

# SWI - MANAGEMENT OF HOT COAL AND COAL FIRES

<b>PURPOSE</b>	To document procedures for the management of coal fires and hot coal and in the mine.				
<b>AREA</b>	Mining Operations	<b>BUILDING</b>		<b>PC #</b>	
<b>RESOURCES</b>					
<b>QUALIFICATIONS</b>					
<b>PERSONAL PROTECTIVE EQUIPMENT</b>	<b>ITEM</b>	<b>SOURCE</b>			
<b>TOOLS AND EQUIPMENT USED</b>	<b>ITEM</b>	<b>SOURCE</b>	<b>CHECKS</b>		
	Gas Detector	Control Room			
<b>MATERIALS</b>	<b>ITEM</b>	<b>SOURCE</b>	<b>CHECKS</b>		
<b>PERMITS</b>					
<b>ISOLATIONS</b>					
<b>REFERENCE DOCS</b>	Anglesea Emergency Plan <a href="#">D0026137</a>				

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<b>HAZARDS</b>	Crushed / Sheared / Entangled		Falls / Slipping / Tripping		Suffocation	Y
	Lacerated / Pinched / Struck By		Mobile Equipment	Y	Temperature Extremes	Y
	Friction / Heat / Burns	Y	Confined Spaces		Radiation	
	High Pressure (Fluids / Gas / Comp Air)		Guarding / Barriers		Laser Safety	
	Stored Energy		Ergonomics		Toxic Gases / Vapours	
	Vibration		Noise		Dust / Fumes	Y
	Explosions		Access / Exit	Y	Coal Tar Pitch (CTP)	
	Live Conductors		Concealed Services		Asbestos / SMF	
	Magnetic Field		Auto Shutdown / Interlocks		Other Chemicals	
	Pot Earth Potential		Wastes		Hazardous Materials	
	Other					
<b>HAZARD ASSESS</b>	HIRA TITLE	Mine Coal Fires and Hot Coal Procedures			HIRA ID	??????
<b>ENVIRONMENTAL</b>	REG TITLE	Significant Environmental Aspects Register – Mine and Land Management			REG ID	D0055319
<b>IMPACTS</b>	Air Emission / Dust / Fume / Odour	√	Water Discharge / Contamination		Waste Generation	
<b>QUALITY STDS</b>						
<b>HARDCOPY FILES</b>						
<b>DOCUMENT OWNER</b>	Mine Manager	<b>HELP</b>	4225	<b>AUTHOR</b>	Chris Rolland	
<b>COMMENTS</b>						

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## ACTIVITY 1: BACKGROUND

### STEP 1.01: GENERAL

This safe work instruction (SWI) is designed to minimise the risks of an environmental incident relating to the generation of coal combustion fumes resulting from a coal fire within the coal mine area and impacting either internally or externally to the site.

The SWI also addresses preventative management strategies and also methods for coal fires and hot/warm coal events within the mine area.

### STEP 1.02: COAL FIRE SOURCES

#### 1. EXTERNAL SOURCES

The major risk of a mine coal fire resulting from an external source comes from a possible ember attack from either a bushfire or a controlled burn occurring in the surrounding bush land.

Bushfires can be the result of a number of varying events such as lightning, deliberately lit fires, power line faults etc. Sudden wind changes during controlled burns can also lead to ember attack on the mine.

Depending on the proximity of the fire and the prevailing wind strength, the intensity and severity of the spotting can also vary.

#### 2. INTERNAL SOURCES

##### (i) Spontaneous Combustion

Coal, in its pre-mined state, may give off some warmth, a feature that can be observed on cold mornings during mining operations. This normal feature is not an issue, but when observed in loose or cracked coal for prolonged periods, can be an indicator that the coal is self-heating.

When coal begins to self-heat, it starts to steam, the warm coal may also be seen to sweat and there may be areas coated with a white discolouration. If left unattended, the coal will continue to self-heat to its critical temperature when ignition will occur in the form of observable 'blue' smoke, acrid smell and the potential to smoulder and burn as embers and flame. The source 'hot spot' must be found and dealt with to curtail the burning process.

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## (ii) Other potential internal ignition sources

Caution must also be exercised to ensure that other potential internal ignition sources are managed to minimise the risk of initiating coal fires. These potential sources include any Hot Work conducted on or near the coal surface (see 'Anglesea Power Station Hot Work Policy and Procedures – [D0057304](#), coal fire as a result of machinery fires (see various mine equipment SWIs [P2K3107](#) internal overhead electrical fault (line inspection PMs), lightning or violation of the site procedures banning smoking.

With the exception of lightning, each of these potential sources has their own associated procedures or regimes to minimise the risk of contribution to triggering mine fires.

## ACTIVITY 2: PROACTIVE FIRE MINIMISATION STRATEGIES

1. Housekeeping of coal fines and disturbed coal is critical in maintaining a productive approach to coal fires. Coal of this nature should be mined at the earliest possible time and any loose coal should be cleaned up on a regular basis as part of the mining process. Haulroad windrows are prone to heating up and steaming, especially when wet fines are continually graded to the side of haul roads, adding to the windrow volume. Loose coal left in heaps is also susceptible to spontaneous combustion.
2. Old worked out coal batters usually weather over time allowing coal fines to form at the base of the batters. Final coal batters should therefore be covered with overburden at the earliest practicable time following mining. This approach minimises the chance of spontaneous combustion and also eliminates a potential fire source in the coal fines during an ember attack.

3. Where practical, also cover any exposed coal surfaces that remain following the completion of mining.
4. Waste coal material, such as that generated when cleaning the coal surface in preparation for mining, should be disposed of in a way as to not allow it to become a spontaneous combustion source or in a location that makes it difficult to access if it does begin to heat up..
5. Unplanned vegetation growth in mined out areas within the mine should be minimised to reduce an additional fuel source.

## ACTIVITY 3: EXTERNAL EMBER ATTACK

1. HAZ - If the mine comes under threat of external or internal ember attack and there is a threat to employee welfare, all employees must revert to the steps outlined in the Emergency Management Plan, including moving equipment to a safe location and evacuation procedures. Safe locations for the equipment will vary dependent on the threat and direction of travel, but include the overburden surface and the normal park up pad.

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## ACTIVITY 4: INSPECTIONS

1. Checking for coal that is steaming or heating up shall be undertaken on a daily basis directly following the daily start-up meeting and before work commences. This is also the optimum time as it is generally when ambient temperatures are coolest and warmer coal is easier to observe due to warmth or steam rising from the localised site. Another key indicator is the presence of any smell of heating coal.
2. QUAL- This activity shall be captured and recorded as part of the ANG Mine Shift Check sheet performed on a daily basis prior to the commencement of work – [D0268651](#)
3. The main areas of concern are coal windrows and loose coal collected below coal faces. Cracked coal is also a potential source.

## ACTIVITY 5: REPORTING

1. As stated in the Mine Shift Check sheet, any observed warm or hot coal must be reported immediately to mine supervision. This should be done in conjunction with ensuring the warm or hot coal is eliminated as soon as practicable. If mine supervision cannot be contacted then activate the help chain as external reporting of the incident may be required and must be completed in a timely fashion.
2. ENV - Generally, coal that has heated may give off an odour that is easily discernible and is an indicator that the coal has moved to the next combustion stage. An Environmental Near Miss must be captured for any coal combustion event where gas detectors are borrowed from the Control Room.
3. All coal combustion that leads to acrid 'blue' smoke must be reported to CFA inclusive of action to extinguish, irrespective of size of 'hot' spot or extent of fumes.

## ACTIVITY 6: MANAGEMENT OF COAL FIRES

### STEP 6.01: WARM TO HOT COAL

1. Any coal that shows signs of steaming and heating up should be dug out immediately.
2. HAZ - Precautions should be taken if the warm to hot coal is emitting fumes. Always be conservative in this case and obtain carbon monoxide (CO) air testing equipment from the Control Room to be used to measure the air quality. This monitoring equipment must be kept in the cabin of whatever machine is used to eliminate the warm to hot coal. Whenever an alarm is sounded, the machine operator must immediately withdraw from the area and reassess the approach to eliminating the issue.
3. HAZ - If the warm to hot coal cannot be extinguished without alarming the monitor in the cabin, consideration may be given to use of BA equipment by those trained in its use.

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| <p>4. If the coal is obviously hot and the quantity of coal affected is minimal, then that hot coal should be dealt with in the mine by dumping internally away from other coal. The hot coal can then be spread and track rolled or cooled with water or buried or a combination of all these methods.</p> <p>5. If the coal is only warm and of sufficient volume, a joint team composed of power station and mine representatives shall assess any coal where there is some doubt about whether it should be mined and processed, due to its temperature. This allows for a consensus decision to be made and ensures that if the coal is to be mined the power station is aware of this and can manage it appropriately. Utilising a probe and thermocouple arrangement to determine the coal temperature can assist the decision-making process. This coal temperature must be less than 60°C before allowing it to be mined and transported to the power station.</p> <p>6. If agreement cannot be reached, the Mine Manager and Power Station Engineer must be made aware of the</p> | <p>issue to allow a final decision to be made.</p> <p><b>STEP 6.02: COAL FIRES</b></p> <ol style="list-style-type: none"> <li>1. HAZ - Always undertake a Pre-Task Brief prior to excavating or dozing out a coal fire.</li> <li>2. Selection of the best equipment for the task is critical but generally excavators are best for hard to reach fires whereas dozers and loaders are applicable for flat terrain or single bench fires. The excavator is generally the best machine for occasions where it is unsafe to get a machine too close to the fire source.</li> <li>3. HAZ - Precautions should be taken as the hot coal will be emitting fumes. Always be conservative in this case and obtain carbon monoxide (CO) air testing equipment from the Control Room to be used to measure the air quality. This monitoring equipment must be kept in the cabin of whatever machine is used to eliminate the hot coal. Whenever an alarm is sounded, the machine operator must immediately withdraw from the area and reassess the approach to eliminating the issue.</li> </ol> | <ol style="list-style-type: none"> <li>4. HAZ - If the hot coal cannot be extinguished without alarming the monitor in the cabin, consideration may be given to use of BA equipment by those trained in its use.</li> <li>5. HAZ - Care should be taken when approaching a coal fire. To minimise the fume and ember issues, plan your approach to be the maximum distance from the fire and from an upwind direction. Plan the work, including equipment selection and use of respirators.</li> <li>6. HAZ - Minimise the use of bystanders and always ensure that observers are well out of the way and always upwind. Also ensure the wellbeing of other operators involved in the exercise, such as haul truck operators used to move the hot coal.</li> <li>7. Consider dampening down the intensity with the water cart but never assume that the fire is able to be put out by use of water.</li> <li>8. Consider getting the burning coal to a sump area using trucks or the loader bucket where it can be placed in or pushed into a water body.</li> <li>9. If the coal fire cannot be eliminated completely before the end of shift, then operators must either work back</li> </ol> |
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or completed smoother the hot coal area with clay material to exclude air and reduce the event of flare up overnight.

## ACTIVITY 7: FOLLOW UP CHECKS

1. Following the elimination of any significant coal fires, establish an appropriate Fire Watch for 30 minutes after the fire has been thought to be extinguished
2. Ensure hourly follow up checks are organised and performed by trained personnel in the area where the fire has been thought to be eliminated.
3. If the fire has been thought to be eliminated and it is at the end of the shift, then the Control Room needs to be informed of the situation, including an agreed inspection plan.

Follow up comments:

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