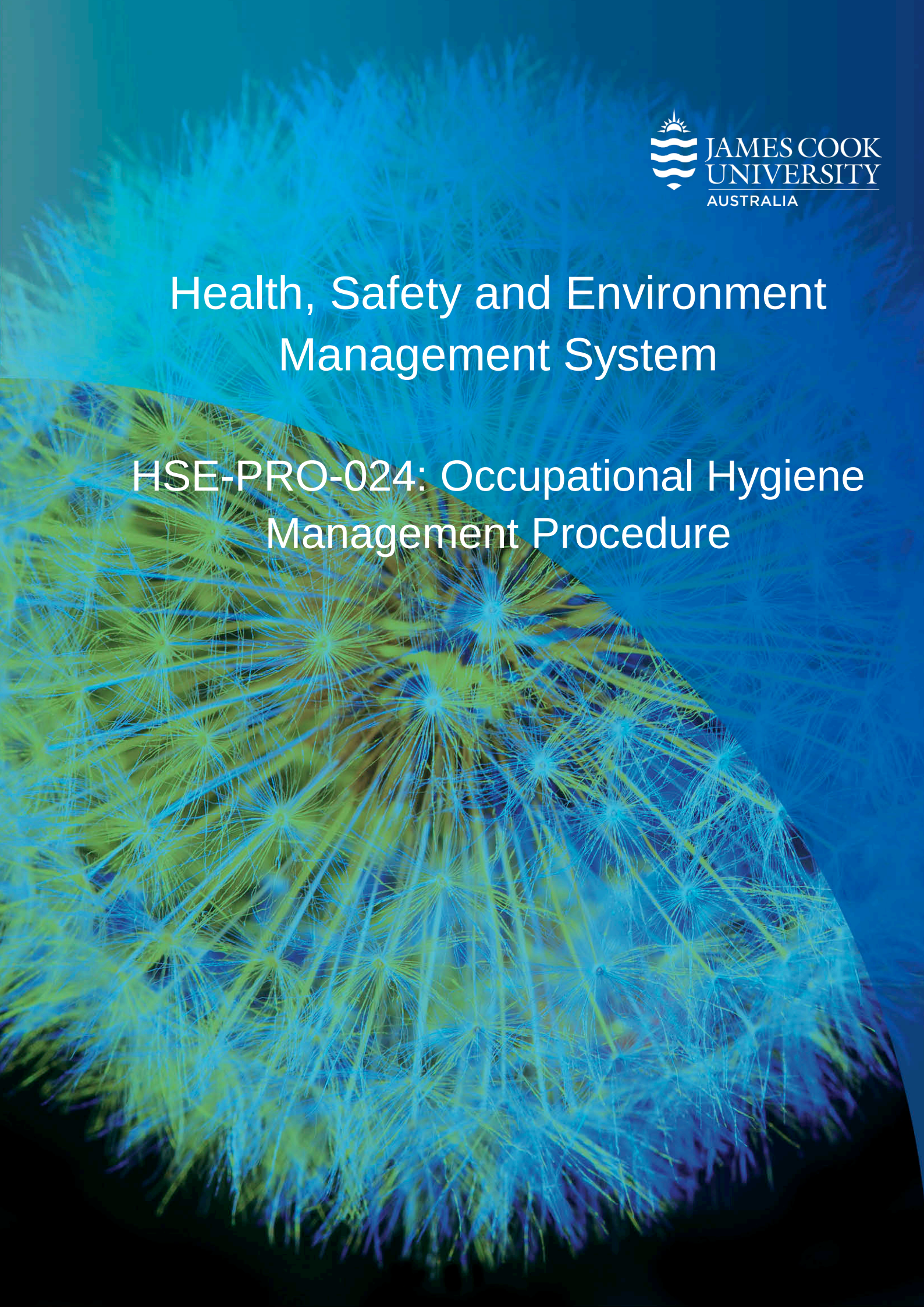
JAMES COOK UNIVERSITY
AUSTRALIA

Health, Safety and Environment Management System

HSE-PRO-024: Occupational Hygiene Management Procedure



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1 Intent

It is the responsibility of a person conducting a business or undertaking to ensure that exposure to occupational hazards in the workplace do not exceed occupational exposure standards and are as low as reasonably practicable.

This procedure outlines the process for occupational hygiene management of health hazards in the workplace that can result in injury, illness, impairment, or affect the wellbeing of workers and members of the community. Occupational hygiene hazards can be categorised as Biological, Chemical, Physical, Ergonomic and Psychosocial. In particular, the process for anticipating, recognising, evaluating, and controlling of health hazards in the workplace is explained.

The procedure outlines the processes for:

- Identifying occupational exposure hazards
- Conducting risk assessments of occupational exposures
- Complying with applicable exposure standards
- Implementing controls to reduce occupational exposures to acceptable levels

2 Scope

This procedure:

- Applies to all JCU workers, staff, students, adjuncts, volunteers and visitors
- Is not intended for application to potential public exposures or environmental harm
- Does not include asbestos fibre monitoring conducted under the JCU asbestos management plan and procedure
- Does not include ionising radiation dose meter program conducted as part of Radiation Safety and Protection Plans
- Is supported by the following JCU procedures:
  - HSE-PRO - 006 Asbestos Management Procedure
  - HSE-PRO - 009 Biosafety Procedure
  - HSE-PRO - 005 Hazardous Chemicals Procedure
  - HSE-PRO - 011 Work Health and Safety Risk Management Procedure

3 Definitions

Term	Definition
Occupational Hygiene	The process of anticipation, recognition, evaluation, control of exposure to occupational hygiene hazards. Occupational hygiene uses a combination of science, engineering and professional judgement in the process.
Environmental Measurement	Taking a measurement within the workplace using a suitable sampling device or measurement instrument. Taking a temperature reading.
OES	Occupational exposure standard.
Personal Monitoring	Measuring an individual's exposure using a valid monitoring technique. Example includes an inhalable dust sampling device situated in the breathing zone.
Physical Hazard	Hazards including radiation, temperature, noise and vibration.
Qualitative Exposure Assessment	Evaluation of potential personal exposure based on personal experience, and professional judgment.
Quantitative Exposure Assessment	Evaluation of actual personal exposure data using accepted numerical and mathematical analysis.
Route of Exposure	The route of exposure consisting of ingestion, inhalation.
SEG	Similar exposure group. Used to define a group of workers that would be expected to have the same exposure to a physical or chemical hazard. These groups will have similar tasks, frequency of tasks, controls and hazards.
Static / Para Occupational Measurements	Taking samples or measurements within the working environment that will be used to determine potential for exposure. This is not an actual exposure measurement.

4 Duty, Obligations and Responsibilities

4.1 Vice Chancellor

- The Vice Chancellor has overall responsibility to ensure the University is able to meet its WHS obligations, including the implementation of this procedure.

4.2 Deputy Vice Chancellor / Director of Operations/ College Managers / Directors/ Deans/ Managers/ Head Academic Groups

- To ensure obligations under this procedure are met.
- To support as required the identification, monitoring and control of occupational hygiene exposures within their work areas. Health Safety & Environment Unit
- To conduct/facilitate the occupational hygiene monitoring program
- Engage/source specialist occupational hygiene advice as required
- Anticipate and identify occupational hygiene requirements.

4.3 Staff/Students/Adjuncts/Volunteers

- To comply with this Procedure
- To participate with any exposure monitoring that is conducted in the workplace
- Provide information as required in regard to potential occupational health exposures
- Notify the HSE unit where exposures have been identified that may require occupational hygiene monitoring.

5 Requirements

5.1 Occupational Hygiene Exposure Monitoring Program

5.1.1 Initial Characterisation for JCU Occupational Hygiene Monitoring Programs

The initial characterisation aims to determine potential exposures to occupational health hazards that require further monitoring/assessment due to likelihood for adverse health effects. It takes the form of a qualitative risk assessment that may involve a walk-through of the workplace and preliminary measurement of exposure. The assessment will identify Similar Exposure Groups (SEGs) and a risk score for the potential to exceed the exposure standard. This will determine the priority for further assessment.

The assessment process will

- Start at Divisional level and follow through to College/Research Group as appropriate
- Identify where potential exposures exist and define SEGs with occupational exposures that require further review/control, or no further action.

Potential occupational health hazards include:

- Respirable dust
- Inhalable dust, including contaminants eg. lead
- Welding/soldering fume
- Asbestos
- Hazardous substances, eg. gas, vapour, liquid, solid
- Noise
- Vibration
- Extremes of temperature
- Non ionising radiation (UV, welding flash)
- Ionising radiation (alpha, betta, gamma, x-ray)
- Electromagnetic fields
- Biological hazards.

A qualitative risk assessment shall be performed to determine:

- SEGS where no further action is required. This can include:
  - SEGS expected to be exposed to <10% of the relevant OES
  - SEGS that are using known control banding techniques to result in very low exposures. Such as the use of fume cabinets during work with hazardous chemicals, or gas monitoring systems that are alarmed
  - Risk assessments may not be recorded where there is not perceived to be a benefit, as in the potential for exposure is so low and infrequent

- SEGS that require further review and monitoring. This can include:
  - SEGS expected to be exposed to >10% - <50% of the exposure standard
  - SEGS expected to be exposed to >50% of the exposure standard
  - SEGS where further review is required due to uncertainty
  - SEGS or exposures that have legislative requirements to assess exposure.

- SEGS that require immediate controls for unacceptable occupational exposures. This will include:
  - SEGS expected to be exposed to >100% of the OES
  - SEGS where occupational disease is reported.

The risk assessment will take into account:

- Any existing exposure monitoring data
- Current control measures such as engineering controls or personal protective equipment
- Visual observation and other indicators of exposure potential
- Work practices
- Worker experience
- Legislative requirements for chemical and physical exposure hazards.

Table 1: Qualitative Risk Rankings

Risk Rank/Level	Estimated Exposure	Action Required
High	Possibly exceeding the OES	Immediate controls
Medium	Possibly exceeding 50% of OES	Further review and monitoring
Low	Possibly exceeding 10% of OES and less than half the OES	Further review and monitoring
Very Low	Unlikely to exceed 10% of OES	No further action
Not applicable	Not applicable to that SEG	No further action

The qualitative risk assessment will be recorded in an Excel matrix stored on the HSE Unit Corporate drive.

The document is to identify any relevant occupational hygiene monitoring reports or health monitoring results.

The assessment will be reviewed every five years or when a change occurs prompting the need for a review.

Notification of risk assessments that determine a need for exposure monitoring or assessment will be made to the HSE Biological, Radiation and Chemical Safety Advisor who will record the assessment in the Excel matrix and include it in the monitoring program. Notifications to the HSE Biological, Radiation and Chemical Safety Advisor will include the Riskware number.

5.2 Exposure Assessment

Exposure assessments may be conducted using a variety of techniques and over different time frames. Sampling methods include:

- Personal monitoring, for example, sampling inhalable dust exposure within the workers breathing zone, or measuring noise exposure at the ear
- Static, para occupational monitoring or environmental monitoring, for example placing a gas monitor on a tripod or monitoring for asbestos fibres
- Monitoring survey, for example conducting a noise survey with a hand held sound level measuring device
- Biological monitoring, for example results from blood lead testing
- Health surveillance results.

Time frames include:

- Grab Sampling: very short term sampling, typically within seconds. Normally used to confirm the presence or identify a contaminant.
- Short term sampling: sampling of 10 – 15 minutes. This sampling can be compared with short term exposure limits (STEL). A series of these short samples may be used to calculate full shift exposure.
- Long term sampling: is typically conducted for either a full shift, or greater than half of a working shift. This type of samplings is ideal for comparing to the 8 hour OES.
- Continued sampling provides a real time measurement of exposure for the sampling period such as in the case of gas monitoring. This method can provide a time weighted average (TWA) for the exposure period, peaks and STEL measurements in one method.
- Concentration measurements can only provide an average result for the sampling periods such as in the case of inhalable dust monitoring. STEL and TWA measurements will need to be taken as separate samples.

Ideally sampling will be full shift, if this is not possible the next preferred method will be to ensure the full task is measured and appropriate estimation of exposure conducted.

5.2.1 Additional Exposure Assessment:

Where through other means such as risk assessments conducted within a Division/College/Research Group determines the need for additional exposure assessment, the additional exposure assessment will be recorded in the exposure monitoring schedule required by section 5.2.2 of this procedure.

Reasoning for additional exposure assessments may include:

- Incidents
- New research
- New substances
- New equipment/plant
- Legislative changes
- Risk assessments including hazardous chemical risk assessments
- WorkCover claims
- Results of Health Surveillance
- Results from biological monitoring
- Requests.

5.2.2 Exposure Assessment Monitoring Schedule

A monitoring schedule will be produced from the information gained during the initial characterisation and risk assessment. The schedule will also be updated as new exposure assessment issues are identified.

The monitoring schedule shall consist of:

- Identification of the SEG to be monitored
- The type of exposure assessment to be conducted, such as personal monitoring survey
- Frequency of monitoring
- Record of a decision when monitoring is no longer required
- List of relevant reports/records for the SEG.

5.3 Occupational Hygiene Reports

Occupational hygiene reports prepared by JCU staff and contractors should address the headings provided below. This includes:

- Introduction – including date, location, person who commissioned the monitoring, aim of the monitoring

- Monitoring Methods and Equipment – sampling procedures, assessment standards applied, type of survey
- Analysis Method – analysis method and technical standard
- Occupational exposure standard – detail regarding the occupational exposure standard that results have been compared to
- Background – description of the process, task, history
- Results and discussion – results including date, sampling period, sample identifier, task description, monitoring period description, discussion of the results
- Conclusions and recommendations – recommendations that apply the hierarchy of control
- Calibration certificates for instrumentation
- Analysis certificates
- Personal exposure summary for participants
- Separate results table with names of participants marked confidential to be supplied.

Note: Personal monitoring and static/survey results are to be presented in separate result tables. Names of people monitored are not to appear in the body of reports.

Submit a draft report to the HSE Biological, Chemical and Radiation Safety Advisor for review prior to submitting a final report to HSE.

5.4 Occupational Exposure Standards

Occupational exposure standards (OES) are nominated for airborne contaminants and noise in Queensland. Where an OES is not legislated alternative sources will be researched.

The reasoning used to determine if exposure monitoring is required is found in section 5.1 of this procedure.

5.4.1 Airborne Contaminants

The “QLD Work Health and Safety Regulation 2011, Section 49 ” requires a person conducting a business or undertaking to ensure exposure standards for substances and mixtures are not exceeded.

Occupational Exposure standards are defined as:

- Time Weighted Average (TWA). This is a concentration of exposure for a period of eight hours
- Short Term Exposure Limitation (STEL). This is a 15 minute TWA exposure limit which cannot be exceeded at any time during the working day. The STEL exposure cannot last longer than a 15 minute period, which is not repeated more than four times during the shift. There must also be at least a 60 minute interval between the exposures at the STEL.

- Peak limitation. This is the maximum airborne concentration of a particular substance determined over the shortest practicable period which does not exceed 15 minutes. The peak limitation must not be exceeded at any time.

The Safe Work Australia document "Guidance on the Interpretation of exposure standards for Airborne Contaminants" should be consulted when interpreting exposure standards.

The occupational exposure standards can be found on the Safe Work Australia website's Hazardous Chemical Information System (HCIS).

5.4.2 Noise

The "Qld Work Health and Safety Regulation 2011, Section 56, Part 4.1" states the occupational exposure standard for noise. Consisting of:

- LAeq,8h of 85 dB(A). This is the sound pressure averaged over the time period.
- LC, Peak of 140 dB(C). This is an instantaneous level that can cause immediate damage to hearing.

5.4.3 Extended Working Shifts

When work shifts are longer than 8 hours, or working weeks longer than 5 days adjustments will be required to determine if an OES has been exceeded.

5.4.3.1 Airborne Contaminants

An 8 hour TWA occupational exposure standard is based on an 8 hour working day, 5 day working week. Where the length of a shift is longer than 8 hours, more than 5 days is worked in a row, or more than 40 hours is worked in a week, an adjustment to the TWA OES may be required.

The Australian Institute of Occupational Hygienists (AIOH) recommends using the Quebec model to adjust for extended shift arrangements.

In the case of JCU the majority of workers will work 8 hour shifts, five days a week. In these cases the OES will not need adjustment.

The Safe Work Australia document *"Guidance on the Interpretation of exposure standards for Airborne Contaminants"* should be consulted when interpreting exposure standards to determine if shift adjustment is appropriate for the substance being monitored.

The Peak limitations cannot have any shift adjustment performed.

5.4.3.2 Noise

Where work shifts are longer than 8 hours, assessments of noise exposure (the measurement) must be normalised and adjusted as per AS:1269.1 (2005) to allow comparison with the $L_{Aeq,8h}$ of 85 dB(A).

5.4.4 Alternative Exposure Standard

Where a Queensland or Australian OES does not exist, guidance from other sources may be used.

The source of the alternative OES should be a recognised government or professional agency.

Sources may include:

- Australian New Zealand Standards
- Health and Safety Executive (United Kingdom)
- Occupational Safety and health Administration (USA)
- Australian Institute of Occupational Hygienists
- American Conference of Governmental Industrial Hygienists (USA).

5.5 Monitoring Methods

When occupational hygiene monitoring is conducted the method for measurement and analysis should be as stated in the relevant legislation or sourced from a recognised body.

Recognised monitoring methods and sources are include in Table 2 below.

Table 2: Occupational Monitoring Methods

Occupational Hygiene Hazard:	Source for Monitoring Method:
Occupational Noise	AS/NZS 1269.1:2005 Occupational noise management – Measurement and assessment of noise immission and exposure
Whole Body Vibration	AS/NZS 2670.1:2001Evaluation of human exposure to whole-body vibration
Inhalable Dust	AS 3640:2009 Workplace atmospheres – Method for sampling and gravimetric determination of inhalable dust
Respirable Dust	AS 2985:2009 Workplace atmospheres – Method for sampling and gravimetric determination of respirable dust
Various Airborne Chemical Hazards	Occupational Safety and Health Administration, Sampling and analytical Methods
Various Airborne Chemical Hazards	The National Institute for Occupational Safety and Health (NIOSH), Manual of Analytical Methods 4th Edition
Asbestos Fibre	Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]

5.6 Equipment

Occupational hygiene monitoring equipment will be maintained, serviced and calibrated as required by the manufacturer's recommendations and the sampling methodology being applied.

A register of the occupational hygiene monitoring equipment used by the HSE Unit will be maintained on the HSE Unit Corporate drive.

When equipment is hired, a copy of the calibration documentation will be obtained.

Copies of calibration certificates will be included in the report as an attachment.

5.7 Records

The following records will be retained:

- Occupational hygiene monitoring reports
- Personal exposure letters/statements
- A record of exposure sampling is to be kept in a spreadsheet by the HSE Unit. The record will include the date of sampling, monitoring conducted, and outcome/follow up.

A copy of records in relation to occupational hygiene monitoring shall be retained in accordance with the retention and disposal schedules governed by the Queensland State Archives:

- General retention and disposal schedule
- University sector retention and disposal schedule

6 Related Documents, Legislation and Other Resources

6.1 Related Documents and Other Resources

Procedure	HSE-PRO-005 Hazardous Chemicals Procedure
	HSE-PRO-006 Asbestos Management Procedure
	HSE-PRO-003 Ionising Radiation Procedure
	HSE-PRO-011 Work Health and Safety Risk Management Procedure

6.2 Regulatory Authorities and Other Relevant Entities

Safe Work Australia
Workplace Health and Safety
Australian Institute of Occupational Hygienists

6.3 Related Legislation, Codes of Practice and Standards

Legislation	Work Health and Safety Act 2011 Work Health and Safety Regulation 2011
Standards	AS/NZS 1269.1:2005 Occupational noise management – Measurement and assessment of noise immission and exposure AS/NZS 2670.1:2001Evaluation of human exposure to whole-body vibration AS 3640:2009 Workplace atmospheres – Method for sampling and gravimetric determination of inhalable dust AS 2985:2009 Workplace atmospheres – Method for sampling and gravimetric determination of respirable dust The National Institute for Occupational Safety and Health (NIOSH), Manual of Analytical Methods 4th Edition Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]
Codes of Practice	Managing Risks of Hazardous Chemicals in the Workplace Code of Practice 2013 Labelling of Workplace Hazardous Chemicals Code of Practice 2011 Managing Noise and Preventing Hearing Loss at Work Code of Practice 2011 Welding Processes Code of Practice 2013 Managing the Work Environment and Facilities Code of Practice 2011 How to Manage Work Health and Safety Risks Code of Practice 2011 Work Health and Safety Consultation, Co-operation and Co-ordination Code of Practice 2011

7 Administration

NOTE: Printed copies of this procedure are uncontrolled, and currency can only be assured at the time of printing.

7.1 Approval Details

Procedure Sponsor	Deputy Vice Chancellor, Services and Resources
Approval Authority	Deputy Vice Chancellor, Services and Resources

Consultation Committee	Health, Safety and Environment Advisory Committee (HSEAC)
Approval date	08/12/2017
Implementation date	08/12/2017
Date for next review	08/12/2020
Contact Unit	safety@jcu.edu.au

7.2 Revision History

Version	Date Amended	Description of changes	Author
17-1	08/12/2017	Procedure established	Drew Kleier, HSE Biological, Radiation and Chemicals Safety Advisor

8 Schedules

Not applicable

9 Appendices

9.1 Appendix 1: Occupational Hygiene Monitoring Program Overview