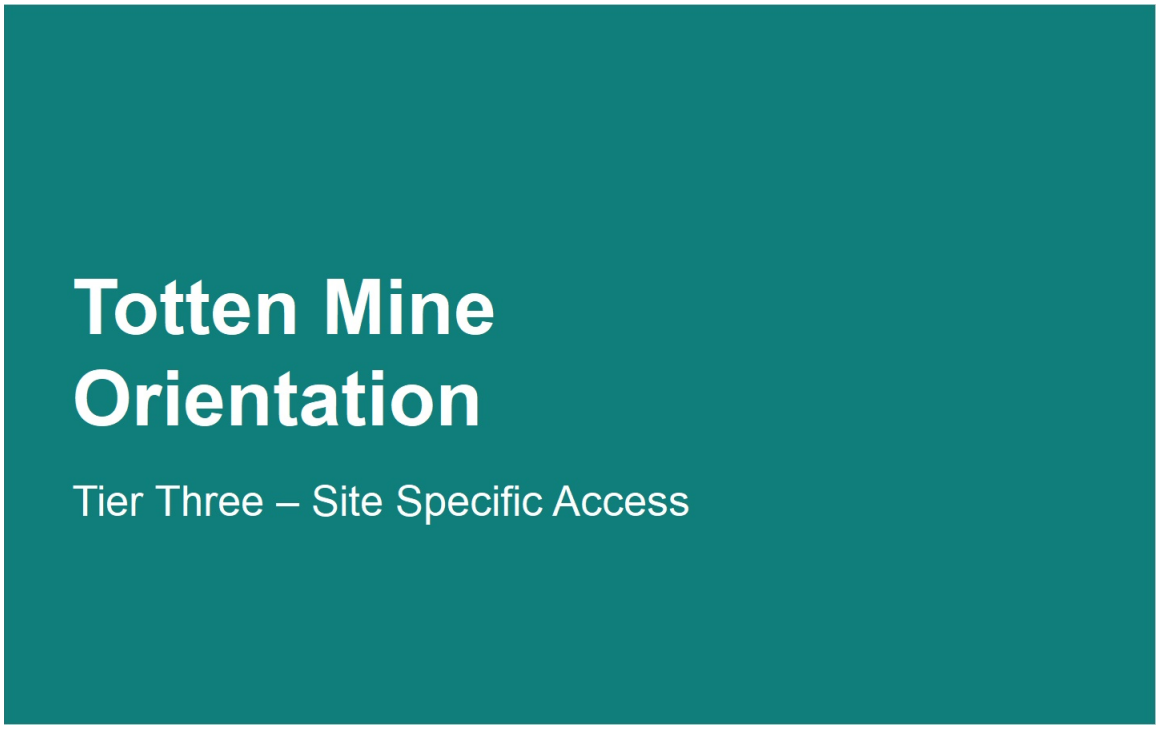
Tier 3: Coleman Mine Orientation - 16

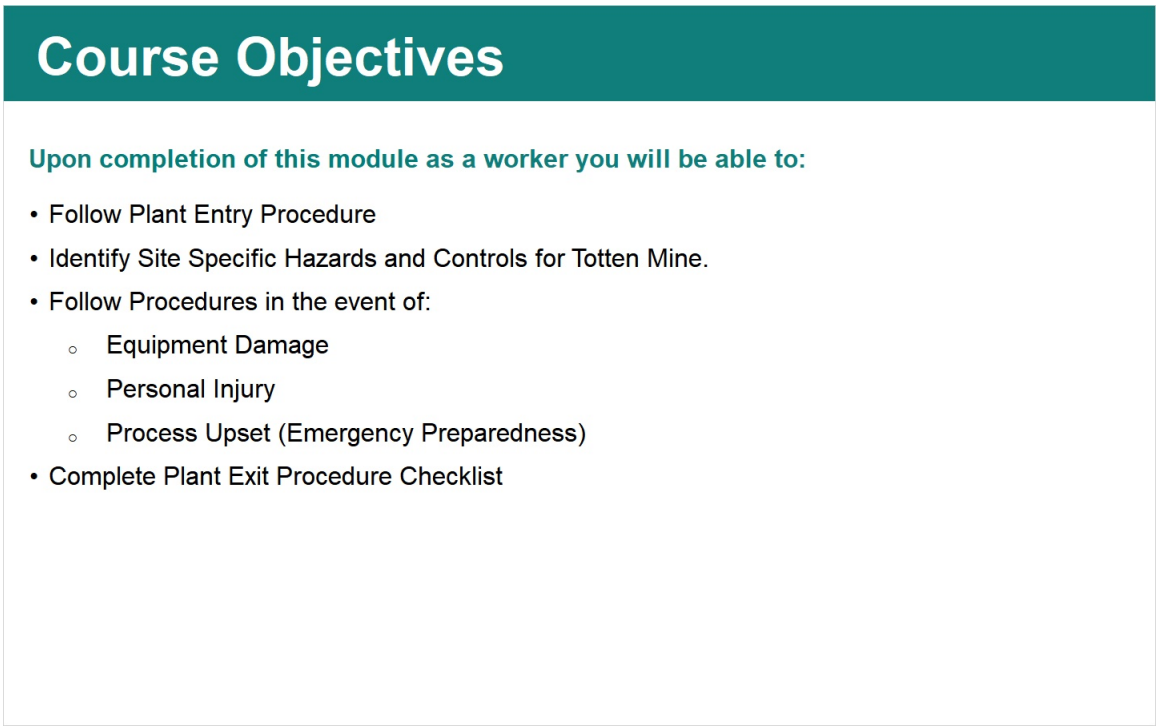
1. Totten Mine

1.1 Totten Mine Orientation

1.2 Totten Mine Orientation



1.3 Course Objectives



2. Impacts and Benefits

2.1 Introduction

2.2 Impacts and Benefits Agreement

Impacts and Benefits Agreement

Vale and Sagamok Anishnawbek Agreement: Totten Mine

2.3 Impacts and Benefits Agreement

Impacts and Benefits Agreement

Introduction: Sagamok Anishnawbek First Nation

Sagamok Anishnawbek is a First Nation community on the north channel of Lake Huron.

The reserve is located off the Trans-Canada highway, 1 hour west of Sudbury Ontario. *(south of Massey).*

Signatory to Robinson Huron Treaty 1850.

Registered members as of January 2013 is 2748, with an on-reserve population of 1544.

Governed by the Indian Act with an elected Chief and 12 councillors.

A progressive First Nation working towards building a sustainable community through strong leadership, administration of government and business partnerships.

Received ISO 9001 designation in 2007.

2.4 Vision

Impacts and Benefits Agreement

Introduction: Sagamok Anishnawbek First Nation

Our Vision:

To facilitate a healthy and safe environment where dignity and integrity of each First Nation member is nurtured and maintained through a spiritual and cultural foundation that gives a sense of belonging. First Nation members working together towards an improved quality of life.

2.5 Treaties with First Nations - Historical Perspective

Impacts and Benefits Agreement

Treaties with First Nations – Historical Perspective

Treaties were agreements for relatively small tracts of land with individual First Nation groups.

In the 1850s, two treaties fell outside the norm and would become the template for future treaties in the West.

As settlement lands were filled, attention turned for the first time to northern areas where minerals had been discovered along the shores of Lake Superior and Lake Huron.

2.6 Treaties with First Nations - Historical Perspective

Impacts and Benefits Agreement

Treaties with First Nations – Historical Perspective

Two treaties, called the Robinson-Huron and Robinson-Superior treaties, were negotiated with the various Ojibway peoples inhabiting the area which ceded First Nations lands and rights to the Crown in exchange for:

- reserves
- annuities and
- the continued right to hunt and fish on unoccupied Crown lands.

This formula of concluding agreements with numerous bands for large tracts of lands would become the model for the Post-Confederation Numbered Treaties.

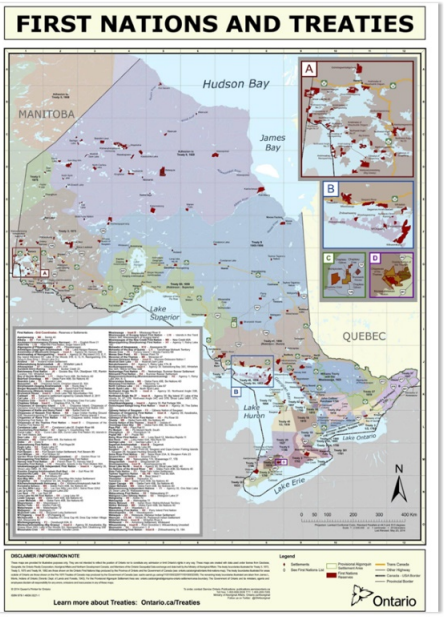
2.7 Treaties with First Nations - Present Day

Impacts and Benefits Agreement

Treaties with First Nations – Present Day

As new treaties are concluded, new relationships are added to the overarching Treaty Relationship between Canada and First Nations.

This relationship defines not only mutual rights and obligations, but also assists both Canada and First Nations to work in a more cooperative and productive manner to improve the lives of First Nation people and all Canadians.



2.8 Impacts and Benefits Agreement - Defined

Impacts and Benefits Agreement

Impacts and Benefits Agreement - Defined

An Impact and Benefit Agreement (IBA) is a formal contract outlining the impacts of the project, the commitment and responsibilities of both parties, and how the associated Aboriginal community will share in benefits of the operation through employment and economic development.

2.9 Impacts and Benefits Agreement - Defined

Impacts and Benefits Agreement

Impacts and Benefits Agreement - Defined

Here are some of the reasons why mining companies now enter into IBA's with Aboriginal communities:

- Historically, resource development in First Nation traditional territories has brought negative social and environmental impacts, while the wealth generated was transferred outside the community.
- Today, First Nation communities want to ensure that resource extraction generates substantial benefits for the community, and that negative environmental impacts are minimized.

2.10 Impacts and Benefits Agreement - Defined

Impacts and Benefits Agreement

Impacts and Benefits Agreement - Defined

Here are some of the reasons why mining companies now enter into IBA's with Aboriginal communities:

- Impact and Benefit Agreements are contemporary agreements (a contract) made between a resource development company and a First Nation.
- IBAs specify understandings as to how resources will be developed within First Nation traditional territories, and how the First Nation will participate in the project.

2.11 Impacts and Benefits Agreement - Defined

Impacts and Benefits Agreement

Impacts and Benefits Agreement - Vale and Sagamok

IBA negotiations between Vale (formerly INCO) and Sagamok Anishnawbek began in 2006 and an IBA was signed on June 22, 2012.

This agreement addresses the following concerns of the development of Totten Mine including:

- Development of Totten may impact the Spanish River
- Wild life and aquatic life are potentially impacted
- Environmental impacts may be permanent
- Overall limits First Nation ability to hunt and fish / exercise treaty rights, thereby affecting the quality of life of many who still rely heavily on hunting and fishing for food.

2.12 Impacts and Benefits Agreement - Defined

Impacts and Benefits Agreement

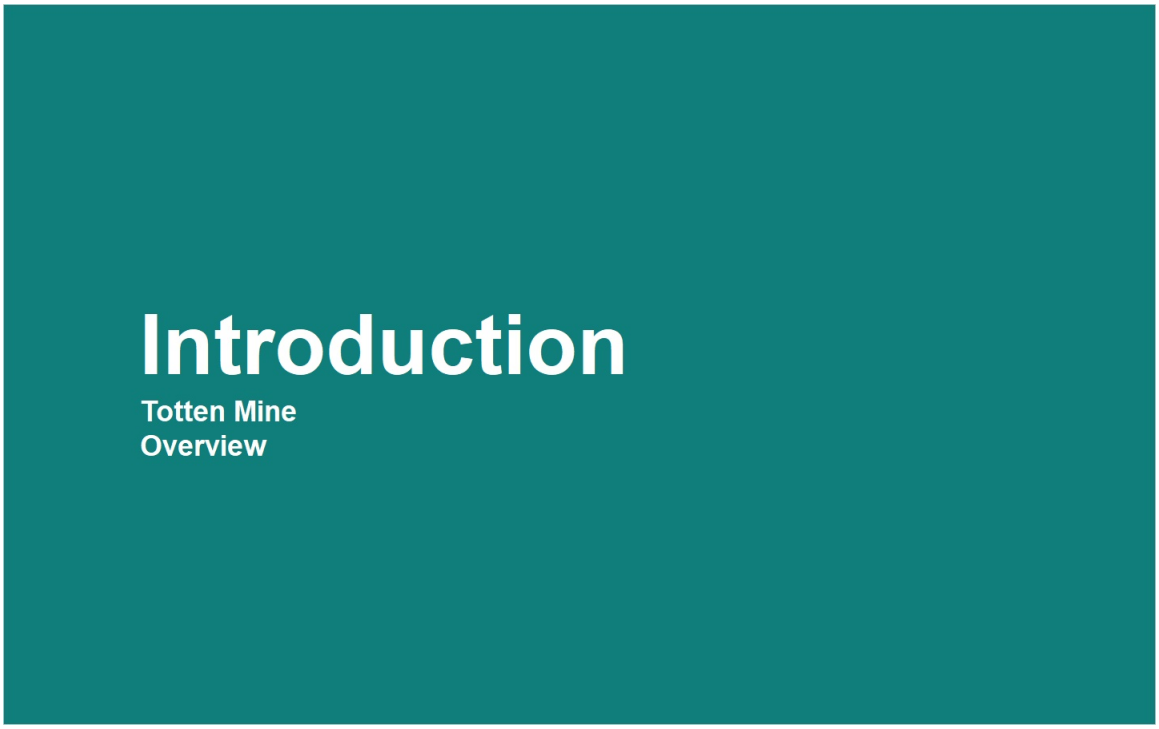
Impacts and Benefits Agreement - Vale and Sagamok

The IBA also includes benefits to the band including:

- Maximizing employment of Sagamok members
- Providing business contracting opportunities
- Ensuring environmental stewardship
- Promoting youth development and
- Implementation Committee to ensure effective communication.

3. Introduction

3.1 Introduction



3.2 Totten Mine Overview

Totten Mine Overview

Nickel ore was first discovered in the Worthington and Elsie areas in 1884, then began operations in 1892 and continued until October 4th, 1927, when a foreman noticed some unusual shifts in the rocks. An immediate evacuation was ordered.

A few hours later, the entire mine workings collapsed. Fortunately no one was hurt, however the mine was closed following the disaster.

Totten Mine was purchased by Vale in 1935 and put back into Operation until closing in 1974.

3.3 Totten Mine Overview

Totten Mine Overview

In 2005, rising metal prices prompted the company to re-evaluate the mine's potential nickel, copper and precious metal deposits.

A feasibility study was conducted and a decision was made to bring the mine into production.

The project was completed in 2014, handed over to operations and is now in full production with a workforce of approximately 210 Vale employees.

3.4 Totten Mine Overview

Totten Mine Overview

Nickel and copper metals are mined at Totten, mainly via the Vertical Retreat (VR) mining method.

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

Approximately 2200 tons per day is hoisted to surface from 4000 level loading pocket, the ore is trucked to the surface ore tent. It is then loaded into transport trucks for delivery to Clarabelle Mill for processing.

3.5 Totten Mine Overview

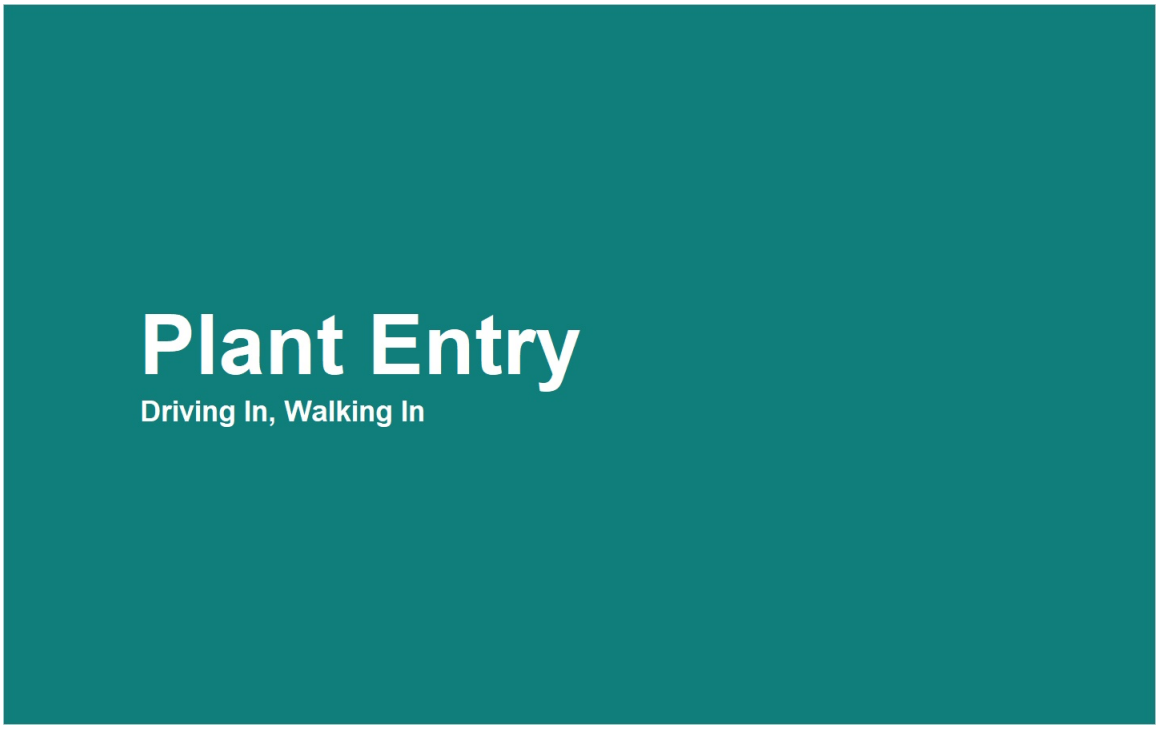
Totten Mine Overview

The active mining levels are accessed from shaft stations 3150, 3850 and 4000 levels.

The Totten Waste Water Treatment Plant recycles raw mine water and surface waste water through a high density sludge (HDS) process to ensure the removal of heavy metals, and suspended solids to achieve the proper site Certificate of Approval limits prior to release back into the environment.

4. Plant Entry

4.1 Plant Entry

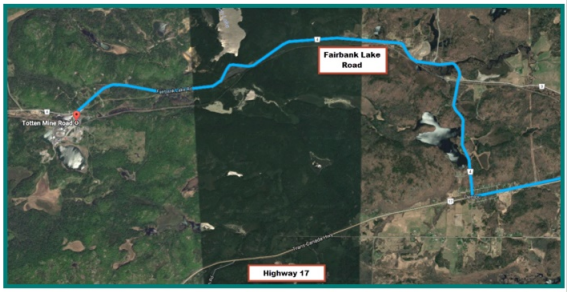


4.2 Approaching The Plant

Approaching The Plant

Totten is accessed from Municipal Regional Road 4 off of Hwy 17.

- Heading west from Sudbury, turn right at the first set of lights after the four lanes.
- Turn right on Regional Road #4 (Fairbanks) and continue to Totten Mine Site.
- Heading east from Espanola, turn left at the set of lights just prior to the start of the four lanes.



Be aware that the Speed limit on Regional Road #4 is 60 KPH.

4.3 Approaching The Plant

Approaching The Plant

Totten Mine site requires the use of safety whips (flags) once past the yard gate.

Flags are available at the plant First Aid office.

4.4 Approaching The Plant

Approaching The Plant

Turn onto C Johnson Road, you will be required to cross railway tracks as you enter the Totten Mine property, look both ways prior to crossing the tracks, railway crossing light signals located at the crossing.

Obey the posted speed limit signs of 25km while on Totten Mine property.

Always be aware of haulage truck traffic while on Totten Mine property.

The only area where haulage trucks do not travel is the one way road in front of the administration building.

4.5 Approaching The Plant

Parking

There are several parking lot locations at Totten Mine. They are sequenced below as you would encounter them entering the plant,

- The Victoria Creek pump house
- The one way road in front of the administration building
- The Water Treatment Plant and
- The upper parking lot

Be aware that there is a pedestrian crosswalk from the upper parking lot with two stop signs and you MUST come to a COMPLETE stop before driving through.

4.6 Approaching The Plant

Pedestrian Crosswalks

Totten Mine hosts several Pedestrian Crosswalks throughout the Totten Mine property.

- There is a designated pedestrian walkway that runs the entire length of the Totten main parking lot.
- Exiting the front of the administration building, the upper parking lot is accessed by traveling across the crosswalk and up the staircase.
- The sandplant is accessed by a crosswalk at the intersection of the one way road and the back access road.

4.7 Approaching The Plant

Approaching the Sign-in Location

The pedestrian crosswalks meet up with the entrance of the administration building.

Go through the set of doors located on the landing after the first set of stairs.

First Aid is located beyond the doors to the right.

4.8 Surface Sign-in Requirements

Surface Sign-in Requirements

All contractors and visitors working on surface must sign into the surface sign-in book when entering the plant, and must sign out when leaving.

The surface sign-in book is located directly inside the First Aid office. Contractors will also enter their contact person's name in the book as well as time in and time out.

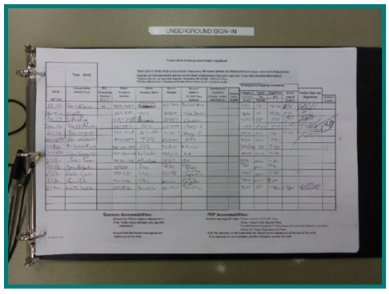
4.9 Underground Sign-in Requirements

Underground Sign-in Requirements

Every occasional visitor traveling underground at Totten 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 will issue a radio equipped with light complete with a man down button. (verified by plant protection) These are to be returned upon arrival to surface.



4.10 Underground Sign-in Requirements

Underground Sign-in Requirements

All Individuals going underground at Totten Mine require a cap lamp equipped with a registered RFID tag.

RFID tags are used to monitor the location of mobile equipment and provide the ability to locate personnel in case of an emergency.

4.11 Underground Tagging Requirements

Underground Tagging Requirements

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

These tags will include:

- Photograph
- Full Name
- Employee Number
- Phone Number
- Mine Identification

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.

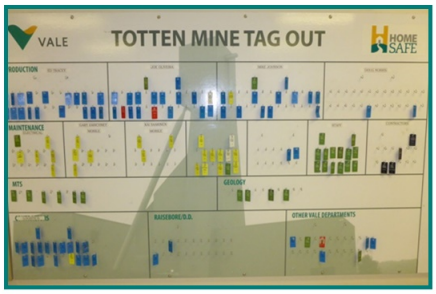
This tag is to be used on the Totten Mine underground tag in board.

4.12 Underground Tagging Requirements

Underground Tagging Requirements

When tagging in, remember the following:

- You are required to tag in before going underground.
- Tag in to the correct location indicated on the board.
- Do not tag in until it is permitted to do so in the case of the board being blocked for blasting or clearing.
- Always remember to tag out when you return to surface as there can be no blasting in the mine until ALL workers and visitors are accounted for and tags are removed by their respective owners.
- You must return your tag to first aid and sign out of the underground sign in book before leaving the property.



4.13 Going Underground

Going Underground

Totten Mine has two locations on surface to enter/exit the cage. Regular personnel runs are generally loaded at the sub-collar, the level below the warm room (collar).

Once the Shaft Service Leader (SSL) announces your scheduled personnel run on the PA system proceed to sub-collar via the ramp located in the warm room.

4.14 Going Underground

Going Underground

Ensure you are wearing all required PPE at this time.

Only lunch pails, bit bags and small hand supplies are allowed on regular scheduled personnel runs.

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

5. Plant Hazards and Controls

5.1 Plant Hazards and Controls

Published by Articulate® Storyline www.articulate.com

5.2 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

5.3 Site Specific Hazards

Site Specific Hazards

At Totten Mine, workers need to be aware of site specific hazards and their related controls.

These include but are not limited to:

- Wild Animals
- Skip over Cage Shaft Design
- Shaft Size Restrictions
- Ventilation Control System (VCS)
- Seismicity
- Mobile Equipment

5.4 Wild Animals - Hazards

Wild Animals - Hazards

The location of Totten Mine provides some unique challenges as it relates to wildlife.

The potential hazard of colliding with animals is present while driving down Fairbank road.

Many types of wildlife have been encountered,

- Elk
- Deer
- Bear
- Turtles which are a protected species are often seen crossing the road.

5.5 Wild Animals - Controls

Wild Animals - Controls

To mitigate this hazard the following controls have been implemented.

Worthington Road has a restricted speed limit of 60km.

It is expected that employees report these sightings to First Aid so appropriate notification can take place for employees leaving the plant.

5.6 Skip Over Cage Design - Hazards

Skip Over Cage Design - Hazards

The skip over cage design is unique to Totten Mine.

This design along with the Auxiliary cage enables the hazard of muck moving in the shaft while potential boarding of the Auxiliary Cage, this creates the potential hazard of material falling on workers.

5.7 Skip Over Cage Design - Controls

Skip Over Cage Design - Controls

To mitigate the hazard of workers being struck by material, Totten Mine has implemented the following controls:

- Full PPE is required around the shaft workings at all times.
- There is a 10 foot standoff distance clearly identified at all shaft stations.
- Skipping takes place primarily on nightshift to minimize the amount of people in hoisting areas.

5.8 Skip Over Cage Design - Controls

Skip Over Cage Design - Controls

To mitigate the hazard of workers being struck by material, Totten Mine has implemented the following controls:

- Full height shaft doors are maintained at collar and sub collar to completely close off the shaft compartment.
- The auxiliary hoist/shaft is completely separated from the main hoist/shaft through the use of solid brattice from other shaft compartments.
- Inspections are performed prior to moving people after the conveyance has completed skipping.

5.9 Shaft Size Restrictions - Hazards

Shaft Size Restrictions - Hazards

Due to the size of the Totten Mine shaft, it is necessary to sling equipment and material into the mine.

Because slinging is a frequent task for Totten Mine, there is an increased risk to workers being caught by or crushed.

5.10 Shaft Size Restrictions - Controls

Shaft Size Restrictions - Controls

To mitigate this hazard be aware of the following controls:

- The shaft schedule is strictly adhered to in order to maintain an organized flow of material underground.
- Skipping takes place primarily on nightshift to allow for material movement during the day.
- Totten has detailed job procedures specific to slinging material underground.

5.11 Ventilation Control System - Hazards

Ventilation Control System - Hazards

At Totten mine, the Ventilation Control System provides the ability to direct ventilation air in the mine to the area that requires it, at the quantity needed, triggered by personnel and equipment entering workplaces underground.

The system is automatic and is overseen by the control room operator.

The compromise or failure of this system presents workers with the hazard of being subjected to contaminated air.

5.12 Ventilation Control System - Controls

Ventilation Control System - Controls

To mitigate this hazard be aware of the following controls:

- In the event a worker identifies that the ventilation is not sufficient for the workplace, he or she is to contact the control room on channel 5 for assistance before entering.
- RF ID tags that are maintained in all Totten Mine underground cap lamps as well as mobile equipment.
- All employees are required to use approved cap lamps, including visitors; non-Totten Mine issued cap lamps will lead to non-activation of ventilation systems.

5.13 Seismicity - Hazard

Seismicity - Hazard

Mining leaves voids that generally alter the balances of forces in rock, at times causing rock bursts.

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
- Obstruction or loss of egress.

5.14 Seismicity - Controls

Seismicity - Controls

To mitigate this hazard be aware of the following controls:

- Tracking of the unique dyke zones / adverse ground conditions are maintained by the mines technical service group.
- There are sensors throughout the mine that record seismic activity. These can be monitored from the control room, ground control department, and supervisor's computer on 3850 level.
- Report any suspected seismic activity to your supervisor.
- The Ground Control Department will determine what type of ground support system is required based on the changing ground conditions.

5.15 Heat Stress - Hazard

Heat Stress - Hazard

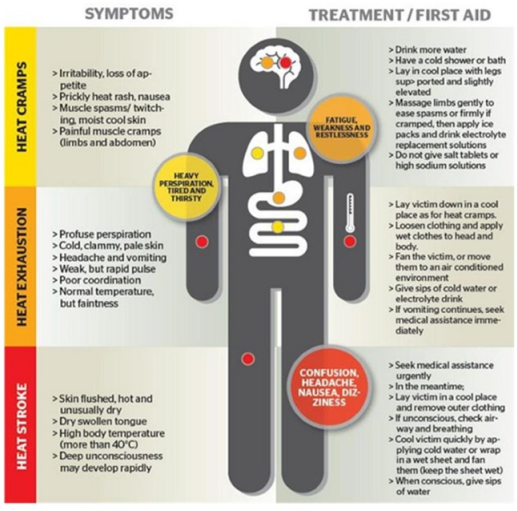
Due to the depth at Totten Mine, the inherent rock temperature is naturally higher.

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.

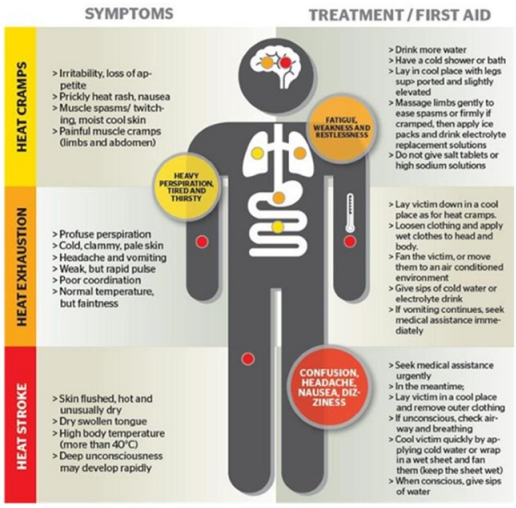


5.16 Heat Stress - Hazard

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



5.17 Heat Stress - Controls

Heat Stress - Controls

To mitigate the hazard of heat stress, Totten 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.
- Personal sized bagged ice is available to workers and can be found in the sub-collar.

5.18 Mobile Equipment - Hazard

Mobile Equipment - Hazard

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

The mobile equipment hazards at Totten Mine include the following:

- Totten Mine has Diesel trucks hauling on the ramps and levels.
- There are 6 and 8 yard scoops operating on different levels that have very limited visibility.
- The main intersection on 3850 level (known as the 400/401) is the main dump area for mine rock and the main egress for the lower portion of the mine.

5.19 Mobile Equipment - Controls

Mobile Equipment - Controls

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

- A Ramp and Level Travel Procedure.
- Headlights and vehicle flashing lights are to remain on at all times when operating mobile equipment.
- Vehicles and pedestrians must follow level entry procedure when entering level.
- Restricted access areas. (ie. ore pass gates)
- Safety Pouches with temporary barricades have been installed in all underground vehicles in event of breakdown.
- Identified production areas are restricted to everyone but the production equipment ie; scoops and trucks. These areas are identified with a flashing amber light.

5.20 Mobile Equipment - Controls

Mobile Equipment - Controls

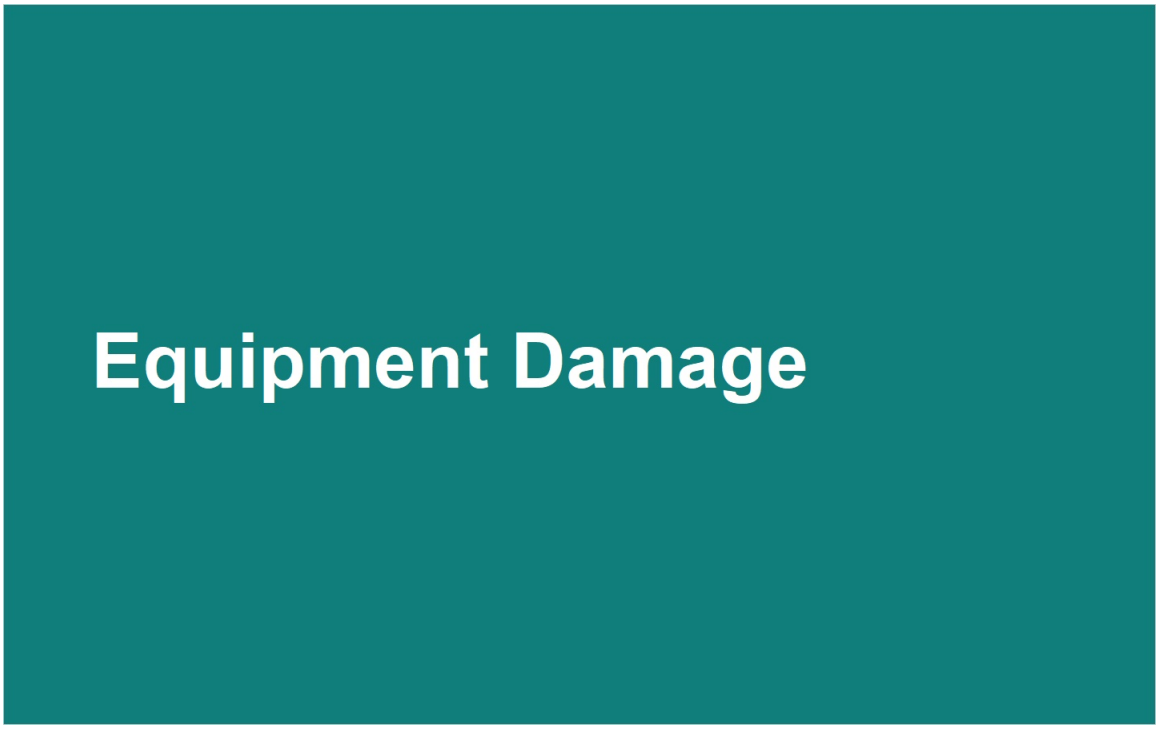
To mitigate the risk of collision, Totten Mine has implemented the following controls:

To enter an area with a flashing amber light:

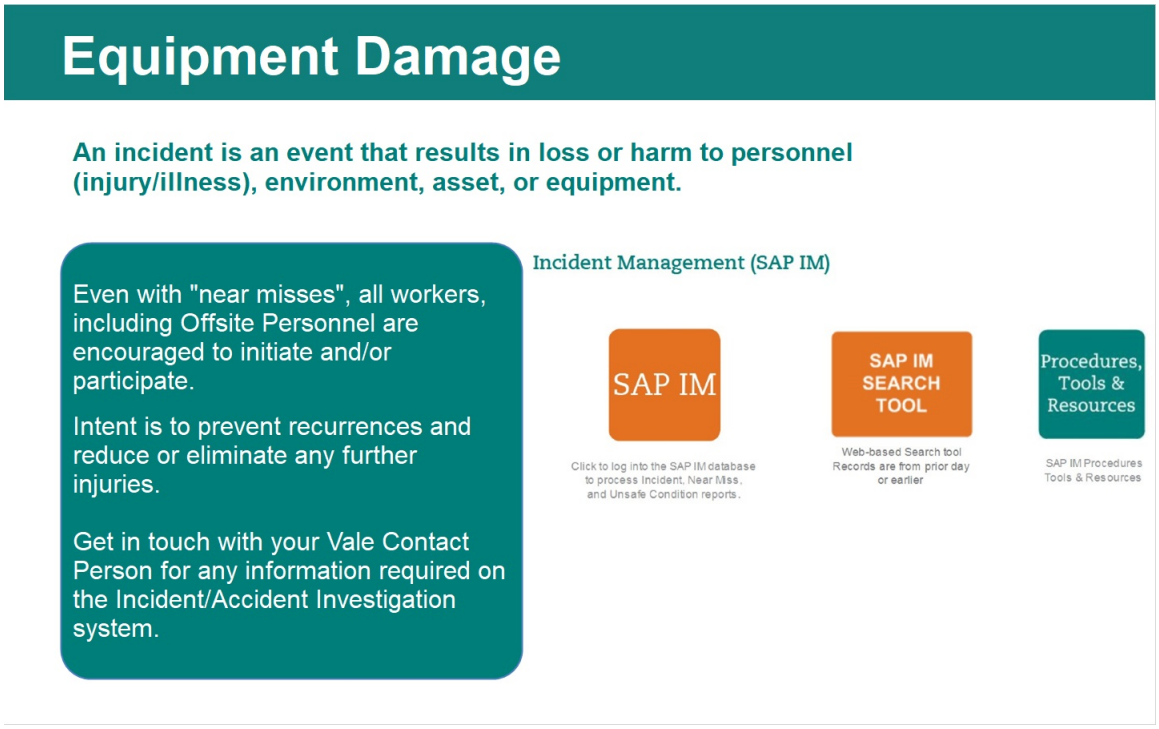
- Contact the scoop operator (ex.. “3800 Scoop Operator, come in”).
- When answered state your business and ask for permission to enter the level.
- If no scoop operator answers after several attempts contact the beat Supervisor. Once you are cleared of the area, let the scoop operator know you’re clear.

6. Equipment Damage

6.1 Equipment Damage



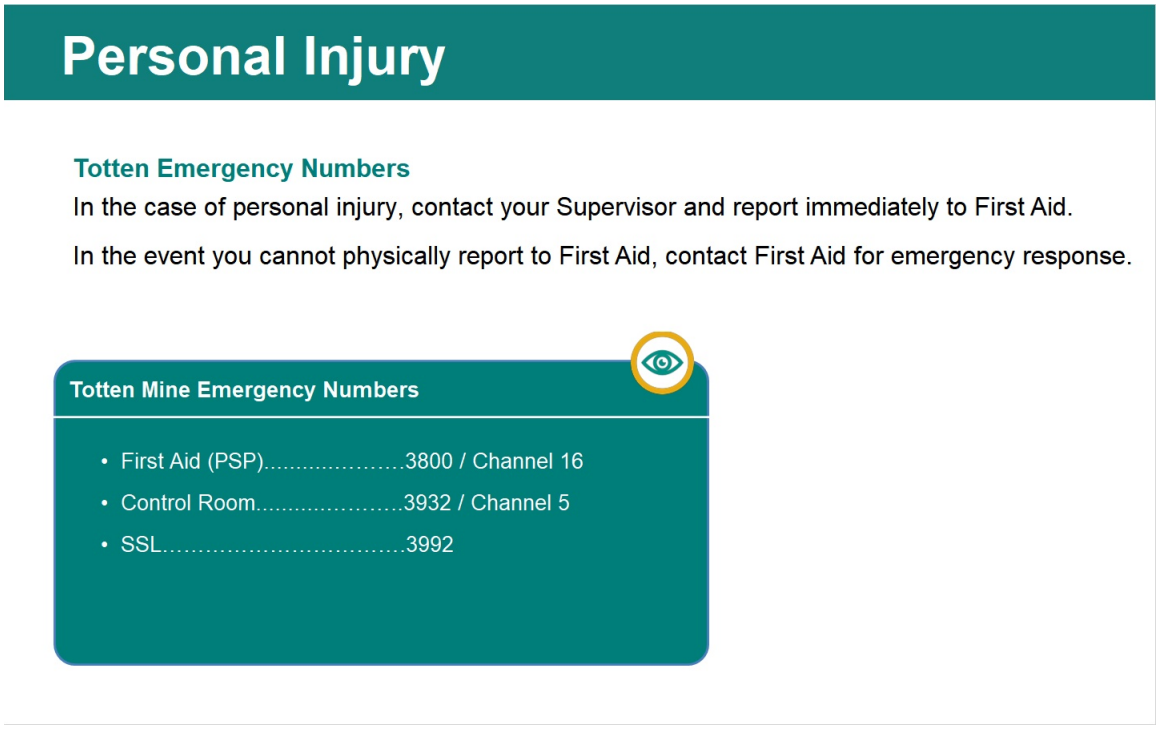
6.2 Equipment Damage



7. Personal Injury

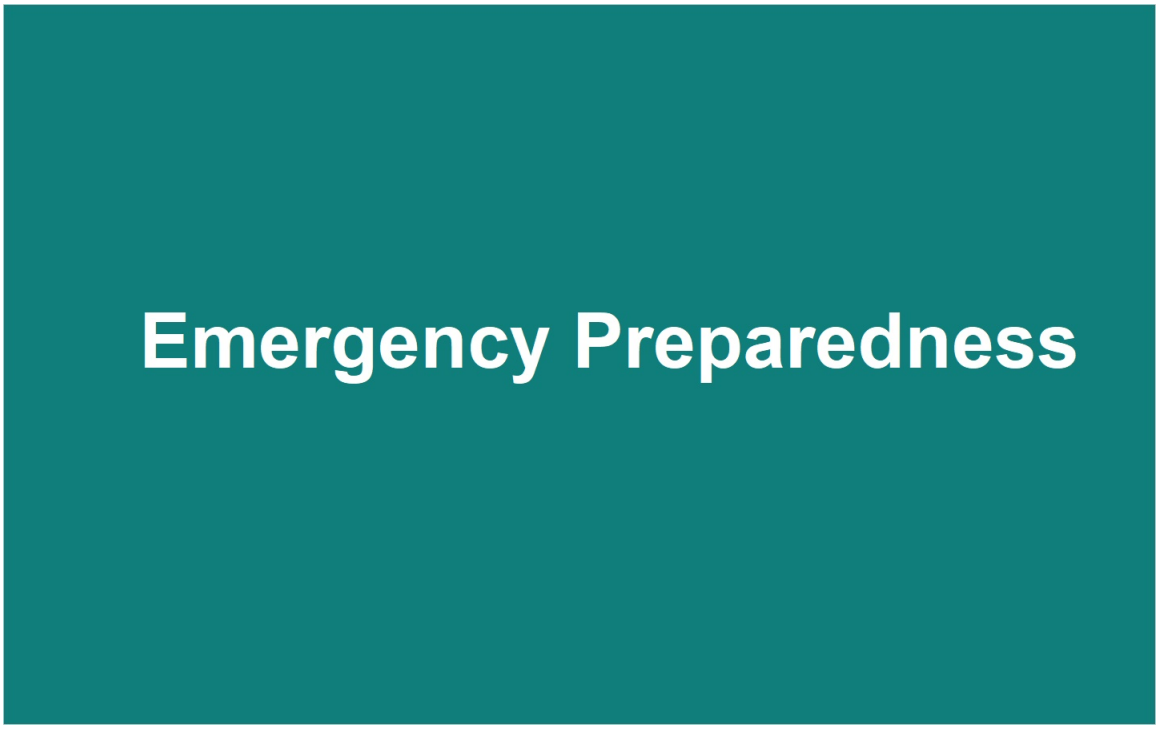
7.1 Personal Injury

7.2 Personal Injury



8. Emergency Preparedness

8.1 Emergency Preparedness



8.2 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 Totten Mine.

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

8.3 Notification

Surface Alarms - Emergency Notification

Totten Mine Specific Fire Procedure

A Surface Fire is signaled by a series of beeps, followed by PA announcement and Radio frequencies, 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.

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.

Leave the building by the nearest exit.

Note:
Only buildings in the fire area must be evacuated.

8.4 Surface Assembly Area

Surface Assembly Area

The Safe Assembly Areas at Vale are designated with a green sign displaying a large letter "A" with white lettering. Report to and register with person in charge.

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.

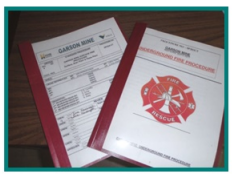
8.5 Underground Fire

Underground Fire

In the event of a fire underground at Totten Mine, stench will be injected into the fresh air system, as well as a message broadcast on all channels "There is a fire underground. Report to the nearest refuge station."

Report to the nearest refuge station and follow the underground fire procedure.

In remote areas of Totten Mine that do not have standard refuge stations, Totten Mine has Tent style emergency fresh air stations to protect workers.



8.6 Emergency Fresh Air Station – Tent Style

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).

- Turn on compressed air valve (main line) to EFAS.
- Un-zip the access door and step inside.
- Watch footing on tubing floor as it is slippery.
- Re-zip the door shut.

8.7 Emergency Fresh Air Station – Tent Style

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 the Control Room 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.

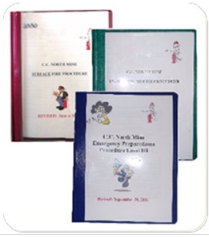
8.8 Other Mine Emergency

Other Mine Emergency

In the event there is a mine emergency *(i.e. Loss of primary services)* 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 you are accounted for and wait for instructions.

Do not clay the doors unless otherwise instructed.



9. Plant Exit

9.1 Plant Exit

9.2 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.

9.3 Plant Exit

Plant Exit

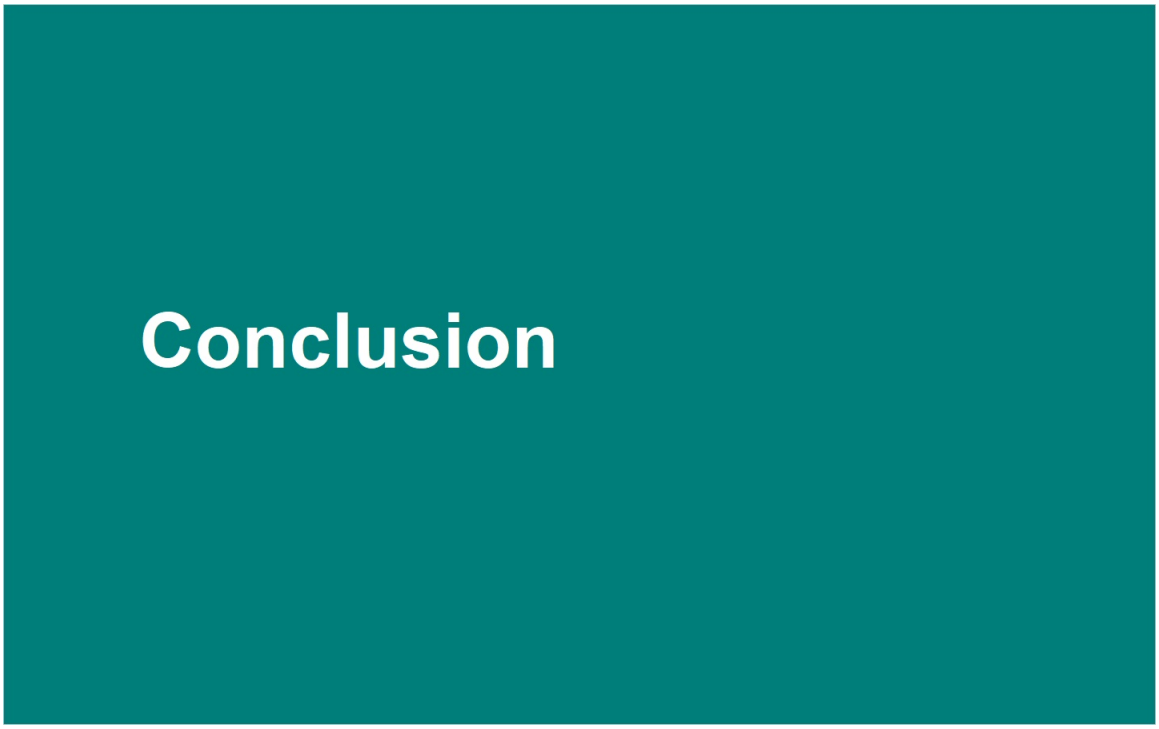
Exit from the front parking lot is one way to the intersection at the stop sign. It then becomes a two way left and right.

Remember;
When exiting the property STOP at the stop sign at the gate. C. Johnson Road has the right of way.

Obey signs, speed limits and railroad crossings.

10. Conclusion

10.1 Conclusion



10.2 Conclusion

Conclusion

This concludes the material for Tier 3 Vale Totten 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 regards to:
  - Wild animals
  - Skip over Cage shaft design
  - Shaft Size Restrictions
  - Ventilation Control System (VCS)
  - Seismicity and
  - Mobile Equipment

10.3 Conclusion

Conclusion

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

11. Totten Mine Orientation Review

11.1 Oxygen Plant Orientation

(Results Slide, 0 points, 1 attempt permitted)

Congratulations!

You have successfully completed the Totten Mine Orientation review.

You should now be aware of hazards you could encounter Totten Mine, however if you have any questions ask your Supervisor or Vale Contact Person.

11.2 Conclusion

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

Thank-you for your participation
and your commitment to safety at Vale.

HOME SAFE

11.3 Start The Module Quiz

Thank you for completing the Vale Online Module Training.

To start the module Quiz CLICK HERE