

EXPOSURE PREVENTION AND ASSESSMENT

Summary

Measures to prevent employee exposure to hazardous chemicals include the use of proper engineering controls, work practices, and protective equipment. Supervisors and principal investigators are required to maintain ready access to Material Safety Data Sheets and a complete chemical inventory must be included in their written safety plan. Periodic inspections of the work area for safe work practices and protective equipment use must be conducted. Industrial Hygiene conducts exposure assessment surveys of work areas to review safe work practices, to assess the potential for chemical exposure, and to recommend corrective action. OSHA requirements include air sampling for certain materials and circumstances, described in this section. Requests for surveys, which may include the collection of air or surface samples, can be forwarded to 515-4190.

Objective

The objective of the University exposure assessment program is to identify those areas where corrective action is needed to reduce employee exposure and/or where medical surveillance is necessary. This program also provides assistance to employees in the recognition, evaluation, and control of occupational health hazards. Increased worker awareness gained through this process should be useful in reducing employee exposure to hazardous materials.

Supervisor / Principal Investigator Responsibilities

1. Assure the properties of hazardous materials are understood by all employees
2. Assure MSDS are available and chemical inventories are up-to-date. Assure chemicals, which become more hazardous with age are discarded on an appropriate schedule.
3. Assure materials requiring exhaust ventilation are used in fume hoods, biological safety cabinets, or other Facilities- installed exhausted enclosures. See Exhaust Ventilation for Hazardous Materials section of this manual for assistance.
4. Assure appropriate protective clothing is used. See Protective Equipment section of this manual for assistance.
5. Assure appropriate work practices are followed. This includes prevention of ingestion of heavy metals, radioactive materials, or other internal hazards through properly identified work areas and regular cleaning of work surfaces. Proper handling and disposal of sharps (e.g. needles, etc) will reduce the risk of injection.
6. Review the Exposure Assessment Criteria section, listed below. Please contact Industrial Hygiene (515-4190) if your work area matches this criteria and if your lab has not had an exposure assessment conducted within the past year.
7. Contact Industrial Hygiene if questions or concerns arise regarding chemical handling or the effects of toxic or corrosive materials.

8. Implement corrective actions recommended by Industrial Hygiene through the work area health assessment program.
9. Provide a copy of air sampling results promptly to affected employees.

Industrial Hygiene Department Responsibilities

1. Industrial Hygiene will notify supervisors and/or principal investigators to coordinate work area health hazard assessments based on a review of lab safety plans.
2. Safety Plan chemical inventories will be reviewed prior to the assessment.
3. Health hazard assessments will include interaction with lab occupants and dissemination of written information (fume hood use, protective equipment)
4. Conclusions reached during the work area assessment will be used as the basis for recommendations for changes in work practices, engineering controls, protective equipment.
5. Work area health hazard assessments will also be used to determine whether air sampling is necessary or if medical surveillance of employees is necessary.
6. Health hazard assessments will be filed in the Environmental Health and Safety Center, referenced by safety plan number and work location.
7. A summary of findings will be forwarded to the principal investigator or work area supervisor for corrective action.

Exposure Assessment Criteria

The Industrial Hygiene Department uses the following criteria for prioritizing locations for exposure assessment. Supervisors / principal investigators should contact Industrial Hygiene if the following criteria apply to their work area:

1. Use of OSHA regulated materials, which require air sampling under specific conditions.
 - Laboratory Scale Use of Chemicals - "Lab Scale" means the laboratory use of containers, which are designed to be easily and safely manipulated by one person. OSHA requires air sampling of the materials listed below under "Non-laboratory scale" and for other OSHA regulated substances if there is "reason to believe" that exposure levels for that substance routinely exceed OSHA specified levels. "Reason to believe", as used above, includes the presence of visible emissions, uncontrolled odors, or the perception that adverse health effects have been experienced, which are associated with the materials in use. Principal Investigators of lab areas where these materials are in use should contact Industrial

Hygiene (515-4190) to determine if a review of the work area and air monitoring is needed.

- Non-laboratory scale use of the chemicals listed below typically require an initial assessment of exposure, regardless of whether there is "reason to believe" exposures may be exceeded. Persons involved in "non-laboratory scale" use of these materials should contact Industrial Hygiene for an exposure assessment.
- Asbestos - Asbestos-containing materials may not be used at NC State University. Construction and maintenance jobs may involve the disturbance of existing asbestos-containing building materials. This work may only be performed by specially trained personnel. Air sampling requirements are based on type of work performed.
- Vinyl Chloride -
- Inorganic Arsenic -
- Lead - This covers metallic lead, all inorganic lead compounds, and organic lead soaps. Sampling requirements may also apply to construction/maintenance activities where lead is disturbed.
 - Cadmium
 - Benzene
 - Cotton dust
 - Methylenedianiline
 - 1,2-dibromo-3-chloropropane
 - Acrylonitrile
 - Ethylene oxide
 - Formaldehyde
 - 1,3-butadiene

2. The following materials are considered to be cancer-causing materials, which are specifically regulated by OSHA. Use of these materials in labs is discouraged. Use outside of laboratories or use inside laboratories in greater than "lab scale" quantities (lab scale refers to the use of small containers) is not permitted. Lab use of these materials, where determined necessary by the Principal Investigator, must be conducted in a "designated area" which is specifically marked. Precautions against skin contact with these materials must also be clearly emphasized. Please contact Industrial Hygiene if you use any of these materials.

- 4-Nitrobiphenyl
- alpha-Naphthylamine
- Methyl chloromethyl ether
- 3,3-Dichlorobenzidine (and its salts)
- bis-Chloromethyl ether
- beta-Naphthylamine
- Benzidine
- 4-Aminodiphenyl
- Ethyleneimine
- beta-Propiolactone
- 2-Acetylaminofluorene
- 4-Dimethylaminoazobenzene
- N-Nitrosodimethylamine

3. Routine use of hazardous materials without the benefit of a fume hood or other exhausted enclosure. This would include operations where exhaust ventilation is not available (e.g. maintenance operations) or operations where exhaust is present, but the material is not used inside of an exhausted enclosure. Use of hazardous materials, which can cause chronic health effects and have poor warning properties (e.g. little odor at hazardous concentrations) would also be a priority for an exposure assessment.
4. When using hazardous materials, regardless of whether they are regulated by OSHA, and warning signs such as odors, visible emissions, or other indication of incomplete capture and exhaust are present

Please contact Industrial Hygiene for any questions or concerns regarding exposure to hazardous materials.