module Quiz



Thank you for completing the  
Vale Online Module Training.

To start the module Quiz

[CLICK HERE](#)