

# STANDARD OPERATING PROCEDURE TIRE FIRES/TIRE ELECTRIFICATION

Effective Date: 01/27/2019

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Rev: 4

## PURPOSE:

The conditions for a tire explosion may be initiated by numerous events. The most common of these are vehicles coming in contact with power lines, being struck by lightning, tire fires, and under-inflated tires.

These initiating events can set off a chemical reaction (pyrolysis) or diffusion of material inside a tire, generating heat that causes the sudden increase of internal tire pressure to extreme levels resulting in explosive tire failure.

Bingham Canyon Mine has put into place the following procedure to manage a tire fire and/or electrification.

## SCOPE:

To set procedures in handling a tire on fire or a tire to which electrification has occurred on ALL rubber tired equipment (light duty, medium duty, and HME).

## RESPONSIBILITY:

It is the responsibility of the Tire Coordinator to ensure that this procedure is made available to all Supervisors at the mine. It is the responsibility of Supervisor(s) and incident commander(s) to ensure enforcement.

## HEALTH AND SAFETY:

Through proper management during potential tire fire/electrification events the potential for human injury will be decreased.

***NOTE: The immediate stopping and parking of rubber tired equipment is required, not optional. This requirement is due to the potential of tires exploding either instantaneously or within several minutes or hours of fire damage or contacting electricity (i.e. lightning strikes, power lines, trail cables, etc.).***



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**THE PICTURE BELOW IS OF A TIRE THAT EXPLODED (KILLING THE OPERATOR) MINUTES AFTER CONTACTING A HIGH VOLTAGE LINE. TIME IS OF THE ESSENCE.**



## DEFINITIONS:

### PYROLYSIS

The decomposition of a substance by high temperatures (usually in the absence of air). In a tire liner this will commence at about 250°C and produces volatile chemicals like carbon black, styrene and butadiene.

### ELECTRIFICATION

The state whereby a piece of equipment has come into contact with an external source of electricity and the piece of equipment is providing a grounding path for the current.

### TIRE FIRE

Tire fires that occur through any means such as lightning strike, contact with electricity, or application of external heat or flame such as a vehicular oil fire that burns tires as collateral damage.

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## TIRE EXPLOSION

A result of a chemical reaction (pyrolysis) that produces a rapid increase of pressure inside the tire. A tire explodes when its pressure retaining capabilities are exceeded. This type of failure causes a sudden and potentially lethal release of extreme internal pressures. Usually associated with such an explosion is an air blast which is capable of killing people. Debris from explosions, such as pieces of tire carcass and rim components, can be propelled large distances with significant velocities.

### REFERENCES:

Name	Location
C3 Vehicles and Driving Standard	Prospect
Rio Tinto Tyre and Tim Guidance Notes	Prospect
Tyre and Rim Safety Group Procedure	Prospect
Tire Manufacturers – Michelin and Bridgestone	External

### GENERAL PROCESS FOR ALL SCENARIOS:

#### DANGER!

**Never approach a burning tire under any circumstances. The timing of a tire explosion is not predictable. Explosions can either be immediate or they can be delayed for up to 24 hours. Dealing with them is the responsibility of the Incident Commander and the Emergency Response Team.**

In any event of a tire fire or the electrification of any rubber tired equipment (including light vehicles), the tires shall be treated as a potential for tire explosion.

**NOTE: Do not attempt to fight a tire fire with a hand held extinguisher.**

**NOTE: The operator will not attempt to move the vehicle farther than what is necessary for safe exit.**

These emergency procedures are to be used as guidelines in the event an emergency situation develops. Upon becoming aware of equipment electrification or a tire fire, the driver will:

- Press the MAYDAY button on your computer and/or call on the Mine Operations channel on your radio stating "Mayday, Mayday, this is an emergency", over the radio. Give your location and relevant information about the situation. DO NOT state names over the radio if you are calling for other personnel or equipment.
- Sound horn four or more rapid blasts for an emergency.

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- **Ensure there is an evacuation path in front of the truck.**
- If on an incline, the truck shall be turned into the high wall to prevent rolling.
- If possible, safely move the equipment away from the power line, or source of energy, to a distance no less than 160 feet.
- If possible, park the truck in an area where a water truck will have easy access to any tire affected by fire.
- Park the truck immediately and if equipment has come into contact with an electrical line either through direct contact or through indirect contact then the operator is to stay in the cab until power has been isolated. Treat all power lines as energized.

**NOTE: DO NOT EXIT THE CAB UNTIL A CERTIFIED ELECTRICIAN OR LINEMAN HAS CONFIRMED THE POWER HAS BEEN ISOLATED AND THE EQUIPMENT IS NO LONGER ENERGIZED.**

- Shut down the truck and secure in accordance with existing procedures.
- Activate the fire suppression system (if a fire is present).
- **Once power has been isolated, operator is to evacuate the truck in a safe but expeditious manner (the intent is to get off the truck as soon as possible, keeping large protective parts of the truck, e.g. radiator, between the driver and the tires).**
- Once on the ground, the operator shall exit to a distance no less than 1000 feet from the equipment by moving along a path forward of the truck and maintaining the least exposure to the affected tire.

**NOTE: OPERATORS LEAVING THE VEHICLE SHOULD AVOID PASSING IN FRONT OF, OR BESIDE A BURNING TIRE.**

**NOTE: Production Control will ensure that no other trucks pass the equipment in question and that the surrounding 1000 foot exclusion zone is vacated of all employees and maintained for the duration as described in the following specific scenarios.**

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## SPECIFIC SCENARIOS PROCESSES:

### FOR TIRE FIRES WITH NO ELECTRICAL CONTACT (24 HOUR QUARANTINE)

This process will be followed if a tire fire occurs and there has been no possibility of electrical contact.

Firefighting equipment may enter the area if minimum exposure to the operator can be ensured.

**The rubber tired equipment must NOT be moved from the incident location until inspected and released by a competent Tire Craftsman and/or Tire Coordinator.**

**NOTE: UNDER NO CIRCUMSTANCE SHOULD ANY NON-EMERGENCY PERSONNEL ENTER THE 1000 FOOT EXCLUSION ZONE FOR ANY REASON.**

Where fire damage of a tire is evident, use of remote control equipment to puncture/deflate the affected tire should be considered as an option to minimize exposure of personnel to explosion hazard. If the affected tire is rendered incapable of air retention, it is no longer a potential for explosion. However, the affected truck must remain in quarantine for 24 hours prior to non-emergency personnel approaching within the 1000 foot distance. A fire watch must be present for the duration of the quarantine.

At the conclusion of the 24 hour quarantine period, the piece of equipment that has been quarantined must be inspected by a competent Tire Craftsman and/or Tire Coordinator.

<b>STANDARD OPERATING PROCEDURE TIRE FIRES/TIRE ELECTRIFICATION</b>		
Effective Date: 01/27/2019	Document Number: MNSOP10340-0036	Rev: 4

Inspection

1. If equipped, use the internal tire pressure/temperature monitoring tool (MEMS) to verify tire temperatures have decreased before entering the 1000 foot quarantine.
  - a. If the tire temps have not decreased, then the quarantine must be extended.
2. When approaching the equipment, smell for burnt rubber.
3. Inspect tires and wheel components for smoldering/melting/burning/cracking.

If the equipment shows no signs of damage and is released by the competent Tire Craftsman and/or Tire Coordinator, the equipment shall be driven to the Copperfield Truck Shop and have all tires and rim assemblies disassembled to be inspected by the Tire Coordinator and respective manufacturers.

Any tire or rim assembly that shows signs of fire damage must be removed from service immediately. If there are no signs of fire or electrical damage, the front tires must be removed, and only placed on the rear positions for the remainder of their life (this will be tracked using TTC and SAP).

FOR RUBBER TIRED EQUIPMENT ELECTRIFICATION/LIGHTNING (24 HOUR QUARANTINE)

This process will be followed if **the body** of any of rubber tired equipment (including light vehicles) is suspected of / comes in contact with lightning, a power line, or a trail cable.

**Due to the fact that the affected tire(s) cannot be visually identified in the case of electrification/lightning strike, the rubber tired equipment must NOT be moved from the incident location until inspected and released by a competent Tire Craftsman.**

**NOTE: UNDER NO CIRCUMSTANCE SHOULD ANYONE ENTER THE 1000 FOOT EXCLUSION ZONE FOR ANY REASON.**

If lightning/electrical damage to a tire is evident, the use of remote control equipment to puncture/deflate the affected tire should be considered as an option to minimize exposure of personnel to the possibility of an explosion hazard. If the affected tire is rendered incapable of air retention, it is no longer a potential for explosion. However, the affected truck must remain in quarantine for 24 hours prior to non-emergency personnel approaching within the 1000 foot distance. A fire watch must be present for the duration of the quarantine.

At the conclusion of the 24 hour quarantine period, the piece of equipment that has been quarantined must be inspected by a competent Tire Craftsman and/or Tire Coordinator.

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Inspection

1. If equipped, use the internal tire pressure/temperature monitoring tool (MEMS) to verify tire temperatures have decreased before entering the 1000 foot quarantine.
  - a. If the tire temps have not decreased, then the quarantine must be extended.
2. When approaching the equipment, smell for burnt rubber.
3. Inspect tires and wheel components for smoldering/melting/burning/cracking.

If the equipment shows no signs of damage and is released by the competent Tire Craftsman and/or Tire Coordinator, the equipment shall be driven to the Copperfield Truck Shop and have all tires and rim assemblies disassembled to be inspected by the Tire Coordinator and respective manufacturers.

Any tire or rim assembly that shows signs of fire or electrical damage must be removed from service immediately. If there are no signs of fire or electrical damage, the front tires must be removed, and only placed on the rear positions for the remainder of their life (this will be tracked using TTC and SAP).



*Evidence of electrical damage to tire bead from HT1203 contacting power line on 12/8/2017.*

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Rev: 4

## FOR TIRE CONTACT WITH TRAIL CABLE (2 HOUR QUARANTINE)

This process will be followed if **ONLY THE TIRE** on any of rubber tired equipment (including light vehicles) is suspected of / comes in contact with a **trail cable**.

**The rubber tired equipment must NOT be moved from the incident location until inspected and released by a competent Tire Craftsman.**

**NOTE: UNDER NO CIRCUMSTANCE SHOULD ANYONE ENTER THE 1000 FOOT EXCLUSION ZONE FOR ANY REASON.**

At the conclusion of the 2 hour quarantine period, the equipment that has been quarantined must be inspected by a competent Tire Craftsman and/or Tire Coordinator. If the equipment shows no signs of damage or fire, the equipment shall be released for work.

### Inspection

1. If equipped, use the internal tire pressure/temperature monitoring tool (MEMS) to verify tire temperatures have decreased before entering the 1000 foot quarantine.
  - a. If the tire temps have not decreased, then the quarantine must be extended.
4. When approaching the equipment, smell for burnt rubber.
5. Inspect tires and wheel components for smoldering/melting/burning/cracking.

**Note from Electrical Group: The reason for needing only a 2 hour quarantine when a tire contacts the trail cable is because the electricity will either travel back to the source or directly into the ground. The electricity will not travel through the tire which eliminates the possibility of pyrolysis.**

### REVISION/REVIEW HISTORY:

MOC#	Description of Change	Prepared By	Date
14568	Added Distance for Exclusion	Steve Husted	1/27/2011
No MOC	Adding review schedule, No MOC needed. "M" taken out of SOP#.	Shawn Bateman & Lisa Jansson	2/10/2014
25829	Review & Re-formatting. Changed area to 10340.	Ben Fishburn	2/28/2014
33634	Addition of Emergency Procedures Tire Electrification.	Fred Hazlewood	7/25/2016
45552	Revised to be in line with Rio Tinto / Tire Manufacturers' standards, to include specifics on contact with trail cables and addition of CRM icons.	Travis Hone, Uziel Higuera, Sierra Hicks & Cody Meadows	1/27/2019