



# Hygiene Exposure Risk Management Specification

## Brief description

This Specification provides guidelines to effectively manage the risk of occupational exposures to the GPC workforce.

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# 1 Terms and definitions

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In this Specification:

“**Brief and Scala Model**” means a model used for calculating adjustments to exposure standards. This method is regarded as the most conservative model and considers the impact of the number of increased hours worked and the recovery time between exposure periods.

“**IHSTAT**” means an excel spreadsheet tool used for the purpose of inputting an occupational exposure limit for comparison with the data obtained from monitoring results.

“**PPE**” means personal protective equipment.

“**Qualitative Exposure Risk Assessment**” means a risk assessment used to screen exposure risks and set priorities for sampling. Judgements on each SEG exposure profile is made based on estimated exposure levels, severity of health effects and uncertainty associated with available information.

“**Quantitative Exposure Risk Assessment**” means an evaluation of exposure using empirical methods and is the actual measurement of the agent of exposure using a sampling method.

“**SEG**” means Similar Exposure Group. A SEG is a group/s of Workers having the same general exposure profile because of the similarity and frequency of the tasks they perform, the materials and processes with which they work, and the similarity of the way they perform the tasks.

“**STEL**” means Short Term Exposure Limit. STELs are the time weighted average maximum airborne concentration of a substance calculated over a 15 minute period. Exposures at the STEL should not be longer than 15 minutes and should not be repeated more than four times per day. There should be at least 60 minutes between successive exposures at the STEL.

“**WES**” means Workplace Exposure Standard. A WES is the airborne concentration of a particular substance or mixture that must not be exceeded in the workplace. A WES does not represent an acceptable exposure level for Workers but is the maximum permissible upper limit prescribed by legislation.

Terms that are capitalised and not otherwise defined in this Procedure are defined in the GPC Corporate Glossary Instruction (as listed in Appendix 1 – Related documents).

## 2 Introduction

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### 2.1 Purpose

GPC is committed to ensuring the health, safety and wellbeing of Workers, port users and Inducted Visitors in its workplaces and in the community.

This Specification is to ensure GPC meets all legislative requirements in relation to anticipating, recognising, evaluating and controlling health hazards in the working environment with the objective of protecting the Worker’s health and well-being and safeguarding the community at large.

### 2.2 Scope

This Specification describes the method by which occupational hygiene exposure hazards are identified, assessed, controlled and managed consistent with the GPC Safety Policy, the WHS Act and WHS Regulation.

Exposure assessment criteria applies to all occupational hygiene exposure risks including atmospheric contaminants, noise, hazardous chemicals and heat stress.

## 2.3 Objectives

GPC has an obligation to manage any risks associated with health exposure risks by eliminating such risks, and if that is not reasonably practicable, minimising such risks so far as is reasonably practicable. This Specification supports GPC in achieving this obligation and ensuring a healthy and safe workplace is provided.

## 3 Hygiene exposure risk management

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### 3.1 Identification of Occupational Hygiene Hazards

Hazard identification should be performed before the commencement of any task, in accordance with the Safety Risk Management Procedure, to understand the potential level of exposure to the Workers.

#### (a) Establishment of Similar Exposure Groups (SEGs)

GPC have established SEGs based on:

- Observation – grouping work activity according to task, job description, process and exposure to any hazards in the work environment and control measures applied; and
- Sampling data to support observational data.

SEGs will be reviewed when there are changes to work activities or compliance obligations as well as periodically to ensure ongoing accuracy and effectiveness.

#### (b) Qualitative Exposure Risk Assessment

A Qualitative Exposure Risk Assessment will be conducted for each occupational exposure hazard group (otherwise referred to as a SEG) identified at GPC. The estimated exposure will be judged as extreme, high, medium, low, very low or unknown, using the GPC risk matrix. The risk is based on the toxicity of the hazard and frequency of exposure.

Assessments must address all routes of exposure including inhalation, skin contact/absorption, inadvertent digestion and whole and partial body exposure. The qualitative assessment shall be reviewed on a risk basis and as monitoring is conducted to quantify the assessment. A qualitative exposure shall also be carried out:

- for newly planned facilities;
- if there is a significant change in the process equipment, material, jobs, tasks or work practices; or
- if new and significant information becomes available on the toxicity of a material or a change in the Workplace Exposure Standard (WES).

The risk rating outcome shall determine the monitoring (quantitative assessment) priority (see Figure 1), rated from 1-5. Unknown and extreme risk outcomes are rated as a priority 1, through to very low outcomes ranked priority 5.

SAMPLING PRIORITY	
HEALTH RISK OUTCOME	SAMPLING PRIORITY
UNKNOWN	1
EXTREME	1
HIGH	2
MEDIUM	3
LOW	4
VERY LOW	5

Figure 1: Sampling priority

**(c) Quantitative Exposure Risk Assessment**

A Quantitative Exposure Risk Assessment shall be obtained for all identified occupational exposure hazard groups (SEGs) and classified as unacceptable, significant or insignificant according to the exposure classification criteria, control and periodic surveillance table (see table section 3.6).

Quantitative exposure and health monitoring will be conducted in accordance with applicable work health and safety legislation.

The number of samples required to be taken for each SEG is dependent on the number of Workers in each group. When a new SEG is established, the National Institute for Occupational Health and Safety (NIOSH) Sampling Strategy Manual (Sample Size) will be utilised to determine number of samples to establish a preliminary data set.

**(d) ChemAlert**

GPC utilise ChemAlert as an electronic Hazardous Chemical register to gather and maintain required information related to all chemicals approved for use, handling and storage. ChemAlert provides up-to-date information of any exposure standard changes, any news items, improvement items and lessons learnt communications. It also provides Workers with readily available information of how to manage the safe use of a chemical with guidance from the current safety data sheet (SDS). Further information on chemical approval health, safety and environmental assessments as well as risk assessments is outlined in the Hazardous Chemical Management Procedure.

**(e) Asbestos register**

GPC's Asbestos register lists all identified (or assumed) asbestos in all GPC owned and/or operated assets. The register provides any Worker who is performing any maintenance or removal of any structure at GPC owned and/or operated assets the known asbestos hazards and previously sampled locations with results. Further details are in the Asbestos Management Procedure.

## 3.2 Hazard control options

Hazard controls are fundamental for protecting Workers. For occupational hygiene hazards, the hierarchy of controls (see Figure 2) will be applied to determine how to implement feasible and effective controls to eliminate or reduce risks to as low as reasonably practicable.



Figure 2: Hierarchy of control model

Single or multiple implementation of controls can be considered when reducing a risk to as low as reasonably practicable.

## 3.3 Control strategy

Cessation of a task or appropriate PPE shall be used immediately to control an unacceptable exposure risk.

Unacceptable exposure risks will be escalated to the relevant manager of the work group affected, and immediate interim controls will be implemented.

New plant and equipment shall be designed and purchased in accordance with GPC engineering standards and procedures (including Minimising Health, Safety and Environmental Impacts in Procurement Instruction) to reduce / maintain Employee exposure as low as practicable.

All PPE must be approved to be on GPC operating sites and meet requirements outlined in the Personal Protective Equipment Procedure. Any requests for new PPE or changes to PPE must be approved by the GPC Safety Team in accordance with the Personal Protective Equipment Procedure and be considered through the management of change process to ensure all known hazards have been adequately addressed.

## 3.4 Control monitoring

Control monitoring can be performed on an individual's workplace exposure or as a static review of the hazardous environment. Monitoring environmental controls should be performed prior to any significant changes to plant or equipment. This monitoring will provide quantitative data to assist with ascertaining the effectiveness of the control and to validate whether the introduction to a new control has reduced the level of exposure.

### (a) Audit

Internal and external audits are used to ensure there is a systemic review on the effectiveness of controls. Internal system audits are included in the GPC Safety Team audit schedule and may be performed by both GPC personnel and/or external third parties.

### 3.5 Periodic surveillance program

The primary focus of GPC’s periodic surveillance program is to reduce Worker exposure to health and safety risks so far as reasonably practicable as well as monitor effectiveness of controls.

Periodic surveillance is conducted in accordance with the exposure classification criteria, control and periodic surveillance table (detailed in section 3.6).

Periodic surveillance will also occur whenever there is a change in work processes, equipment, materials, tasks or practices. Repeated sampling will occur with any observation of excessive incidence of disease or symptom.

### 3.6 Exposure classification criteria, control and periodic surveillance table

Classification	Classification criteria	Control	Periodic surveillance
Extreme risk outcome	<ul style="list-style-type: none"> <li>5% (or more) of day to day exposures exceed WES (or peak WES)</li> <li>Exposure to heat stress in a restricted work zone for acclimatised Workers (and is not managed in accordance with GPC Heat Stress Management Procedure)</li> </ul>	<ul style="list-style-type: none"> <li>Controls implemented immediately</li> <li>Biological monitoring if skin absorption is the main route of exposure</li> <li>Both basic and task specific practices as set out in GPC Heat Stress Management Procedure</li> </ul>	<ul style="list-style-type: none"> <li>3 yearly (low toxicity)</li> <li>Annually (high toxicity)</li> </ul>
High risk outcome	<ul style="list-style-type: none"> <li>5% (or more) of day to day exposures exceed 50% WES (50% peak WES &amp; 50% WES noise)</li> <li>Exposure to heat stress in the cautionary work zone for acclimatised Workers (and is not managed in accordance with GPC Heat Stress Management Procedure)</li> </ul>	<ul style="list-style-type: none"> <li>Controls maintained to preclude unacceptable exposure frequency</li> <li>Both basic and task specific practices as set out in GPC Heat Stress Management Procedure</li> </ul>	<ul style="list-style-type: none"> <li>3 yearly (low toxicity)</li> <li>Annually (high toxicity)</li> </ul>
Medium risk outcome	<ul style="list-style-type: none"> <li>5% (or more) of day to day exposures between 10% and 50% WES</li> </ul>	<ul style="list-style-type: none"> <li>Controls maintained to preclude unacceptable</li> </ul>	<ul style="list-style-type: none"> <li>Conduct initial monitoring and then three yearly provided there is no changes to</li> </ul>

Classification	Classification criteria	Control	Periodic surveillance
	<p>(&gt;10% - &lt;50% peak WES &amp; &gt;25% - &lt;50% WES noise).</p> <ul style="list-style-type: none"> <li>Exposure to heat stress in acclimatisation zone for acclimatised Workers (and is managed)</li> </ul>	<p>exposure frequency</p> <ul style="list-style-type: none"> <li>Both basic and task specific practices as set out in GPC Heat Stress Management Procedure</li> </ul>	<p>process, material or controls since last monitoring</p>
Low risk outcome	<ul style="list-style-type: none"> <li>5% (or more) of day to day exposures do not exceed 25% WES (50% peak WES &amp; 50% WES noise).</li> <li>Exposure to heat stress in acclimatisation zone for acclimatised Workers (and is managed)</li> </ul>	<ul style="list-style-type: none"> <li>Controls maintained to preclude unacceptable exposure frequency</li> <li>Both basic and task specific practices as set out in GPC Heat Stress Management Procedure</li> </ul>	<ul style="list-style-type: none"> <li>&lt; 50% - 3 yearly</li> <li>&lt; 10% - no further action</li> </ul>
Unknown risk outcome	<ul style="list-style-type: none"> <li>Inadequate information to estimate exposure level</li> <li>Inadequate health effects information available to judge exposures</li> </ul>	<ul style="list-style-type: none"> <li>Quantitative assessment required</li> </ul>	<ul style="list-style-type: none"> <li>As per exposure classification criteria</li> </ul>
Health surveillance	<ul style="list-style-type: none"> <li>5% (or more) of day to day exposures exceed WES (or peak WES)</li> <li>Significant exposure to hazards included in Schedule 14 WHS Regulation</li> <li>Significant or unacceptable skin exposure to a hazardous chemical</li> </ul>	<ul style="list-style-type: none"> <li>Health surveillance requirement recorded and notified as per GPC Injury/ Illness Management Standard</li> </ul>	<ul style="list-style-type: none"> <li>GPC Injury/ Illness Management Standard</li> </ul>



Classification	Classification criteria	Control	Periodic surveillance
	<ul style="list-style-type: none"> <li>Significant or unacceptable exposure to heat stress</li> <li>Workers are engaged to perform work at the GPC Quarry</li> </ul>		

### 3.7 Health surveillance

GPC has obligations to perform health surveillance in a number of circumstances under the WHS Regulation and Mining and Quarrying Safety and Health Regulation. Requirements and processes for health surveillance are outlined in the Fit for Work Standard and Injury/Illness Management Standard.

### 3.8 Communication

#### (a) Reporting results

The quantitative classification criteria result is determined by statistical analysis of monitoring results in IHSTAT spreadsheet completed for each SEG. Occupational hygiene data is analysed in accordance with relevant workplace exposure work instruction. GPC will utilise the support of an Occupational Hygienist to facilitate statistical analysis.

GPC uses the Brief and Scala method for the reduction factor when performing calculations for extended shifts or shift adjustments.

The results from static sampling cannot be used to quantify personal exposure. Static sampling is used to determine the effectiveness of controls implemented in the workplace.

If any results are recorded in excess of 50% of the relevant WES (extreme and high exposures), they will be escalated and captured in SAI360 and an investigation will commence. A review of the effectiveness of the current controls will be performed to determine whether additional controls needed to be implemented to reduce the level of exposure.

#### (b) Recording results

Results will be identified and referable to individual Workers and kept for 30 years after the date the record is made and will be readily accessible to persons who may be exposed to the occupational exposure hazard.

All results ascertained from measuring any occupational hygiene hazards will be documented in SAI360.

#### (c) Communicating results

All Workers who have participated in personal occupational health monitoring studies will be provided with their individual results. Any static monitoring of occupational hygiene exposure risks will be communicated to relevant management after completion, and then communicated to the relevant workforce.

Workers will be informed where there is a change to exposure that significantly affects the health risk or there is new information available regarding the potential health effects of a hazardous chemical, for example, change in the applicable WES, or substance's reclassification as a carcinogen.

**(d) External reporting**

Where health surveillance indicates the presence of notifiable disease or where exposure to a substance meets the criteria of a notifiable incident to a safety regulator, the Safety Manager will make the notification in accordance with the Incident Management & Investigation Procedure.

### 3.9 Training

GPC provides education and training to relevant Workers on the health effects of hazard/s and how to effectively manage exposure to such hazard/s through bulletins, toolbox talks, mandatory training and targeted training.

Any monitoring will be performed in accordance with WHS Regulations and Australian Standards by trained and competent personnel.

Any analysis is to be performed by a NATA accredited laboratory.

### 3.10 Contractors and port users

All Contractors and port users have an obligation to manage all hazards which are created by performing a task. All workplace exposure standards should be adhered to and all health monitoring for their individual Workers is the obligation of the contracting company or port user. All known hazards on GPC sites are communicated via the induction process and/or by GPC Representative/Contractor Supervisor.

## 4 Appendices

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### 4.1 Appendix 1 – Related documents

**(a) Legislation and regulation**

Key relevant legislation and regulations, as amended from time to time, includes but is not limited to:

Type	Legislation/regulation
State Acts	<i>Work Health and Safety Act 2011</i> <i>Work Health and Safety Regulation 2011</i> <i>Mining and Quarrying Safety and Health Regulation 2017</i>
Other	<i>Managing risks of hazardous chemicals in the workplace Code of Practice</i> <i>NIOSH Sampling Strategy Manual</i>

**(b) GPC documents**

The following documents relate to this Standard:

Type	Document number and title
<b>Tier 1: Policy</b>	#365624 Safety Policy
<b>Tier 2: Standard/Strategy</b>	#1276408 Injury / Illness Management Standard #1331115 Fit for Work Standard
<b>Tier 3: Specification/ Procedure/Plan</b>	#1086240 Hazardous Chemical Management Procedure #664817 Asbestos Management Procedure #1075526 Incident Management and Investigation Procedure #1389109 Heat Stress Management Procedure (DRAFT)
<b>Tier 4: Instruction/Form/ Template/Checklist</b>	#1621179 GPC Corporate Glossary Instruction #1632458 Minimising Health, Safety and Environmental Impacts in Procurement Instruction
<b>Other</b>	#1063099 Occupational Hygiene Database

**4.2 Appendix 2 – Current monitored occupational exposure hazards**

Category of Health Hazards	Specific Exposure Hazard	Occupational exposure monitoring
Physical	Dust <ul style="list-style-type: none"><li>• Silica</li><li>• Coal</li><li>• Calcite</li><li>• Blast media</li></ul>	Personal and static
	Noise	Personal and static
	Vibration <ul style="list-style-type: none"><li>• Whole body</li><li>• Hand arm</li></ul>	Personal

Category of Health Hazards	Specific Exposure Hazard	Occupational exposure monitoring
Thermal	Heat stress	Personal and static
Radiation/non-ionising radiation	Solar Ultraviolet	Static
Hazardous substances	Chemicals <ul style="list-style-type: none"> <li>• Isocyanates</li> <li>• Volatile organic compound (VOC)</li> <li>• Solvents</li> </ul>	Personal
	Atmospheric Gases <ul style="list-style-type: none"> <li>• CO<sub>2</sub></li> <li>• H<sub>2</sub>S</li> <li>• CO</li> <li>• CH<sub>4</sub></li> </ul>	Personal and static
	Diesel particulate matter (DPM)	Personal
	Welding fumes <ul style="list-style-type: none"> <li>• Welding fume (particles not otherwise classified)</li> <li>• Iron (as iron oxide fume)</li> <li>• Manganese (as inhalable fraction)</li> <li>• Manganese (as respirable fraction)</li> <li>• Nickel (as inhalable elemental/metal)</li> <li>• Nickel (as inhalable insoluble compounds)</li> <li>• Nickel (as inhalable soluble compounds)</li> <li>• Chromium (metal or valence II &amp; III compounds)</li> </ul>	Personal

Category of Health Hazards	Specific Exposure Hazard	Occupational exposure monitoring
	<ul style="list-style-type: none"> <li>Chromium (valence VI compounds)</li> <li>Ozone (gas)</li> </ul>	
	Asbestos	Static
Biological hazards	Waterborne Pathogens <ul style="list-style-type: none"> <li>Drinking – rainwater tank supply</li> <li>Dust mitigation sprays/cleaning – raw water</li> <li>Recreation (water park) – chemical treatment recirculated potable water</li> </ul>	Static
	Mould	Static

#### 4.3 Appendix 3 – Schedule 14 – Hazardous chemicals (other than lead) requiring health monitoring

Item	Hazardous Chemicals	Type of Health Monitoring
1	Acrylonitrile	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Records of personal exposure</li> <li>Physical examination</li> </ul>
2	Arsenic (inorganic)	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Records of personal exposure</li> <li>Physical examination with emphasis on the peripheral nervous system and skin</li> <li>Urinary inorganic arsenic</li> </ul>
3	Benzene	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Records of personal exposure</li> <li>Physical examination</li> <li>Baseline blood sample for haematological profile</li> </ul>

Item	Hazardous Chemicals	Type of Health Monitoring
4	Cadmium	<ul style="list-style-type: none"> <li>• Demographic, medical and occupational history</li> <li>• Records of personal exposure</li> <li>• Physical examination with emphasis on the respiratory system Standard respiratory questionnaire to be completed</li> <li>• Standardised respiratory function tests including for example, FEV1, FVC and FEV1/FVC</li> <li>• Urinary cadmium and <math>\beta</math>2-microglobulin</li> <li>• Health advice, including counselling on the effect of smoking on cadmium exposure</li> </ul>
5	Chromium (inorganic)	<ul style="list-style-type: none"> <li>• Demographic, medical and occupational history</li> <li>• Physical examination with emphasis on the respiratory system and skin</li> <li>• Weekly skin inspection of hands and forearms by a competent person</li> </ul>
6	Creosote	<ul style="list-style-type: none"> <li>• Demographic, medical and occupational history</li> <li>• Health advice, including recognition of photosensitivity and skin changes</li> <li>• Physical examination with emphasis on the neurological system and skin, noting any abnormal lesions and evidence of skin sensitisation</li> <li>• Records of personal exposure, including photosensitivity</li> </ul>
7	Crystalline silica	<ul style="list-style-type: none"> <li>• Demographic, medical and occupational history</li> <li>• Records of personal exposure</li> <li>• Standardised respiratory questionnaire to be completed</li> <li>• Standardised respiratory function test, for example, FEV1, FVC and FEV1/FVC Chest X-ray full size PA view</li> </ul>
8	Isocyanates	<ul style="list-style-type: none"> <li>• Demographic, medical and occupational history</li> <li>• Completion of a standardised respiratory questionnaire</li> <li>• Physical examination of the respiratory system and skin</li> </ul>

Item	Hazardous Chemicals	Type of Health Monitoring
		<ul style="list-style-type: none"> <li>Standardised respiratory function tests, for example, FEV1, FVC and FEV1/FVC</li> </ul>
9	Mercury (inorganic)	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Managing risks of hazardous chemicals in the workplace Code of Practice 2013 (PN11578) Page 58 of 82</li> <li>Physical examination with emphasis on dermatological, gastrointestinal, neurological and renal systems</li> <li>Urinary inorganic mercury</li> </ul>
10	4,4'-Methylene bis (2-chloroaniline) (MOCA)	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Physical examination</li> <li>Urinary total MOCA Dipstick analysis of urine for haematuria</li> <li>Urine cytology</li> </ul>
11	Organophosphate pesticides	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history including pattern of use Physical examination</li> <li>Baseline estimation of red cell and plasma cholinesterase activity levels by the Ellman or equivalent method</li> <li>Estimation of red cell and plasma cholinesterase activity towards the end of the working day on which organophosphate pesticides have been used</li> </ul>
12	Pentachlorophenol (PCP)	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Records of personal exposure</li> <li>Physical examination with emphasis on the skin, noting any abnormal lesions or effects of irritancy</li> <li>Urinary total pentachlorophenol</li> <li>Dipstick urinalysis for haematuria and proteinuria</li> </ul>
13	Polycyclic aromatic hydrocarbons (PAH)	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Physical examination Records of personal exposure, including photosensitivity</li> <li>Health advice, including recognition of photosensitivity and skin changes</li> </ul>

Item	Hazardous Chemicals	Type of Health Monitoring
14	Thallium	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Physical examination Urinary thallium</li> </ul>
15	Vinyl chloride	<ul style="list-style-type: none"> <li>Demographic, medical and occupational history</li> <li>Physical examination Records of personal exposure</li> </ul>

#### 4.4 Appendix 4 – Revision history

Revision date	Revision description	Author	Endorsed by	Approved by
27/08/20	Document creation	Julie Meinberg, Safety Specialist	Rowen Winsor, People Community & Sustainability General Manager	Tony Young, Safety & Training Manager
05/09/2023	Desktop review to maintain document currency. Immaterial changes. Full review of hygiene management system scheduled.	Kirsty Iszlaub, Safety & Environment Systems Lead	Tony Young, Safety Manager	Richard Haward, EGM Safety & ESG