

**U/G VENTILATION MANAGEMENT HIF AUDIT - 17/06/2003 03:03:50 PM****1. VENTILATION PERSONNEL**

| Point | Standard                                                                                                                            | Guideline                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 1.1   | The manager has appointed an Underground Ventilation Officer for the mine.                                                          | Intent: To ensure that a person is appointed by the Manager to be the Underground Ventilation Officer at the mine in accordance with MSI Reg 9.3(1) and Section 44.<br>Personnel: Mine Manager and Underground Ventilation Officer.<br>Method: Verify by examination of the letter of appointment and entry in record book. The letter of appointment should include the summary of responsibilities the area of responsibility and be signed with an acknowledgement of appointment. |
| 1.2   | The District Inspector has been notified in writing of the appointment.                                                             | Intent: To ensure that the District Inspector has been informed in writing of the appointment.<br>Personnel: Mine Manager and Underground Ventilation Officer.<br>Method: Verify by examination of the letter of appointment and cross reference with Department files.                                                                                                                                                                                                               |
| 1.3   | The Underground Ventilation Officer is appropriately qualified.                                                                     | Intent: To ensure that the Underground Ventilation Officer has the qualifications and experience to perform his stated duties in compliance with MSIA Reg 9.4.<br>Personnel: Mine Manager and Underground Ventilation Officer.<br>Method: Verify by interview.                                                                                                                                                                                                                        |
| 1.4   | The Underground Ventilation Officer has the authority to close down operations in areas where inadequate ventilation is identified. | Intent: To verify that the U/G Ventilation Officer has the authority that is commensurate with the duties of the position.<br>Personnel: Registered Manager, Underground Manager and U/G Vent Officer.<br>Method: Interview personnel, view position description for U/G Vent Officer and documentary records of surveys, inspections etc. associated with the U/G Vent Officers duties.                                                                                              |
| 1.5   | Mine Supervisors and operators receive basic mine ventilation training.                                                             | Intent: To verify that persons involved in daily underground operations and activities are trained in the basics of underground mine ventilation.<br>Personnel: Underground operators and supervisors, Training Officers.<br>Method: Interview personnel and view training documentation.                                                                                                                                                                                             |

**2. MONITORING EQUIPMENT**

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| 2.1 | The mine has ventilation instrumentation to conduct the required flow measurements.                                                                | <p>Intent: To ensure that the mine has equipment to carry out airflow measurement underground.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Verify that the mine has air flow measurement equipment which may include:</p> <ol style="list-style-type: none"> <li>1. Anemometer or air velocity device appropriate to the air velocities encountered.</li> <li>2. Pitot tube.</li> <li>3. Extension devices for measurement of large openings.</li> </ol>                           |
| 2.2 | The mine has equipment to monitor oxygen and any toxic or asphyxiant gases anticipated to occur on the mine site.                                  | <p>Intent: To ensure that the mine has equipment to monitor oxygen and any toxic, asphyxiant or flammable gases present at the mine.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Verify that the mine has monitoring equipment which should include an Oxygen monitor and a methanometer and may include testing equipment for other gases such as:</p> <p>Carbon monoxide, Carbon dioxide, Nitrogen oxide, Nitrogen dioxide, Sulphur dioxide, hydrogen sulphide, Ammonia etc.</p> |
| 2.3 | All measuring equipment is calibrated and maintained to manufacturers specifications.                                                              | <p>Intent: To ensure that ventilation monitoring equipment is being maintained and calibrated in accordance with manufacturers specifications.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Verify by sighting the calibration certificates etc.</p>                                                                                                                                                                                                                                |
| 2.4 | When ventilation or gas measuring equipment is sent for calibration or repair, alternative equipment is made available.                            | <p>Intent: To ensure that the mine monitoring capability is maintained during periods where equipment is sent away for calibration.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Interview personnel observe equipment.</p>                                                                                                                                                                                                                                                         |
| 2.5 | A record is kept of each item of calibrated equipment that includes the latest date of calibration, the calibration factors and the next due date. | <p>Intent: To ensure that the mine has system in place to maintain equipment in calibration.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: View records.</p>                                                                                                                                                                                                                                                                                                                         |
| 2.6 | A procedure exists to ensure that where indicator tubes are used, the tubes use-by-date has not expired.                                           | <p>Intent: To ensure that the mine maintains indicator tubes within the used by date for each individual gas present at the mine.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Sight a sample of tubes.</p>                                                                                                                                                                                                                                                                         |

### 3. VENTILATION RECORD KEEPING

| Point | Standard                             | Guideline                                                                                                                                                                                                                                                    |
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| 3.1   | The mine has a ventilation log book. | <p>Intent: To ensure that the mine airflow measurements, airborne contaminants and gas measurements are recorded and kept up to date.</p> <p>Personnel: Underground Ventilation Officer.</p> <p>Method: Verify by sighting that the ventilation records.</p> |

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| 3.2 | The mine ventilation records indicate that testing occurs at the required intervals for ventilation, and fan surveys                          | Intent: To ensure that monitoring occurs in all operating areas at an appropriate frequency as identified in MSIA Reg 9.5.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by examination of ventilation records:<br>a) Primary Airflows - 3 months<br>b) Primary fans 3 months<br>After any major change in the circuit.             |
| 3.3 | Each site air measurement is documented and retained at the mine.                                                                             | Intent: To ensure that air measurements taken at each ventilation station are documented and are available for examination or scrutiny<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation field records.                                                                                                                       |
| 3.4 | Each entry in the ventilation record book is dated and signed.                                                                                | Intent: To ensure that each entry made is documented, dated and signed by the person making the entry.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by examination of ventilation records.                                                                                                                                         |
| 3.5 | Each ventilation system has a diagram showing the flow balance.                                                                               | Intent: To ensure that the mine has a diagram available for each separate ventilation system underground.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by sighting a diagram for each auxiliary ventilation circuit.<br>This should show the link with the primary ventilation station.                                            |
| 3.6 | There is a procedure for the reporting of defects within the ventilation system and for the issuing of instructions to rectify those defects. | Intent: To ensure that defects are brought to the manager's attention and that instructions are issued to correct the defects.<br>Personnel: Manager, Underground Ventilation Officer and mine personnel.<br>Method: View records and procedures.                                                                                                      |
| 3.7 | A copy of the current National Exposure Standards NoHSC:1003 is available at the mine.                                                        | Intent: To ensure that the mine is in possession of the current Exposure standards for each contaminant.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by sighting a copy of the Worksafe Australia Standard NOHSC:1003.                                                                                                            |
| 3.8 | Underground Ventilation Officer has a copy of the Mine Safety Inspection Act & Regs.                                                          | Intent: To ensure that the Underground Ventilation Officer is aware of the duties, obligations and statutory responsibilities of current legislation.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by sighting a copy of the current Mines Safety and Inspection Act and Regulations in the Underground Ventilation Officers room. |
| 3.9 | Mine ventilation costings are monitored and recorded.                                                                                         | Intent: To verify that the individual cost elements of the mine ventilation function are established and recorded.<br>Personnel: Underground Manager and U/G Ventilation Officer.<br>Method: Interview personnel and view costing system records.                                                                                                      |

#### 4. VENTILATION PLANS

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| 4.1  | The mine has ventilation plans which are updated at intervals not exceeding 3 months.                | Intent: To ensure that each mine has an up to date Ventilation plan available at the mine in accordance with MSI Reg 9.5 and 9.28.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by sighting the ventilation plan. |
| 4.2  | Mine plans containing current ventilation and survey information are issued to the Mine Rescue Team. | Intent: To ensure that the mine has up to date plans of all ventilation circuits for use in an emergency.<br>Personnel: Underground Ventilation Officer and Survey Department.<br>Method: Verify by sighting plans.                   |
| 4.3  | The direction and volume of air flows are clearly marked on plans. (Intake - blue, Return – red)     | Intent: To ensure that the direction and volume of air currents are shown on the ventilation plan.<br>Personnel: Underground Ventilation Officer.<br>Method: Verify by sighting primary and secondary ventilation plans.              |
| 4.4  | The position of vent stations are clearly marked on the plan.                                        | Intent: To ensure that the location and number of each ventilation survey station is clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                       |
| 4.5  | The position of air doors are clearly marked on the plan.                                            | Intent: To ensure that the location of air door is clearly marked on the plan.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                                                      |
| 4.6  | The position of stoppings are clearly marked on the plan.                                            | Intent: To ensure that the location of stopping is clearly marked on the ventilation plan.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                                          |
| 4.7  | The position of fans are clearly marked on the plan.                                                 | Intent: To ensure that the location of fan is clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                                              |
| 4.8  | The position of regulators are clearly marked on the plan.                                           | Intent: to ensure that the location of regulator is clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                                        |
| 4.9  | The position of all fresh air bases are clearly marked on the plan.                                  | Intent: To ensure that the location of all fresh air bases are clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                             |
| 4.10 | The position of all refuge chambers are clearly marked on the plan.                                  | Intent: To ensure that the location of all refuge chambers are clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br><br>Method: View ventilation plans.                                         |
| 4.11 | The position of all telephones (including numbers) are clearly marked on the plan.                   | Intent: To ensure that the location of the telephones with their numbers are clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                               |

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| 4.12 | The position of all second means of egress are clearly marked on the plan.            | Intent: To ensure that the location of all second means of egress are clearly marked on the ventilation plans.<br>Personnel: Underground Ventilation Officer.<br>Method: View ventilation plans.                                                                 |
| 4.13 | The position of fire extinguishers and water hydrants are clearly marked on the plan. | Intent: To ensure the location of all firefighting equipment is clearly marked on the ventilation plans.<br>Personnel: Confirm by interview with the Underground Ventilation Officer.<br>Method: Verify by sighting the primary and secondary ventilation plans. |

## 5. AIR MEASUREMENT

| Point | Standard                                                                                                                   | Guideline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| 5.1   | Air velocity instrumentation is available to adequately measure the range of velocities encountered during volume surveys. | Intent: To ensure that the mine has a sufficient range of equipment to measure the different velocities associated with primary and secondary ventilation.<br>Personnel: Ventilation Officer.<br>Method: Verify that the mine has equipment to measure low, medium and high velocities, e.g.<br>a) low speed - smoke tubes<br>b) Medium speed - anemometer<br>c) High speed - pitot tube and inclined manometer.                                                                                                                                                                                                                                                                                                                                                           |
| 5.2   | There is a written procedure for the measurement and recording of airflows.                                                | Intent: To ensure that measurement and recording of airflows are governed by a procedure.<br>Personnel: Ventilation Officer.<br>Method: View procedure key elements of which should include:<br>(i) All vehicle movement is stopped in the area.<br>(ii) Air measurements are taken at right angles to the air flow.<br>(iii) An average of four air velocities are taken by traverse or spot method.<br>(iv) Where a traverse measurement is utilised the start of the traverse should be on alternate sides of the drive.<br>(v) Where spot measurements are taken each measurement area does to exceed 1m <sup>2</sup> .<br>(vi) The person taking the measurement does not allow the measuring device to traverse in a direct line between any person and the airflow. |
| 5.3   | Ventilation stations are selected with regard to obtaining reliable velocity reading.                                      | Intent: Self evident.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting plans and a sample of the ventilation stations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5.4   | The area of each ventilation station is determined by survey.                                                              | Intent: To ensure that an accurate measurement of station areas is obtained.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting area calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 5.5   | The mine has carried out an assessment of the natural ventilation circuit                                                  | Intent: To ensure that an assessment can be made of the effects of the natural ventilation circuit in the case of a primary fan failure.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting documentation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## 6. FANS

| Point | Standard                                                                                                              | Guideline                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 6.1   | Primary fans at the mine are equipped with means to determine pressure and flow across each fan.                      | <p>Intent: To ensure that the primary fans are provided with pressure and flow measurement devices or measurement ports are available to carry out a fan test in accordance with MSI Reg 9.5(g).</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting each primary fan location at the mine.</p> <p>Each fan should be equipped with pressure flow equipment or have port holes through which monitoring devices can be passed.</p> |
| 6.2   | Primary fans at the mine are equipped with vibration monitoring.                                                      | <p>Intent: To ensure that the Primary fans at the mine are equipped to detect vibration which may lead to damage.</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting each fan location at the mine.</p>                                                                                                                                                                                                                           |
| 6.3   | The fans are maintained in accordance with the manufacturers specifications                                           | <p>Intent: To ensure that fans are maintained in accordance with manufacturers specifications .</p> <p>Personnel: Ventilation Officer, Mechanical and Electrical Staff.</p> <p>Method: Verify by sighting manufacturers literature and site maintenance records.</p>                                                                                                                                                                                    |
| 6.4   | All flow or damper adjustment controls are locked to prevent tampering.                                               | <p>Intent: To ensure that flow control devices fitted to each primary fan cannot be operated by personnel other than the Ventilation Department.</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting that such devices are locked in position.</p>                                                                                                                                                                                 |
| 6.5   | Surface fan installations are located in an area that does not exhibit evidence of ground subsidence or wall failure. | <p>Intent: To ensure that primary fans are not exposed to any danger from ground subsidence or wall failures.</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting each fan location. Examine for any cracking subsidence or wall failures in the area.</p>                                                                                                                                                                         |
| 6.6   | Surface fan installations have fire breaks around them.                                                               | <p>Intent: To ensure that there are no fire hazards present within 50 metres of each fan which could result in damage to the fan or smoke being drawn underground.</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting each fan location.</p>                                                                                                                                                                                      |
| 6.7   | There is an alarm system in place to indicate a primary fan failure.                                                  | <p>Intent: To ensure that the alarm is raised should failure of a primary fan occur.</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting alarm system.</p>                                                                                                                                                                                                                                                                         |
| 6.8   | There is a procedure in place to manage the occurrence of a primary fan failure.                                      | <p>Intent: To ensure that personnel are not exposed to hazards due to primary fan failure and that diesel equipment operation is suspended .</p> <p>Personnel: Ventilation Officers.</p> <p>Method: View procedure.</p>                                                                                                                                                                                                                                 |
| 6.9   | Primary fans located on the surface are equipped with permanent lighting.                                             | <p>Intent: To ensure that lighting is provided at each primary fan location in accordance with MSI Reg 10.14 (1) (c).</p> <p>Personnel: Ventilation Officer.</p> <p>Method: Verify by sighting each fan location.</p>                                                                                                                                                                                                                                   |

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| 6.10 | The installation of each primary fan is such that recirculation of air is prevented.                                       | Intent: To ensure that the primary fans do not recirculate.<br>Personnel: Ventilation Officer.<br>Method: Verify by observation and checking records.                                                                 |
| 6.11 | The installation of auxiliary fan is such that recirculation of air is minimised.                                          | Intent: To ensure that recirculation at auxiliary fans is minimised in compliance with MSIA Reg 9.16.<br>Personnel: Ventilation Officer.<br>Method: Verify by inspection of fan installations and checking air flows. |
| 6.12 | Fan selection is based on the required pressure/volume characteristics for the mining parameters and equipment to be used. | Intent: To ensure that the fan characteristics are compatible with expected duty.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting design calculations.                                               |

## 7. VENTILATING DEVICES

| Point | Standard                                                                                     | Guideline                                                                                                                                                                                                                                                                                                                                         |
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| 7.1   | Disused areas of the mine are equipped with stoppings to prevent leakage of ventilating air, | Intent: To ensure that disused areas are sealed off where leakage could occur.<br>Personnel: Ventilation Officer.<br>Method: Verify by viewing plans and old areas.                                                                                                                                                                               |
| 7.2   | Permanent stoppings are of robust construction.                                              | Intent: To ensure that permanent stoppings built at the mine are of robust construction capable of withstanding airblast, ground movement or stresses applied to it.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting sample of permanent stoppings. Permanent stoppings should be made of non flammable material.                |
| 7.3   | Stoppings are inspected regularly.                                                           | Intent: To ensure that the stoppings are examined where there is potential for damage to occur such as blast vibration, ground movement or vehicle movement etc.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting sample of permanent stoppings. View records of inspection completed by a Shift Boss or Ventilation Officer etc. |
| 7.4   | Air doors installed at the mine are of robust construction.                                  | Intent: To ensure that air doors built at the mine are of robust construction capable of withstanding airblast, ground movement or stresses applied to it etc.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting sample of air doors. Air doors should be made of non flammable material.                                          |
| 7.5   | Air doors installed at the mine are designed and built to be self closing where practicable. | Intent: To ensure that all air doors are self closing to prevent a short circuit of airflow in the mine.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of air doors.                                                                                                                                                  |
| 7.6   | Notices are displayed indicating whether doors should be left open or closed.                | Intent: To ensure that adequate notices are displayed on each door to instruct each person whether the door should be left open or kept closed .<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of air doors.                                                                                                          |

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| 7.7  | Air doors are inspected regularly.                                                                                    | Intent: To ensure that the air doors are examined where there is potential for damage to occur such as blast vibration, ground movement or vehicle movement etc.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting sample of air doors. View records of inspection completed by a Shift Boss or Ventilation Officer etc. |
| 7.8  | Regulators installed at the mine are of robust construction.                                                          | Intent: To ensure that Regulators provided at the mine are capable of withstanding ground movement and any stresses applied to it.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of regulators and make sure that they are made of strong durable material.                                                 |
| 7.9  | Regulators installed at the mine are provided with a means to prevent tampering.                                      | Intent: To ensure that regulators provided at the mine cannot be tampered or altered except by an authorised person.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of regulators.                                                                                                                           |
| 7.10 | Regulators are free from obstruction and easily accessible.                                                           | Intent: To ensure that regulators can be operated with ease and are accessible.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of regulators.                                                                                                                                                                |
| 7.11 | Regulators are inspected regularly.                                                                                   | Intent: To ensure that regulators are examined on a regular basis to prevent any short circuit affecting personal safety.<br>Personnel: Ventilation Officer.<br>Method: Verify by viewing a record of inspection.                                                                                                                       |
| 7.12 | Any change to a regulator setting is recorded in the ventilation log book.                                            | Intent: To ensure that all changes are documented in the ventilation log book.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting a sample of regulators and examine the mine ventilation records.                                                                                                                        |
| 7.13 | Where a brattice is installed to control airflow in a workplace it is inspected on each shift for damage and leakage. | Intent: To ensure that brattice devices are examined on a shift by shift basis to ensure that ventilation is maintained in the workplace.<br>Personnel: Ventilation Officer, supervisors and U/G Manager etc.<br>Method: Verify by interview, view shift records etc.                                                                   |

## 8. VENTILATION CONSIDERATIONS

| Point | Standard                                                                                               | Guideline                                                                                                                                                                                                                                                                                              |
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| 8.1   | There are no unnecessary activities in the vicinity of the intake airways that generate dust or fumes. | Intent: To ensure that no contaminants are drawn into the mine from the surface.<br>Personnel: Ventilation Officer.<br>Method: Verify by inspecting each intake access into the mine to ascertain that no work is being carried out which would have an adverse affect on the underground ventilation. |

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| 8.2  | Intake velocities in roadways do not exceed 6 m/s                                                                                                                                | Intent: To ensure that the velocity in the intake roadway is not sufficient to raise dust in the roadway.<br>Personnel: Ventilation Officer.<br>Method: Verify by carrying out an air measurement in each main intake roadways and examine the mine ventilation records.                                                                       |
| 8.3  | A means and procedure exists to provide dust suppression in the main intake roadway.                                                                                             | Intent: To ensure that a dust suppression system is provided in each intake roadways accessing the mine.<br>Personnel: Ventilation Officer.<br>Method: Verify that a dust suppression device is installed at each intake roadway.                                                                                                              |
| 8.4  | The volume of primary air in the mine exceeds the total volume requirement specified on diesel registrations for diesel equipment operating in the mine.                         | Intent: To ensure that there is sufficient airflow in the mine for the number of vehicles in use.<br>Personnel: Ventilation Officer.<br>Method: Verify by examining a list of diesel registrations and the mine ventilation records. Confirm that there are controls in place to restrict access where too many vehicles have been registered. |
| 8.5  | The volume of airflow in each area of the mine meets the legal requirement for the diesel equipment operating in those areas.                                                    | Intent: To ensure that sufficient airflow is provided in each area of the mine for the equipment working there.<br>Personnel: Ventilation Officer.<br>Method: Verify by examining the mine ventilation plan and ventilation records.                                                                                                           |
| 8.6  | The ventilating airflow is arranged such that fresh air sweeps the working place.                                                                                                | Intent: To ensure that the auxiliary ventilation ducting is adequately extended to ventilate each place of work.<br>Personnel: Ventilation Officer.<br>Method: Verify by inspection of workplaces.                                                                                                                                             |
| 8.7  | Ventilation ducting is maintained in a satisfactory condition.                                                                                                                   | Intent: To ensure that any damaged auxiliary ventilation ducting is repaired or replaced to maintain efficiency.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting ventilation duct. Where people are working in an area with a large tear in the duct the standard has not been complied with.                                 |
| 8.8  | There is a procedure to ensure that each working place in a multiple duct ventilation system is adequately ventilated.                                                           | Intent: Self evident.<br>Personnel: Ventilation Officer mine personnel.<br>Method: View procedure and interview personnel.                                                                                                                                                                                                                     |
| 8.9  | A computer based model of the mine ventilation system has been developed.                                                                                                        | Intent: To verify that a computer based model of the mine ventilation system has been developed to assist in the planning and monitoring of the system.<br>Personnel: Underground Manager and Ventilation Officer.<br>Method: Interview personnel and view computer model and its application.                                                 |
| 8.10 | Potential mine emergencies that may have an effect upon the ventilation system have been modelled.                                                                               | Intent: To verify that potential mine emergencies have been investigated and planned for in regard to their effect upon the mines ventilation.<br>Personnel: Underground Manager and Ventilation Officer.<br>Method: Interview personnel and view modelling outputs.                                                                           |
| 8.11 | The Mine Emergency Plan has contingencies in place to deal with the effects of the various likely emergencies modelled that could effect the mine' s primary ventilation system. | Intent: To verify that the Mine Emergency Plan has been set up to deal with those expected effects on the mine' s primary ventilation during an emergency.<br>Personnel: Underground manager and Ventilation Officer.<br>Method: Interview personnel and view Emergency Plan.                                                                  |

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| 8.12 | Specific areas within the mine with the potential to generate large volumes of dust, such as crusher stations, conveyor transfers and internal ore passes, are exhaust ventilated. | Intent: To verify that the areas within the mine that have the potential to generate large volumes of dust are exhaust ventilated.<br>Personnel: Underground manager and Ventilation Officer.<br>Method: Interview personnel and view relevant ventilation plans. |
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## 9. GAS EMISSIONS AND FUMES

| Point | Standard                                                                                                                  | Guideline                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| 9.1   | A procedure exists to monitor and control the formation or emission of toxic, asphyxiant and explosive gases in the mine. | Intent: To ensure that a procedure exists at the mine to monitor and control toxic asphyxiant or explosive gases in compliance with MSIA Reg 9.29.<br>Personnel: Ventilation Officer.<br>Method: View procedures where the mine is prone to outburst of gases etc and examine what monitoring or controls have been implemented.                                                                                                                                             |
| 9.2   | The mine has evaluated the potential for oxygen depletion.                                                                | Intent: To ensure that the mine has investigated the potential for oxygen depletion.<br>Personnel: Ventilation Officer.<br>Method: View records.                                                                                                                                                                                                                                                                                                                             |
| 9.3   | Signs are displayed forbidding unauthorised entry into unventilated areas.                                                | Intent: To ensure that the mine restricts access into unauthorised areas.<br>Personnel: Ventilation Officer.<br>Method: Verify by inspecting a sample of unventilated areas.                                                                                                                                                                                                                                                                                                 |
| 9.4   | A written procedure or instruction exists to measure or evaluate the time for blast fumes to clear from an area.          | Intent: To ensure that the mine has a system in place to ascertain when blast fumes have cleared from each workplace.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting any calculations or measures identifying the time for blast fumes to clear.                                                                                                                                                                                                           |
| 9.5   | The clearance of blast fumes is checked by gas monitoring before re-entry.                                                | Intent: To ensure that the mine carries out an inspection of each blast area using suitable electronic monitors prior to allowing general access back into the area.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting suitable monitors to verify that the oxygen, carbon monoxide, nitrous fumes and ammonia levels are safe. Ascertain that the re-entry crew check all roadways where the blast fumes travel prior to removing the danger no entry signs. |
| 9.6   | Mine workings that exhibit high working temperatures have developed a 'HEAT STRESS INDEX'.                                | Intent: To verify that the mines with the potential to create heat stress problems in their employees have developed a heat stress index to manage their employees exposure to heat stress hazards.<br>Personnel: Underground manager and Ventilation Officer.<br>Method: Interview personnel and view relevant documentation and records..                                                                                                                                  |

## 10. ISOLATION OF DISUSED AREAS

| Point | Standard | Guideline |
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| 10.1 | When an area of the mine has been isolated from the ventilation system, a corresponding entry has been made in the record book. | Intent: To ensure that all areas which have been isolated from the ventilation system are documented in the ventilation log book.<br>Personnel: Ventilation Officer.<br>Method: View the record book.          |
| 10.2 | An effective barricade is provided at each entrance of the disused area.                                                        | Intent: To ensure that all such areas have been secured against inadvertent entry,<br>Personnel: Ventilation Officer.<br>Method: Inspect sites.                                                                |
| 10.3 | Notices are displayed at each entrance forbidding entry to the area.                                                            | Intent: To ensure that signs are displayed at each disused area access to prevent unauthorised entry.<br>Personnel: Ventilation Officer.<br>Method: Verify by sighting signs at the entrance to disused areas. |
| 10.4 | A re-entry procedure exists to re-establish ventilation in disused areas before work recommences.                               | Intent: Self explanatory.<br>Personnel: Ventilation Officer.<br>Method: View procedure.                                                                                                                        |