Risk-based hygiene management planning and CONTAM system procedures

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**Introduction**

Mine sites are required to carry out a structured risk assessment of their occupational health hazards, and develop a risk-based hygiene management plan (RBHMP).

The RBHMP provides Resources Safety with an overview of the mine-specific occupational health hazards, monitoring programs and control measures, and forms a basis from which the sampling quota can be negotiated.

This procedure will define and detail:

- roles and responsibilities
  - Ventilation Officer
  - Registered CONTAM sampler
  - Responsible Inspector
  - CONTAM Manager
- how to conduct a health and hygiene risk assessment and develop a RBHMP
- how to propose a sampling quota
- how to report sampling results

**Risk-based hygiene management plan (RBHMP)**

For greenfield sites, the RBHMP should be prepared in advance of commissioning based on available knowledge of potential occupational exposures. Existing sites should have a RBHMP approved by the Responsible Inspector before the end of each financial year. The RBHMP addresses the questions:

- What occupational hygiene hazards are employees (including contractors) potentially exposed to?
- How do the exposures occur – what task and what process?
- What monitoring is conducted?
- What are the results?
- What controls are in place?
- What controls are required?
- What is the current sampling quota and the proposed sample quota?

The RBHMP is intended to accurately describe all health hazards in the operation and the controls required to prevent harm to persons from these. It is a commitment to identify, acknowledge and respond appropriately, and it is a tool that will be used by each Responsible Inspector for auditing purposes.

By developing a RBHMP each operation has the opportunity to effectively:

- characterise their workplace and work force
- determine actual and potential health hazard exposures
- risk-assess these exposures
- detail monitoring requirements to support risk determination or verification
- define existing and required controls to prevent or reduce exposures to ALARP.

The RBHMP will be required to reference a Diesel Emissions Management Plan, Fibrous Minerals Management Plan or Radiation Management Plan where these contaminants are known to exist within an operation. Copies of these documents, if relevant, will need to be submitted with the RBHMP.
Legislation and useful information

Applicable legislation, codes of practice, standards and guidance material include:

- **Legislation (Western Australia)**
  - Mines Safety and Inspection Act 1994 (the Act)
  - Mines Safety and Inspection Regulations 1995 (the Regulations)
- **Code of Practice (Department of Mines and Petroleum)**
  - Prevention and control of Legionnaire’s disease
- **Australian Standards**
  - AS 2985 *Workplace atmospheres – Method for sampling and gravimetric determination of respirable dust*
  - AS 2986 *Workplace air quality – Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography*
  - AS 3640 *Workplace atmospheres – Method for sampling and gravimetric determination of inhalable dust*
  - AS/NZS ISO 31000 *Risk management – Principles and guidelines*
  - AS/NZS 4801 *Occupational health and safety management systems – Specification with guidance for use*
  - AS/NZS 4804 *Occupational health and safety management systems — General guidelines on principles, systems and supporting techniques*
- **National Standards (Safe Work Australia)**
  - National standard for manual tasks
  - National standard for limiting occupational exposure to ionizing radiation
  - National standard for occupational noise
  - National standard for the control of inorganic lead at work
  - Adopted national exposure standards for atmospheric contaminants in the occupational environment
  - Hazardous Substances Information System (HSIS, Safe Work Australia)
- **Guidelines (Department of Mines and Petroleum)**
  - Adjustment of exposure standard for extended work shifts
  - Management and prevention of heat stress
  - Management of diesel emissions in Western Australian mining operations
  - Management of fibrous minerals in Western Australian mining operations
  - Management of noise in Western Australian mining operations
  - Managing naturally occurring radioactive material (NORM)
  - Risk-based health surveillance and biological monitoring
- **Other Guidance Material**
  - Guidance note on the membrane filter method for estimating airborne asbestos fibres
  - Approved criteria for classifying hazardous substances
  - Guidance on the interpretation of workplace exposure standards for airborne contaminants
  - Hazardous chemicals requiring health monitoring
– Health Monitoring for exposure to hazardous chemicals
– Developing and implementing a health management plan (2010) (Industry and Investment, NSW)

Roles and responsibilities

Ventilation Officer

In relation to a mine, a Ventilation Officer means a person appointed for the mine under regulation 9.3. In addition to the duties specified in regulation 9.5 and 9.6, the Ventilation Officer is responsible for developing, reviewing and maintaining the RBHMP.

The Registered Manager of a mine appoints the Ventilation Officer and notifies the District Inspector in writing. If the Registered Manager considers the scale, scope and nature of the mining operations do not warrant the appointment of a Ventilation Officer, the Registered Manager needs to apply to the District Inspector for an exemption under regulation 9.3(4).

Regulation 9.4 specifies the training and qualifications required for an appointed Ventilation Officer in underground and surface mining operations.

Note: Where a site has received an exemption for appointment of a Ventilation Officer, or where the Ventilation Officer has insufficient experience or knowledge to develop and maintain a RBHMP, an external, qualified, hygiene contractor or consultant may be utilised.

Registered CONTAM sampler

The CONTAM system is a Resources Safety electronic database used to store personal mine employee atmospheric contaminant exposure results.

Only CONTAM registered samplers may submit results to the CONTAM system.

To become a registered CONTAM sampler, the registered sampler form (see Appendix 1) with proof of qualifications must be submitted to the CONTAM Manager for approval.

The Surface Ventilation technician and Surface Ventilation officer qualifications meet the required certification criteria. Other qualifications and experience related to Occupational Hygiene may also meet competency requirements.

CONTAM sampler registration lasts for five years. Re-registration will only be approved if evidence of current competency in air monitoring skills can be provided.

Responsible Inspector

The Inspector or Officer responsible for ensuring the health hazard management and CONTAM systems operate effectively for mine and exploration sites under their jurisdiction is the OSH assignee. For the purposes of this procedure, this person is referred to as the Responsible Inspector.

CONTAM Manager

The CONTAM Manager is the Department of Mines and Petroleum’s administrator of the CONTAM system, and is the link between the mine site and the Responsible Inspector. The CONTAM Manager is responsible for the integrity and quality assurance of the CONTAM database.
RBHMP and risk assessment

The following is a step-by-step methodology for conducting a site occupational health hazard risk assessment and developing an effective RBHMP for a mine site.

Establish the goals for the program

1. Define the mine site’s objectives from a risk based approach.
2. Define roles and responsibilities (i.e. those involved in information gathering, ownership of the program, monitoring, control maintenance, analysis and reporting).

Characterise the workplace

1. Prepare a schematic of the workplace detailing the critical processes, equipment and tasks, including exploration, haulage and rehabilitation activities if relevant.
2. Conduct hazard identification through a combination of:
   - walking through and observing the workplace
   - examining records of previous incidents and health issues
   - considering potential events and exposures
   - discussing with workers their safety concerns
   - examining available information on hazardous substances and equipment used on site — a good source of information is the hazardous substances register
   - checking the geochemistry of ore sources for elevated levels of contaminants.
3. Using the above methods, identify the chemical, physical and biological agents; and ergonomic conditions in the work environment that have the potential to cause harm. Consider:
   - noise — potential to cause noise induced hearing loss
   - vibration — potential to develop musculoskeletal conditions
   - diesel emissions — potential to develop respiratory disease or cancer
   - other atmospheric contaminants, such as dust, gas, vapour, mist, fume, smoke — potential to develop acute or chronic health condition
   - other hazardous substance exposures — potential to develop contact dermatitis
   - water treatment — potential to be exposed to legionella and other biological agents
   - ergonomic stressors — potential for musculoskeletal conditions, back problems and fatigue related conditions
   - ultraviolet radiation from sun or welding — potential for skin or eye disease
   - heat and cold — potential for development of heat related illness
   - ionising radiation — potential for development of toxicity or malignancies.
4. List the occupational exposure limits for each applicable agent taking into account shift adjustment and site policy requirements.
5. Describe how the workforce is organised and staffed.
6. Identify the processes, operations, tasks and work practices that pose significant exposure to the identified health hazards.
7. Identify existing controls and how they are used.
All components of the RBHMP should be clearly linked. As a minimum, the outputs from this section should include:

- A schematic identifying the critical processes, equipment and tasks for the whole operation.
- An accompanying list of associated actual and potential health hazards. This list can appear on the schematic, or in a separate document linked to the schematic. If no health hazards exist for a particular operational component, it is to be identified as such to indicate that the component has been included in the characterisation.
- A list of roles associated with each critical process, equipment and task, and the work force number for each role.

Establish similar exposure groups (SEGs)

1. Using the information gathered, group employees believed to have similar exposures, assuming no use of personal protective equipment. These groups should be based on similarity of exposure:
   - type
   - intensity/concentration/levels.
2. The result should identify:
   - appropriate SEGs, where each employee (and long-term or high-risk activity contractor) is a member of at least one exposure group
   - what each SEG is potentially exposed to
   - the number of people that make up each SEG
   - the occupational code for SEGs exposed to atmospheric contaminants (see Appendix 2)
   - the roster worked by each SEG.

*Note: An individual may be allocated to more than one SEG, and there may be more than one occupational code per SEG.*

Risk-assess exposures

1. Using the information gathered, formally risk-assess and document each of the exposures for each SEG taking into consideration the:
   - likelihood (i.e. intensity, concentration, frequency and duration of exposures)
   - consequence (i.e. severity and latency period)
   - previous sampling data, if applicable or available.
2. Where a risk is identified as ‘uncertain’, greater than ‘low’ or ‘unacceptable’, monitoring is required to verify the degree of risk.
3. Where previous personal atmospheric contaminant samples are used to determine risk, contaminant exposure is only to be considered ‘low risk’ or ‘acceptable’ where the result has either consistently been below the limit of detection or below 20% of the shift-adjusted OEL.

*Note: Part 3 of the Regulations requires that health assessment and / or biological monitoring be conducted if the occupational exposure indicates it is necessary.*
4. The site version of a formal, documented risk assessment can be used. As a minimum, the following information should be included:
   - SEG descriptor — identifying roles included in each SEG
   - SEG size
   - health hazards relevant to each SEG
   - description of how the exposure occurs for each SEG
   - consequence, likelihood, previous results (if any), and risk evaluation.

**Determine number of employees to sample**

1. Sampling is conducted for two purposes:
   - to confirm a level of risk where it is unknown, or suspected to be unacceptable (baseline monitoring)
   - to verify the ongoing acceptability of low risk exposures (maintenance monitoring).

The sampling regime to confirm a level of risk will be more rigorous than the maintenance regime.

The following table provides guidance on sample number determination specifically for baseline monitoring. This version ensures with 95% confidence that at least one individual from the highest 20% exposure group is contained within the sample. Other sample number determination methods may be used, but as with maintenance monitoring numbers, this should be negotiated with the Responsible Inspector.

<table>
<thead>
<tr>
<th>N (size of group)</th>
<th>≤ 6</th>
<th>7-8</th>
<th>9-11</th>
<th>12-14</th>
<th>15-18</th>
<th>19-26</th>
<th>27-43</th>
<th>44-50</th>
<th>51+</th>
</tr>
</thead>
<tbody>
<tr>
<td># (number of samples required)</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

*(reference: Leidel, Busch and Lynch, 1977, NIOSH)*

2. Once the number of samples required per SEG has been identified, this should be expanded into quarterly reporting periods (i.e. how many samples to be taken July – Sept, Oct – Dec, Jan – March and April – June).

3. Develop a method that ensures random selection of persons within a SEG when sampling is required.

**Develop a results strategy**

1. Within the RBHMP, clearly stipulate how sampling result anomalies or exceedances will be reported, investigated and dealt with; and, how results consistently below relevant exposure standards for a twelve month period will be dealt with.

2. In addition to site requirements for reporting, any exposure exceedance and associated investigation details will need to be reported through the CONTAM system using the form in Appendix 8.
Health hazard control

1. All health hazards should be either eliminated, or controlled sufficiently such that their associated risk is reduced to as low as reasonably practicable (ALARP).
   
   *Note: The greater the risk associated with a hazard, the greater the priority for control becomes.*

2. For each identified health hazard, develop a hazard control plan identifying both what is currently in place and what is required to further reduce or eliminate the associated risk.

3. When recommending controls, consider first the effectiveness of what is already in place and determine if efficiency can be increased there.

4. The guide ‘Developing and implementing a health management plan’ has been used to provide suggestions for controls, including:

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Good practice controls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Noise</strong></td>
<td>• Conduct a noise survey and develop a noise management plan</td>
</tr>
<tr>
<td></td>
<td>• Identify high noise areas on an easily accessible noise map</td>
</tr>
<tr>
<td></td>
<td>• Implement noise emission engineering controls</td>
</tr>
<tr>
<td></td>
<td>• Maintain seals, cabins and engines of vehicles in good working order</td>
</tr>
<tr>
<td></td>
<td>• Retro seal or insulate vehicle cabins and work rooms with acoustic dampening material</td>
</tr>
<tr>
<td></td>
<td>• Maintain and monitor engineering controls</td>
</tr>
<tr>
<td></td>
<td>• ‘Buy Quiet’</td>
</tr>
<tr>
<td></td>
<td>• Inform workers about the hazard and methods of protection</td>
</tr>
<tr>
<td></td>
<td>• Limit worker exposure through shift rotations around high noise hazards</td>
</tr>
<tr>
<td></td>
<td>• Set up hearing protection zones and signpost these areas</td>
</tr>
<tr>
<td></td>
<td>• Conduct hearing protection fit testing</td>
</tr>
</tbody>
</table>

<p>| <strong>Diesel emissions</strong> | • Develop a diesel emissions management plan                                           |
|                     | • Use alternative motor types (e.g. electric)                                          |
|                     | • Conduct regular maintenance on equipment components influencing diesel emissions     |
|                     | • Fit all mobile equipment with an exhaust treatment device                             |
|                     | • Limit vehicle traffic into underground environment                                    |
|                     | • Retro seal cabins and crib areas                                                     |
|                     | • Install ventilation appropriate to the area and test regularly                       |
|                     | • Monitor emission levels from their sources                                           |</p>
<table>
<thead>
<tr>
<th>Exposure</th>
<th>Good practice controls</th>
</tr>
</thead>
</table>
| Hazardous substances      | • Keep a hazardous substances register, including safety data sheets (SDS)  
• Use less hazardous varieties of the substance where practicable  
• Maintain well signposted areas around hazardous substances and restrict access  
• Train and assess all relevant personnel in the storage, handling and use of hazardous substances  
• Provide adequate washing facilities  
• Check storage facilities for compliance with compatibility criteria  
• Ventilate storage and handling areas where required (e.g. fume hoods in laboratories)  
• Audit safety shower and eye wash stations for proximity to hazardous substances  
• Develop and maintain a hazmat emergency response plan  
• Alert authorities (e.g. fire brigade) of location and nature of stored substances                                                                                     |
| Whole body vibration      | • Develop a maintenance plan for vehicles and suspension  
• Improve awareness of harmful effects of vibration  
• Enforce speed limits appropriate to road conditions  
• Install adjustable seats in vehicles and ensure appropriate suspension for loads  
• Improve visibility from vehicle cabs  
• Face all passenger seating forward                                                                                                                                 |
| Hand arm vibration        | • Design workstations to minimise force caused by poor posture:  
  − use devices such as jigs and suspension systems to reduce the need to grip heavy tools tightly  
  − provide fit-for-purpose tools that are in good repair  
  − provide dampeners or vibration reducing handles  
• Provide alternative work methods to minimise exposure and poor posture  
• Develop maintenance programs to mitigate equipment vibration  
• Limit the time workers are exposed to vibration  
• Implement purchasing policy to replace old equipment and tools                                                                                                                                 |
| UV radiation              | • Develop a plan for the management of UV hazards. Include processes that may produce UV radiation, such as welding  
• Implement UV protection controls, such as:  
  − tinted windows for vehicles and offices  
  − temporary structures for outdoor work  
  − temporary office structures positioning to avoid direct sunlight  
• Provide protective gear, such as  
  − protective close weave, dark coloured clothing  
  − wide brimmed hats, UV rated sunglasses and sunscreen  
• Arrange ‘UV Awareness’ training for all employees                                                                                                                                 |
RBHMP re-assessment

1. Re-assessment is the evaluation phase of the RBHMP and is conducted annually, or whenever it is identified that:
   - SEGs contain exposure incompatibilities
   - changes have occurred to the workplace, workforce, processes or environment that potentially influence exposures
   - monitoring reveals unacceptable exposures.

2. The re-assessment needs to identify as a minimum the acceptability of the SEGs (i.e. the variance in exposures between the groups making up the SEG) and the acceptability of the exposures of the SEGs.

   Note: If the initial RBHMP accurately identified groups with similar exposures, and these SEGs were exposed at levels deemed acceptable against (shift-adjusted) National Exposure Standards or site standards that are more conservative than this, then the re-assessment document will be brief and may recommend a reduction in sampling as a result. However, if the initial RBHMP developed requires considerable review due to changes, lack of acceptability of SEGs, or lack of acceptability of exposures then a full revision of the original documented RBHMP may be warranted.

3. RBHMP re-assessments can be submitted to either of the following:
   - Responsible Inspector, if known, or
   - CONTAM Manager at contammanager@dmp.wa.gov.au – the submission will be forwarded to the relevant Responsible Inspector

Quota proposals

1. The quota proposal should reflect numbers for all site occupational health hazards, so that the Responsible Inspector can track and audit results.

2. The quota proposal should be submitted at least annually as part of the periodic re-assessment.
   - If proposing a quota for baseline or unacceptable risk exposures, this should be based on SEG sizes and the sample determination table provided.
   - If proposing a maintenance quota to verify continued low risk, this should be based on SEG sizes with the aim of conducting one sample per six people exposed per year.
   - All quota proposals may be further negotiated with your Responsible Inspector.
   - Quota proposals can be submitted as a stand-alone document or included with the risk assessment and RBHMP.
   - If a quota already exists for an operation, the current quota and proposed sample numbers should be included in the submission.
   - The occupational codes for SEGs should be included when submitting quotas for atmospheric contaminants, as CONTAM personnel can only enter numbers against these codes.
   - Quotas are set for the financial year, with four sampling periods:
     - July – September
     - August – December
     - January – March
     - April – June

   Note: Quota for the next financial year is set by the end of June each year.
   - Indicate the required samples per sampling period, not simply per year.
   - Provide supporting evidence for any proposed increase or decrease in quota numbers.
3. Quota submission can be made to either of the following:
   − Responsible Inspector, if known, or
   − CONTAM Manager at contammanager@dmp.wa.gov.au – the submission will be forwarded to the relevant Responsible Inspector

   Note: Resources Safety may occasionally request sampling independent of the quota.

The proposed quotas that are agreed upon will result in a document being issued to your site(s) that reflects the agreement through specifying quarterly sampling numbers.

**CONTAM results**

Mine sites are required to electronically submit their atmospheric contaminant results within six weeks from the end of the sampling quarter, using the ‘CONTAM sample record sheet’ (Appendix 3).

For results that exceed the exposure standard for a particular contaminant, additional investigation and reporting using the ‘Exceedance Notification Form’ (Appendix 8) should be emailed to either the Responsible Inspector or the CONTAM Manager.
Appendix 1 – CONTAM registered sampler form

Personal details
Title  [ ] Mr  [ ] Mrs  [ ] Ms  [ ] Or  [ ] Other  
Surname  
Qualifications (optional)  
Private address  
Phone no.  
Email  
Office use only: Registered sampler no  
Expiry date  

Employer details
Name of company  
Employer address  
Phone no.  

Course details
Surface ventilation technician  
Course date  
Certificate of competency no.  
Surface ventilation officer  
Course date  
Certificate of competency no.  
Signature  
Date  

Submit By Email
Appendix 2 – Occupational codes

NOC = not otherwise classified

100000 General Management / Professional and Supervisory

Sub Category 1A – Management and Administration

110000 General management occupations
- Financial manager
- Personnel manager
- Sales manager
- Purchasing manager

120000 Engineering occupations
- 121000 Mining engineer
- 122000 Mechanical engineer
- 123000 Civil engineer
- 124000 Chemical engineer
- 125000 Metallurgical engineer
- 126000 Petroleum engineer
- 129000 Engineer NOC

130000 Professional and related occupations
- 131000 Chemist
- 132000 Geologist or geological assistant
- 133000 Metallurgist
- 134000 Environmental scientist or assistant
- 135000 Surveyor
- 136000 Draftsman
- 137000 Health or medical occupations
  - Doctor
  - Occupational health nurse
  - First aid attendant
- 138000 Industrial hygienist
- 139000 Professional and related NOC

140000 Management or administration services
- 141000 Security officer
- 142000 Safety officer
- 143000 Training officer
- 144000 Personnel officer
- 145000 Clerical or secretarial occupations
- 146000 Township or accommodation occupations
  - Caretaker
  - Housekeeper or cleaner
  - Handyman
  - Gardener
  - Groundsman
  - Township or accommodation occupation NOC
- 147000 Catering occupations
  - Cook
  - Catering assistant
  - Kitchen hand
  - Canteen attendant
  - Catering occupations NOC
- 148000 Cleaning or laundering occupations
- 149000 Management or administrative services occupations NOC
150000 Mine management occupations
  151000 Mine manager
  152000 Underground manager
  153000 Assistant underground manager
  154000 Under manager
  155000 Mine management occupations NOC

Sub Category 1B – Supervisory Occupations

160000 Supervisory occupations
  161000 Deputy (coal)
  162000 Foreman or shift boss underground
  163000 Foreman or shift foreman surface
  164000 Overman (coal)
  165000 Supervisor

200000 Underground Production and Services

Sub Category 2A – Underground – Production and Development Miners

210000 Miners production or development (underground)
  211000 Contract miner
  212000 Coal miner (underground)
  213000 Non-contract miner (underground)
  214000 Trainee miner
  215000 Miner NOC
  216000 Miner’s assistant

220000 Long hole drill and blast occupations (underground)
  221000 Long hole drill operator
  222000 Long hole driller’s assistant
  223000 Shotfirer
  224000 Shotfirer’s assistant (charging)

230000 Diamond drillers or raiseborers
  231000 Diamond drill operator
  232000 Diamond driller’s assistant
  233000 Raiseborer operator
  234000 Raiseborer’s assistant

Sub Category 2B – Underground – Loading and Transport Occupations

240000 Loading or transport occupations (underground)
  241000 Diesel loader operator
  242000 Mechanical bogger driver
  243000 Scraper operator
  244000 Locomotive driver
  245000 Truck driver
  246000 Plant operator
  247000 Underground personnel transport driver
  248000 Conveyor attendant or operator
  249000 Trucker

Sub Category 2C – Underground – Service Occupations

250000 Ground or roof support occupations (underground)
  251000 Timberman
  252000 Roofbolter
  253000 Hydraulic fill operator
260000 Services occupations (underground)
261000 Ventilation occupations
262000 Tracklayer or platelayer
263000 Pipefitter
264000 Pumpman or pump attendant
265000 Nipper, salvageman or utilityman
266000 Underground crushing operator
266100 Grizzleyman or pass runner
267000 Underground labourer or tool carrier
268000 Sanitaryman
269000 Underground services occupations NOC

270000 Underground winding and hoisting occupations
271000 Winding engine driver
272000 Hoist driver
273000 Platman
274000 Skipman
275000 Braceman
276000 Brakeman
277000 Onsetter
279000 Winding and hoisting occupations NOC

300000 Mining Production and Services (Surface)

Sub Category 3A – Surface – Blast hole Drilling
310000 Blast hole Drilling Surface
311000 Blast hole drill operator
312000 Blast hole drill operator’s assistant
313000 Air track or crawl air driller
314000 Sniper drill operator (rubber tyred)

Sub Category 3B – Surface – Charging and Blasting
320000 Charging and Blasting Surface
321000 Powder monkey, leading hand or shotfirer
322000 Powder truck driver
323000 Powder crew labourer

Sub Category 3C – Surface - Exploration Drilling
330000 Exploration Drilling Surface
331000 Driller
332000 Driller’s assistant

Sub Category 3D – Surface – Excavation and Ore Transport
340000 Excavation equipment operators (surface)
341000 Bucketwheel operator
342000 Bucketwheel operator’s assistant
343000 Dragline operator
344000 Rope shovel operator
346000 Hydraulic excavator operator
347000 Dredge operator
348000 Front end loader operator
349000 Excavation equipment operator NOC

350000 Mobile plant operator (surface)
351000 Bulldozer operator
352000 Grader driver
353000 Backhoe operator
354000 Scraper driver
359000 Mobile plant operator NOC
360000 Driving occupations (surface)
  361000 Haulage truck driver
  362000 Water truck driver
  363000 Explosives truck driver
  364000 Fuel, grease or service truck driver
  365000 Hiab truck driver
  366000 Passenger vehicle driver or bus driver
  367000 Equipment transport driver
  369000 Driver NOC

Sub Category 3E – Surface – Service Occupations
370000 Open cut service occupations
  371000 Greaser or oiler
  372000 Quarry labourer or labourer
  373000 Fuel and lubrication serviceman
  374000 Wash bay operator
  375000 Dump spotter
  376000 Weighbridge operator

400000 Ore Treatment Occupations
Sub Category 4A – Processing Plant Occupations
410000 Processing plant occupations
  411000 Processing plant operator
  412000 Processing plant serviceman
  413000 Processing plant utility worker

Sub Category 4B – Mobile Plant Occupations
420000 Mobile plant occupations
  421000 Front end loader operator
  422000 Mobile plant operator NOC

Sub Category 4C – Final Product Handling / Transport Occupations
430000 Final product handling or transport occupations
  431000 Final product packer, loader or dumper operator
  432000 Final product warehouse operator
  433000 Final product handling or transport NOC

Sub Category 4D – Sampling, Assay, Laboratory Occupations
440000 Sampling, assay, laboratory occupations
  441000 Laboratory technician, assistant or analyst
  442000 Sample preparation operator
  443000 Sampler or sample plant operator

500000 Railway Operations Occupations
Sub Category 5A – Railway Operators
510000 Railway operator NOC

Sub Category 5B – Locomotive Crew
520000 Locomotive crews
  521000 Locomotive driver
  522000 Observer
  523000 Trainee observer
  524000 Shunter locomotive driver
Sub Category 5C – Track-laying / Maintenance

530000  Track laying or maintenance
531000  Ganger
532000  Platelayer
533000  Track maintenance machine operator
534000  Track labourer

600000  Metalworking Trades

Sub Category 6A – Metal Trades

610000  Sheet metal trades
611000  Metal patternmaker
612000  Sheet metal worker
613000  Coppersmith
614000  Guillotine operator
615000  Millwright

620000  Metal machining trades
621000  Metal machinist
622000  Fitter or turner

630000  Fitter mechanical
631000  Fitter
632000  Fitter – welder
633000  Fitter – diesel
634000  Fitter – pipe

640000  Structural steel trades
641000  Boilermaker or welder
642000  Boilermaker
643000  Welder

650000  Metal trades apprentices
651000  Sheet metal apprentice
652000  Metal machining apprentice
653000  Fitter’s apprentice
654000  Boilermaker’s apprentice
659000  Apprentice NOC

660000  Trades assistant

690000  Metal trades
691000  Tool and dye setter
692000  Saw setter
693000  Electroplater
694000  Blacksmith
695000  Shipwright
696000  Instrument artificer
697000  Lamp room mechanic or assistant
698000  Toolmaker
699000  Drill doctor
700000  Electrical / Electronic Trades

Sub Category 7A – Electrical Trades

710000  Electrical trades
711000  Linesman
712000  Electrical fitter
712100  Cable splicer
713000  Electrical mechanic
714000  Automotive electrician
715000  Refrigeration mechanic
716000  Air conditioning mechanic
717000  Electrical installer
718000  Lift mechanic
719000  Electrician NOC

720000  Electronic trades
721000  Radio technician
722000  Telecommunication technician
723000  Telecommunication trainee
724000  Signals technician
725000  Instrument technician

730000  Electrical or electronic apprentices
731000  Electrical apprentice
732000  Electronic apprentice

790000  Electrical trades assistant

800000  Miscellaneous Trades / Utilities

Sub Category 8A – Miscellaneous Trades

810000  Construction trades
811000  Bricklayer
812000  Carpenter or joiner
813000  Painter
814000  Plasterer or tiler
815000  Plumber or drainer
816000  Rigger or ropesplicer
817000  Scaffolder
818000  Construction trades assistant

820000  Conveyor belt repair occupations
821000  Belt repairer
822000  Belt repairers assistant
823000  Trainee belt repairer
824000  Rubber repairer NOC

830000  Motor or engine trades
831000  Motor mechanic
832000  Diesel motor mechanic
833000  Brake mechanic
834000  Tyre fitter
835000  Panel beater
836000  Spray painter
837000  Mechanic NOC
838000  Trades assistant
839000  Sand blaster
Sub Category 8B – Power Plant Operators

840000  Power plant operators
  841000  Power plant engine driver
  842000  Power plant trainee engine driver
  843000  Power plant greaser
  844000  Boiler attendant
  845000  Fireman

Sub Category 8C – Miscellaneous Utilities

850000  Water treatment plant operator
860000  Waste disposal equipment operator
870000  Gas supply service operator
890000  Utility operator NOC

900000  Material handling — stores or warehouse occupations

Sub Category 9A – Crane Driving Occupations

910000  Crane driving occupations
  911000  Mobile crane driver
  912000  Tower crane driver
  913000  Overhead crane driver (cabin controlled)
  914000  Crane driver NOC
  915000  Dogman or cranechaser

920000  Fork lift operator

Sub Category 9B – Storeman NOC

930000  Storemen NOC
  931000  Toolstore attendant
Appendix 3 – CONTAM sample record sheet

<table>
<thead>
<tr>
<th>Company details</th>
</tr>
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<tbody>
<tr>
<td>Company</td>
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<tr>
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<tr>
<td>Site phone no.</td>
</tr>
<tr>
<td>Vent. tech./officer phone no.</td>
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<table>
<thead>
<tr>
<th>Drilling details</th>
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<tbody>
<tr>
<td>Name of drilling company</td>
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<td>Drilling location</td>
</tr>
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<td>Other</td>
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<table>
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<tr>
<th>Employee details</th>
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<tbody>
<tr>
<td>Health surveillance number</td>
</tr>
<tr>
<td>Surname</td>
</tr>
<tr>
<td>Date of birth</td>
</tr>
<tr>
<td>Name of contracting company (if applicable)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Sample collection details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample purpose</td>
</tr>
<tr>
<td>Sample date</td>
</tr>
<tr>
<td>Sample type</td>
</tr>
<tr>
<td>Sampling equipment code</td>
</tr>
<tr>
<td>Shift length</td>
</tr>
<tr>
<td>Location code (where air sampling occurred)</td>
</tr>
<tr>
<td>Respirator</td>
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</table>

<table>
<thead>
<tr>
<th>Sample result details</th>
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<tr>
<td>Contaminant code</td>
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<td></td>
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<td></td>
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<tr>
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</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Sample</td>
</tr>
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</table>
### Appendix 4 – Contaminant codes

Contaminant codes and the unit of measurement that must be reported for each contaminant are listed below. As a general rule, solvents and gases must be reported as parts per million (ppm), all particulates (dusts, metals, fumes) must be reported as milligrams per cubic metre (mg/m³) and fibres must be reported as fibres per millilitre (f/mL).

<table>
<thead>
<tr>
<th>Contaminant description</th>
<th>Code</th>
<th>Unit of measurement</th>
<th>Sampling equipment code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1-trichloroethane</td>
<td>TCE</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>1,1,2,2-tetrabromoethane</td>
<td>TBE</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>2-ethoxyethanol</td>
<td>EXE</td>
<td>ppm</td>
<td>PM, ST,</td>
</tr>
<tr>
<td>2-ethoxyethyl acetate</td>
<td>EXA</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Acetone</td>
<td>ACT</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Acrolein</td>
<td>ACR</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Actinolite</td>
<td>ACN</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Aldehyde</td>
<td>ALD</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Aluminium metal and oxide</td>
<td>ALM</td>
<td>mg/m³</td>
<td>7H, IO, FC, C2, CA</td>
</tr>
<tr>
<td>Ammonia</td>
<td>NH3</td>
<td>ppm</td>
<td>ED, IP, ST</td>
</tr>
<tr>
<td>Amorphous silica</td>
<td>ASL</td>
<td>mg/m³</td>
<td>C2, CA, IO, 7H</td>
</tr>
<tr>
<td>Amosite</td>
<td>AMS</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Anthophyllite</td>
<td>ANT</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Antinomy and compounds (as Sb)</td>
<td>-SB</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Arsenic compounds (as As)</td>
<td>-AS</td>
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<td>7H, IO</td>
</tr>
<tr>
<td>Asbestos</td>
<td>ASB</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Benzene</td>
<td>BNZ</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Bromoform</td>
<td>BRO</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Cadmium and compounds (as Cd)</td>
<td>-CD</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Calcium hydroxide (slaked lime)</td>
<td>LIM</td>
<td>mg/m³</td>
<td>7H, IO, C2, CA</td>
</tr>
<tr>
<td>Calcium oxide (quicklime)</td>
<td>CAO</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Carbon black</td>
<td>CRB</td>
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<td>7H, IO</td>
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<tr>
<td>Carbon dioxide</td>
<td>CO2</td>
<td>ppm</td>
<td>ED, SB, DT</td>
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<tr>
<td>Carbon disulphide</td>
<td>CS2</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>-CO</td>
<td>ppm</td>
<td>ED, SB, DT</td>
</tr>
<tr>
<td>Chlorine</td>
<td>CL2</td>
<td>ppm</td>
<td>7H, IO, IP</td>
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<tr>
<td>Chromic acid and chromates (as Cr)</td>
<td>-CR</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Chromium metal</td>
<td>CRM</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Contaminant description</td>
<td>Code</td>
<td>Unit of measurement</td>
<td>Sampling equipment code</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------</td>
<td>---------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Chrysotile</td>
<td>CHR</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Coal dust (containing &lt;5% quartz)</td>
<td>COL</td>
<td>mg/m³</td>
<td>C2, CA</td>
</tr>
<tr>
<td>Cobalt, metal dust and fume (as Co)</td>
<td>COB</td>
<td>mg/m³</td>
<td>7H, IO, C2, CA</td>
</tr>
<tr>
<td>Copper</td>
<td>-CU</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Copper (fume)</td>
<td>CUF</td>
<td>mg/m³</td>
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<tr>
<td>Cresol</td>
<td>CRE</td>
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<td>ST</td>
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<tr>
<td>Crocidolite</td>
<td>CRO</td>
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<td>AS</td>
</tr>
<tr>
<td>Cyanides (as CN)</td>
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<td>mg/m³</td>
<td>7H, IO, IP, ST</td>
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<tr>
<td>Diesel particulate</td>
<td>DP</td>
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<td>7H, IO</td>
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<tr>
<td>Disobutyl ketone (DIBK)</td>
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<td>PM, ST</td>
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<td>Ethyl acetate</td>
<td>ETA</td>
<td>ppm</td>
<td>ST, PM</td>
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<td>Ethyl alcohol (ethanol)</td>
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<td>PM, ST</td>
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<td>Ferrovanadium dust</td>
<td>FVA</td>
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<tr>
<td>Fluorides (as F)</td>
<td>FLD</td>
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<td>Formaldehyde</td>
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<td>7H, IO, IP, PM, ST</td>
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<td>Graphite (synthetic)</td>
<td>GRT</td>
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</tr>
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<td>Gypsum (calcium sulphate)</td>
<td>GYP</td>
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<td>7H, IO, C2, CA</td>
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<tr>
<td>Heptane (n-heptane)</td>
<td>HEP</td>
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<td>PM, ST</td>
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<tr>
<td>Hexane (n-hexane)</td>
<td>HEX</td>
<td>ppm</td>
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<td>Hydrogen chloride</td>
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<td>ppm</td>
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<td>Hydrogen fluoride</td>
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<td>Hydrogen sulphide</td>
<td>H2S</td>
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<td>Inspirable dust (inhalable)</td>
<td>INS</td>
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<td>Iron oxide fume (Fe₂O₃) (as Fe)</td>
<td>FEO</td>
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<tr>
<td>Isobutyl alcohol</td>
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<td>Isocyanates, all (as -NCO)</td>
<td>ISO</td>
<td>mg/m³</td>
<td>IP, ST</td>
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<tr>
<td>Isopropyl alcohol</td>
<td>IPA</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Lead, inorganic dusts and fumes</td>
<td>-PB</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
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<td>Limestone (calcium carbonate)</td>
<td>LST</td>
<td>mg/m³</td>
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</tr>
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<td>Manganese (fume) (as Mn)</td>
<td>MNF</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Manganese, dust and compounds (as Mn)</td>
<td>-MN</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
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<td>Mercury, elemental vapour</td>
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<td>7H, IO, PM, ST</td>
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<td>Contaminant description</td>
<td>Code</td>
<td>Unit of measurement</td>
<td>Sampling equipment code</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>------</td>
<td>---------------------</td>
<td>-------------------------</td>
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<tr>
<td>Methyl chloride</td>
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<td>ST</td>
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<td>Methyl ethyl ketone (MEK)</td>
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<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Methyl ethyl ketone peroxide</td>
<td>MKP</td>
<td>ppm</td>
<td>IP, ST</td>
</tr>
<tr>
<td>Methyl isobutyl ketone</td>
<td>MBK</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Methylene chloride</td>
<td>MNC</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Mica</td>
<td>MIC</td>
<td>mg/m³</td>
<td>CA, C2</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>MO</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>N-propyl alcohol</td>
<td>NPA</td>
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</tr>
<tr>
<td>N-butyl alcohol</td>
<td>NBA</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Nickel sulphide roasting (fume)</td>
<td>NIS</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Nickel, metal</td>
<td>NI</td>
<td>mg/m³</td>
<td>7H, IO, CA, C2</td>
</tr>
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<td>Nickel, soluble compounds (as Ni)</td>
<td>NSO</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>HNO</td>
<td>ppm</td>
<td>ST</td>
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<td>Nitric oxide</td>
<td>NO</td>
<td>ppm</td>
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</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>NO2</td>
<td>ppm</td>
<td>DT, ST</td>
</tr>
<tr>
<td>Octane</td>
<td>OCT</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Oil mist, refined mineral</td>
<td>OIL</td>
<td>mg/m³</td>
<td>7H, IO, CA, C2, FC</td>
</tr>
<tr>
<td>Ozone</td>
<td>O3</td>
<td>ppm</td>
<td>DT</td>
</tr>
<tr>
<td>Perchloroethylene</td>
<td>PCE</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Polycyclic aromatic hydrocarbon</td>
<td>PAH</td>
<td>mg/m³</td>
<td>7H, IO, ST</td>
</tr>
<tr>
<td>Respirable dust</td>
<td>RES</td>
<td>mg/m³</td>
<td>C2, CA</td>
</tr>
<tr>
<td>Sec-butyl alcohol</td>
<td>SBA</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Selenium</td>
<td>SE</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Silica, crystalline</td>
<td>SIL</td>
<td>mg/m³</td>
<td>C2, CA</td>
</tr>
<tr>
<td>Silver, metal</td>
<td>AG</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Soapstone (inspirable dust)</td>
<td>SPS</td>
<td>mg/m³</td>
<td>7H, IO, C2, CA</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>NAH</td>
<td>mg/m³</td>
<td>7H, IO, FC</td>
</tr>
<tr>
<td>Styrene, monomer</td>
<td>STY</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Sulphur dioxide</td>
<td>SO2</td>
<td>ppm</td>
<td>7H, IO, DT, ED, FC, IP, ST</td>
</tr>
<tr>
<td>Sulphuric acid</td>
<td>HSO</td>
<td>mg/m³</td>
<td>7H, IO, FC, ST</td>
</tr>
<tr>
<td>Synthetic mineral fibres (SMF)</td>
<td>SMF</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Talc, containing no asbestos fibres</td>
<td>TAD</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Contaminant description</td>
<td>Code</td>
<td>Unit of measurement</td>
<td>Sampling equipment code</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------</td>
<td>---------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Talc, fibrous</td>
<td>TAF</td>
<td>f/mL</td>
<td>AS</td>
</tr>
<tr>
<td>Tantalum, metal and oxide dusts</td>
<td>TAM</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Tellurium and compounds (as Te)</td>
<td>-TE</td>
<td>mg/m³</td>
<td>7H, IO, ST</td>
</tr>
<tr>
<td>Thallium</td>
<td>THA</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Tin, metal</td>
<td>TIN</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Tin, oxide and inorganic compound (as Sn)</td>
<td>SNO</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Toluene</td>
<td>TOL</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Toluene diisocyanate</td>
<td>TDI</td>
<td>mg/m³</td>
<td>7H, IO, IP</td>
</tr>
<tr>
<td>Total petroleum hydrocarbons</td>
<td>TPH</td>
<td>mg/m³</td>
<td>ST</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>TRI</td>
<td>ppm</td>
<td>PM, ST, SB</td>
</tr>
<tr>
<td>Tungsten</td>
<td>TUN</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Turpentine</td>
<td>TUR</td>
<td>ppm</td>
<td>ST</td>
</tr>
<tr>
<td>Vanadium (as V₂O₅) (respirable)</td>
<td>VAN</td>
<td>mg/m³</td>
<td>C2, CA</td>
</tr>
<tr>
<td>Welding fumes (not otherwise classified)</td>
<td>WLD</td>
<td>mg/m³</td>
<td>7H, IO, FC</td>
</tr>
<tr>
<td>Wood dust (certain hardwoods)</td>
<td>WDH</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Wood dust (soft wood)</td>
<td>WDS</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Xylene (o-, m- and p-isomers)</td>
<td>XYL</td>
<td>ppm</td>
<td>PM, ST</td>
</tr>
<tr>
<td>Zinc</td>
<td>-ZN</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Zinc oxide (fume)</td>
<td>ZNF</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
<tr>
<td>Zirconium compounds (as Zr)</td>
<td>ZRC</td>
<td>mg/m³</td>
<td>7H, IO</td>
</tr>
</tbody>
</table>
### Appendix 5 – Sampling equipment codes

<table>
<thead>
<tr>
<th>Sampling equipment</th>
<th>Code</th>
<th>Acceptable flowrate (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 hole</td>
<td>7H</td>
<td>2.0 L/min</td>
</tr>
<tr>
<td>Aluminium cyclone</td>
<td>CA</td>
<td>2.5 L/min</td>
</tr>
<tr>
<td>Asbestos sample head</td>
<td>AS</td>
<td>0.4 - 2.0 L/min</td>
</tr>
<tr>
<td>Cyclone (2.2 L/min)</td>
<td>C2</td>
<td>2.2 L/min</td>
</tr>
<tr>
<td>Detector tube</td>
<td>DT</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Diesel particulate monitor</td>
<td>DM</td>
<td>1.6 - 2.1 L/min</td>
</tr>
<tr>
<td>Electronic device</td>
<td>ED</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Filter cassette</td>
<td>FC</td>
<td>0.9 - 2.1 L/min</td>
</tr>
<tr>
<td>Impinger</td>
<td>IP</td>
<td>0.5 - 2.0 L/min</td>
</tr>
<tr>
<td>IOM head</td>
<td>IO</td>
<td>2.0 L/min</td>
</tr>
<tr>
<td>Passive monitor</td>
<td>PM</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sorbent/sample tube</td>
<td>ST</td>
<td>0.02 - 1.0 L/min</td>
</tr>
</tbody>
</table>
### Appendix 6 – Drilling method codes

<table>
<thead>
<tr>
<th>Method</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircore</td>
<td>AIR</td>
</tr>
<tr>
<td>Bulldozer</td>
<td>BULL</td>
</tr>
<tr>
<td>Core logging</td>
<td>CLO</td>
</tr>
<tr>
<td>Diamond drill</td>
<td>DIA</td>
</tr>
<tr>
<td>Ditch witch</td>
<td>DW</td>
</tr>
<tr>
<td>Grader</td>
<td>GDR</td>
</tr>
<tr>
<td>Hand auger</td>
<td>AUG</td>
</tr>
<tr>
<td>Hand sampling</td>
<td>HS</td>
</tr>
<tr>
<td>Percussive diamond drill</td>
<td>DIAP</td>
</tr>
<tr>
<td>Reverse circulation drill</td>
<td>RC</td>
</tr>
<tr>
<td>Rotary air blast drill</td>
<td>RAB</td>
</tr>
<tr>
<td>Vacuum drill</td>
<td>VAC</td>
</tr>
</tbody>
</table>
Appendix 7 – Location codes

NOC = not otherwise classified

040 Exploration (not at a mine site)
100 Underground workplaces

110 Access, travelling or haulage ways
111 Brace or winder building
112 Shaft
113 Plat
114 Decline, adit or drift
115 Haulroad or level
116 Conveyor road
117 Ladderway
118 Return airways

120 Underground production or development areas
121 Underground face area (coal)
122 Underground stope
125 Loading pocket
126 Raise (development)
127 Decline or winze (development)
128 Level (development)
129 Capital (development)

130 Underground workshop
140 Pump chamber

150 Underground storage areas
151 Fuel storage
152 Explosives magazine
153 Underground stores — general

160 Underground ore or waste dumping
161 Ore or waste tip or pass area
162 Grizzly
163 Millhole

170 Underground crushing area

180 Ancillary locations
181 Crib room
182 Latrine

190 Underground

200 Open pit production or development areas

210 Face loading area
220 Bench areas not haul road
221 Drill pattern area
222 Heavy vehicle park up area

230 Haul road
231 Haul road – level
232 Haul road – ramp or incline

240 Waste dump area
250 Ore tipping area
260  In pit crushing
   261  In pit crusher area
   262  In pit conveyors
270  Stockpile — run of mine
280  Salt production areas
290  Open cut NOC
   291  Dredge
300  Surface work areas — general
   310  Mine access road (not haul road)
   320  Park up area, heavy vehicles or plant
   330  Warehouse or stores
   340  Explosives magazine
   350  Fuel storage area
   360  Laboratory
   370  Storage yard or rebuild area
   380  Lube bay or service bay
   381  Wash down area
   390  Surface general area
400  Treatment plant or ore processing
   411  Process control room
   413  Crushing, screening or conveyor
   416  Heap, vat or insitu leaching
   419  Grinding or classification
   422  Gravity concentration or magnetic separation
   425  Flotation
   428  Leaching
   431  Solvent extraction, scrubber or stripper
   434  Filter, press or wet screening
   437  Thickening or clarification
   439  Crystallisation, nucleation or ion exchange
   441  Electrowinning or cell house
   444  Smelter, roaster or furnace area
   447  Gold room and elution facility
   451  Tailings storage facility
   454  Product packaging or storage
   457  Sample plant or station
   461  Reagent or raw material storage area
   464  Reagent or raw materials preparation plant
   467  Water treatment plant
   471  Processing plant other
500  Crushed ore areas
   510  Stockpiles
      511  Stockpile access road
   520  Train loading or unloading
      521  Train loader or loading area
      522  Train unloader or tippler area
530 Stacker reclaimer area
540 Stacker or reclaim conveyor
550 Wharf area
  551 Shiploader wharf
  552 Conveyors wharf

600 Workshop surface
  610 Workshop heavy equipment
  620 Workshop elect or instruments
  630 Workshop railway
  640 Workshop auto or light vehicles
  650 Workshop boilermakers
  660 Workshop painters or carpenters
  670 Workshop tyre fitting
  680 Workshop belt repairs
  690 Workshop NOC

700 Railways
  710 Main lines
    711 Main line – on track
    712 Main line – off track
  720 Sidings
    721 Siding – on track
    722 Siding – off track
  730 Railway access road
  740 Railway yard

800 Power generation plant
  810 Control room
  820 Distribution or sub-station
  830 Engine room

900 Administration areas
  910 Offices or administration building
  920 Crib room, canteen or mess
  930 Showers or change room
  940 Lamproom
  950 Car park
  960 Pathways
  970 Gardens
  990 Administration NOC
Appendix 8 – Exceedance notification form

Government of Western Australia
Department of Mines and Petroleum
Resources Safety

Occupational hygiene sample exceedance notification

Your company:
Your site:
Your name:
Your contact details:
Date notification submitted:
Email: Your Responsible Inspector, or contammanager@dmp.wa.gov.au
Copy: Ventilation Log Book

Subject:

<table>
<thead>
<tr>
<th>Title</th>
<th>Exceedance of the occupational exposure limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminant</td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
</tr>
<tr>
<td>When</td>
<td>Date:</td>
</tr>
<tr>
<td>Location(s) where the exceedance occurred</td>
<td></td>
</tr>
<tr>
<td>Person exposed</td>
<td>Name:</td>
</tr>
<tr>
<td></td>
<td>Occupation:</td>
</tr>
<tr>
<td></td>
<td>Employer:</td>
</tr>
<tr>
<td>Work being undertaken</td>
<td>Activities during sampling:</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>PPE worn during exposure: Y N Type:</td>
</tr>
<tr>
<td>Investigation leader</td>
<td></td>
</tr>
<tr>
<td>Action plan to prevent recurrence</td>
<td>Action</td>
</tr>
</tbody>
</table>
Appendix 9 – Measurement conversion

The conversion equations are based on 25°C and 1 atmosphere.

**Conversion formula for ppm to mg/m³**

\[ X \text{ ppm} = \left( Y \text{ mg/m}^3 \right) \left( \frac{24.45}{\text{molecular weight}} \right) \]

**Conversion formula for mg/m³ to ppm**

\[ Y \text{ mg/m}^3 = \left( X \text{ ppm} \right) \left( \frac{\text{molecular weight}}{24.45} \right) \]