Health and Safety Guideline

HSG 8.4 Workplace Exposure Assessment

1. Purpose

This document provides guidance on the assessment of exposure to contaminants including any monitoring of the exposure to prevent or detect adverse health effects. Airborne contaminants include all substances for which there is a Workplace Exposure Standard.

2. Scope

This Guideline applies to all health, safety and wellbeing activities of staff, students, visitors (including volunteers and contractors), Council members, and other persons interacting with the University of Newcastle (workers); the operations of staff of University aligned Research Centres and controlled entities; and all activities conducted by or on behalf of the University of Newcastle on and outside of the University's campuses.

3. Guidelines

3.1. Overview

Where a substance is listed within SafeWork Australia Workplace Exposure Standards for Airborne Contaminants, and may place a worker at risk of exceeding the listed Workplace Exposure Standard, an assessment must be undertaken to determine likely levels of exposure, any controls and follow-up health monitoring or review requirements. The assessment must be undertaken by the leader or supervisor of the work area in consultation with the Health, Safety and Wellbeing Team and other relevant stakeholders.

Where the assessment identifies a potential risk of exceeding the exposure standard for the substance in question, further steps must be taken to further quantify the risk - via consultation with a Competent Person, or qualified Occupational Hygiene Consultant dependant on the level of complexity.

The results of a workplace exposure assessment, including results of exposure monitoring, may indicate that a worker must be included in the University's baseline Health Monitoring Program. If it is not possible to control the risk further, or because there is a prescribed need for health monitoring under the NSW Work Health and Safety Regulation (WHS Regulation), additional health monitoring may also be required. Further details regarding health monitoring requirements are outlined in Guideline HSG 8.5: Health Monitoring and Immunisation.

The overall process is intended to achieve an As Low As Reasonably Practicable (ALARP) results, whereby all exposures are kept at the absolute minimum as preference. The flowchart in Appendix 1 demonstrates the overall management process.

New and emerging hazards need to be considered in their own right (i.e. nanoparticles) as further advice become available.

3.2. Asbestos

The University will, as far as is reasonably practicable, ensure that persons at the workplace are not exposed to airborne asbestos. Where elimination of exposure is not possible, the University will, as far as reasonably practicable, minimise exposure. The management of asbestos risks in the facilities at the University will be managed in accordance with the Universities Hazardous Materials Management Plan.

All research and laboratory work where asbestos may be a risk due to the nature of the work will require special control design, awareness training as well as compulsory health monitoring, regardless of the exposure risk. Examples of these activities include:

- Crushing, grinding, milling or handling of ores that may come from known Naturally Occurring Asbestos (NOA) risk areas;
- Microscopic examination via, stereo microscopy, polarised light microscopy or electron microscopy;
- X-ray diffraction.

The risk of working with NOA should be identified as part of the risk assessment for the process and in consultation with publicly available sources.

For further detail consult KRA 3.3: Asbestos and Hazardous Materials Management.

3.3. Lead risk work

If University workers are required to work with Inorganic Lead as a part of their work, an assessment must be completed to determine whether the work is a lead process as defined within the WHS Regulation Part 7.2 Lead, Division 1, Clause 392.

If a Lead Process is identified that is likely to cause the blood lead level of worker to exceed:

(a) for a female of reproductive capacity—5µg/dL (0.24µmol/L), or

(b) in any other case—20µg/dL (0.97µmol/L),

Then the work will be considered Lead Risk Work and require health monitoring and notification to SafeWork in accordance with the WHS Regulation requirements.

3.4. Engineered Stone

The use, supply and manufacture of all engineered stone will be prohibited in NSW from 1 July 2024. Some exceptions will be made for the removal, repair, minor modification, and disposal of engineered stone products installed prior to the prohibition (legacy products), as well as appropriate exceptions for engineered stone products with trace levels of crystalline silica (under 1%).

3.5. Noise

Noise management has separate and specific requirements under the WHS Regulation as well as requirements for ongoing audiometric testing for affected workers. More specific information can be found within KRA 1.6 Noise Management.

3.6. Initial Characterisation and Qualitative Assessment

The first step in identifying sources of exposure is to inspect the work area and consider the nature and type of tasks performed. The assessment should aim to identify types of tasks and likelihood of exceeding the relevant exposure standard(s).

It is useful to identify broad processes within general areas to implement a set of working parameters around the types of exposures that may occur, including:

- Dust, respirable or inhalable, including dust contaminants such as heavy metals
- Welding/soldering fume;
- Asbestos;
- Ingestion / absorption risks;
- Hazardous substances, e.g. gas, vapour, liquid, solid;
- Noise;

- Vibration;
- Extremes of temperature;
- Non ionising radiation (UV, welding flash);
- Ionising radiation (alpha, betta, gamma, x-ray);
- Electromagnetic fields;
- Work with nanoparticles;
- Biological hazards.

Following the initial identification of the tasks and exposure sources, a high-level qualitative risk assessment must be performed.

3.6.1. Qualitative risk assessment

The qualitative risk assessment will be developed to identify where higher order controls are needed, or whether qualified professional advice and monitoring may be required.

To assess the risk, first determine the level of hazard with the substance. Substances classed Schedule 14 under the WHS regulation will have higher health risks and expected exposures associated with their use and should therefore be considered the highest risk materials. Carcinogenic or known health risks should also be factored into the assessment, which can be determined from the allowable exposure standards within SafeWork Australia Workplace Exposure Standards for Airborne Contaminants

Once the level of hazard is defined the following steps should be followed to give a general categorisation:

Exposure risks

- Does the task generate visible indicators for exposure (dust/fumes etc)
- Do workers currently wear Personal Protective Equipment (PPE) or Respiratory Protective Equipment (RPE) to mitigate exposures?
- Is decontamination and clean-up required after the process

  Note – This information can be found within the Safety Data Sheet for the material in use.

Frequency of suspected exposure

- How often is each task performed?
- How long is the task performed for?
- Do different tasks handle the same material?

- Is the work performed regularly on a shift basis, or in a transient nature. Does project work dictate that work has periods of extreme and low intensity?

The estimated exposure risk from the above, should be contextualised within the likelihood of exceeding the following thresholds of the exposure standard in accordance with the following levels:

- **Low Risk <10%** – Estimated exceedance of less than 10% of the stated exposure standard expected (based on an order of magnitude at 100% of the exposure standard). The risk is so minimal that exposure levels are likely to be very low.
  Examples
  - The substance is handled in small quantities, very infrequently and minimal opportunities for exposure occur.
  - The process has existing known controls that work by way of design and are industry standard with known performance levels.

Note – The above risk qualifications will be considered the only reasonable grounds for determining the certainty of not exceeding the exposure standard.

- **Medium Risk >10%, <50%** – Estimate exceedance of 10% of the stated exposure standard expected but below 50%. This is an area of unknown certainty and may or may not present a risk of exposure to workers due to somewhat elevated exposure opportunities.
  Examples
  - The substance is handled infrequently but is not necessarily well-controlled.
  - The controls do not appear to be completely effective due to observations of the process (dust, fumes or excessive noise produced).
  - An over reliance on PPE and RPE may be an indicator of uncontrolled risk
- **High Risk >50%** – Estimate exceedance of 50% of the stated exposure standard. Above 50% of the exposure standard, the process is not considered to be well controlled and may present a risk of exceeding the exposure standard in future.
  Examples
  - The substance is handled regularly, and not well controlled.
  - The controls do not appear to be effective due to observations of the process (dust, fumes or excessive noise produced).
  - An over reliance on PPE and RPE may be an indicator of uncontrolled risk

Where a risk of Medium or above is identified, there must either be further investigation (by engaging a consultant to advise and provide air monitoring) or by implementing further controls as necessary to reduce the risk level.

See Appendix 2 for qualitative exposure assessment matrix.

3.7. Airborne contaminant monitoring and Occupational Hygienist Support

In accordance with the WHS regulation, Air monitoring is to be carried out:

- if it is not **certain on reasonable grounds** whether the exposure standard is being exceeded or not, or
- if it is necessary to determine whether there is a risk to health.

Where the risk cannot be adequately controlled or the risk cannot be determined using known processes and qualitative risk assessment, it may be necessary to engage a consultant to provide air monitoring.

Exposure monitoring by the University must be undertaken by an independent and suitably qualified Occupational Hygiene Consultant based on the level of complexity of the process.

All consultants providing Occupational Hygiene services must have completed the Basic Principles of Occupational Hygiene Course or equivalent as recognised by the Australian Institute of Occupational Hygienists (AIOH).

Personal monitoring (on person) must be used to determine exposures. The use of static or “control” monitoring must only be used to assess whether controls are effective, or to locate specific key areas of risk. The methods used for monitoring must be consistent with relevant legislation, codes of practice and standards.

All samples must be analysis by a laboratory accredited for testing by the National Association of Testing Authorities.

Where air monitoring results reveal an exceedance of 50% of the exposure standard, further controls must be implemented to reduce the risk to the ALARP principle. Measured exposures of below 50% of the exposure standard are considered to be well controlled.

3.8. Gas monitoring

Where gases are installed in an area that has the potential to generate a hazardous atmosphere a risk assessment must be undertaken to identify potential exposure concentrations and the appropriate control measures. The University’s Guideline for the use of gases in Laboratories provide more information on gas monitoring requirements.

Where new activities require gas monitoring, this must be indicated in a Safety Review in tick@lab which will notify Health, Safety and Wellbeing Team and IFS of the requirement. See Guideline HSG 3.1: Health and Safety Risk Management for requirements.

3.9. Health monitoring requirements

Where a significant risk of exposure is identified and the risk cannot be controlled adequately, the worker must be included in the University background health monitoring program.

Workers will be deemed to be at significant risk of exposure if the qualitative exposure risk outcome is **Medium** or above.

Any air-monitoring results in excess of 50% of the exposure standard will be required to undertaken health monitoring if the risk cannot be adequately controlled.

Refer to HSG 8.5: Health Monitoring and Immunisation for more information.

3.10. Assessment and Report Record Management

Sampling, testing and monitoring reports and assessments must be kept in accordance with the University's Records Governance Policy and Guideline HSG 7.1: Health and Safety Records and Document Control.

4. Definitions

In the context of the Health and Safety Management System Framework:

Airborne Contaminant	A hazardous substance in the form of a fume, mist, gas, vapour or dust and includes micro-organisms.
Exposure Standard	The legally enforceable maximum allowable daily limit that a worker can be exposed to of any given substance measured in terms of the 8 hour TWA
TWA	Time Weighted Average – The average concentration of the substance over the given shift. A shift is given as 8 hours.
Respirable	Respirable particles are those less than 10µm in diameter which can remain suspended for days in air. Their extremely small size means they can be drawn deep into the lungs where they can cause damage and even be absorbed into the bloodstream. Respirable dust is not visible to the naked eye.
Inhalable	The larger portion of dust with a diameter of 100µm or less. Inhalable dust generally affects the upper respiratory system and is the visible portion of dust generated during disturbance works.

Ingestion Risk	The risk of ingesting a substance, usually inadvertently through poor hygiene practice e.g. eating or smoking after handling inorganic lead without thorough handwashing.
Absorption Risk	The risk of absorbing a substance through the skin's membranes. Many chemicals may have an absorptive element that may cause damage or ill health just by coming into contact with it.
Hazard	A situation, condition, or event, including a person's behaviour, that exposes a worker to a risk to their health or safety during the course of work in a workplace, that has the potential to cause injury, illness or even death or to damage buildings, plant or equipment.
Hazardous Substance	A substance that: (i) is included on the GHS Hazardous Chemical Information List published by the National Occupational Health and Safety Commission [NOHSC:10005(1994)], which can be found on the Safe Work Australia website; or (ii) has been classified as a hazardous substance by the manufacturer or importer in accordance with the Approved Criteria for Classifying Hazard Substances published by the National Occupational Health and Safety Commission [NOHSC:1008(1994)].
Health Monitoring	Involves periodic monitoring or assessment of a worker's health to ensure that the worker is not being harmed by the use of hazardous substances or other workplace exposures.
Leader / Supervisor	Any member of the University who is responsible for supervising staff and/or undergraduate or postgraduate students and/or for leading research projects.
Ototoxic substance	Is a substance that can cause hearing loss or exacerbate the effects of noise on hearing. They consist of industrial chemicals and some medications. Ototoxic substances absorbed into the bloodstream may damage the cochlea in the inner ear and/or the auditory pathways to the brain, leading to hearing loss and tinnitus. Hearing loss is more likely to occur if a worker is exposed to both noise and ototoxic substances than if exposure is just to noise or ototoxic substances alone.
Worker	Includes an employee, conjoint, student on work experience, contractor, sub-contractor, and volunteer. A person is a worker if the person carries out work in any capacity for the University or another person conducting a business or undertaking, including work as: (a) an employee, or (b) a contractor or subcontractor, or (c) an employee of a contractor or subcontractor, or (d) an employee of a labour hire company who has been assigned to work in the person's business or undertaking, or (e) an outworker, or (f) an apprentice or trainee, or (g) a student gaining work experience, or (h) a volunteer, or (i) a person of a prescribed class.

Personal monitoring (exposure monitoring)	Monitoring undertaken physically on the person being assessed. For air monitoring, includes sample collection within the breathing zone of the worker, to be worn for the duration of the shift.
Static air monitoring	Monitoring in a fixed location to determine presence of risk or to determine if controls are adequate. E.g. placing a monitoring adjacent to a piece of working equipment to measure the air immediately around (measuring containment).

5. Responsibilities

A comprehensive list of health, safety and wellbeing responsibilities is provided in the Roles and Responsibilities Guideline.

Specific responsibilities under this Guideline include:

Infrastructure and Facility Services (IFS)

- Responsible for consultation and review of mgt plan and consultation on infrastructure amendments / refurbishments;
- Consult with contractors in spaces where exposures may occur.

Supervisors and Leaders

- Carry out risk assessments to determine the potential for hazardous contaminants or exposures within their areas of responsibility.
- Ensure that where there is a use of a space, that may introduce a hazardous exposure that requires exposure assessment and that the appropriate monitoring is undertaken.
- Ensure that a program of ongoing exposure assessment and review is put in place where required.
- Ensure that health monitoring occurs as outlined in HSG 8.5 Health Monitoring.
- Take action to improve exposure controls where indicated by health monitoring or environment monitoring results.

Health, Safety and Wellbeing Team

- Facilitate the initial exposure assessment in consultation with the ARP and Precinct Advisors and support for requests in respect to the type of workplace exposure monitoring and identifying competent providers to undertake any workplace exposure monitoring.
- Obtain all reports and outcomes of workplace exposure monitoring to ensure that records are maintained appropriately.
- Determine and advise on assessments and regulatory requirements.

- Assist workers and Supervisors and Leaders with interpretation of surveillance outcomes.
- Provide input to identifying risk controls and improvements in exposure controls.
- Provide education and training where required to assist Leaders, Supervisors and workers to understand their responsibilities with respect to health surveillance.

Workers

- All workers must follow any directions of personnel performing workplace exposure monitoring.
- All workers must follow the direction of the University in relation to health surveillance requirements and participate in the health and safety risk management process including reporting of hazards identified and monitoring for ongoing improvements of risk controls.
- Complete questions relating to health surveillance and personal health monitoring during the recruitment process, or upon a role change when required.

6. References & Related Documents

The following documentation is referenced in, or applicable to this Guideline:

HSG 1.2: Roles and Responsibilities

HSG 3.1: Health and Safety Risk Management

HSG 7.1: Health and Safety Records and Document Control

HSG 8.5: Health Monitoring and Immunisation

KRA 1.6: Noise Management

KRA 1.7: Laboratory Safety

KRA 3.3: Asbestos Management

SafeWork Australia Workplace Exposure Standards for Airborne Contaminants (2022)

University of Newcastle Records Governance Policy

7. Amendment History

Version	Date of Issue	Approval	Section(s) Modified	Details of Amendment
1, 2	October 2016	Manager Health and Safety	-	Original version with latest amendment for HSG 4.2 Workplace Exposure Monitoring
3	July 2023	CPCO	All	1. Renumbered from HSG 4.2 to HSG 8.4 Workplace Exposure Monitoring 2. Updated all content in all sections including requirements of SafeWork Australia Workplace Exposure Standards for Airborne Contaminants (2022). Updated to include monitoring exposure of airborne contaminants including hazardous substances such as asbestos, coal dust, and crystalline silica, as well as hazards including noise and risks of potential exposures 3. Added new/renamed Related Documents 4. Added Amendment History 5. Amended document control header and footer
4	April 2024	CPCO	All	1. Renamed HSG 8.4 Workplace Exposure Assessment 2. Updated wording to meet requirements of assessment under the WHS Regulation 3. Inserted specific requirements for asbestos work and lead risk work 4. Insertion of a qualitative risk matrix process 5. Updated requirement for the ban on use of engineered stone 6. Insertion external consultant requirements 7. Added overarching management flowchart to appendices 8. Added risk assessment matrix to appendices

8. Appendices

Appendix 1 – Workplace Exposure Assessment Management Chart (pending)

Appendix 2 – Workplace Exposure Assessment Matrix (pending)