PURPOSE

Airborne hazards can take a variety of forms such as dusts, mists, vapors, fumes, etc. Some of these substances present an immediate threat to a teammate's health, while others may take decades before adverse health consequences are noted.
The primary focus of this written program is to provide guidance in the proper use of respirators. The intent of this document is educational, preventive and to fulfill the requirements for a written control plan required by the Occupational Safety and Health Act (OSHA), Title 29 of the Code of Federal Regulations, 1910.134. A copy of this written program shall be made available to any teammate upon request. This program shall be reviewed on an annual basis by the Safety Health and Environmental Department and updated as necessary to reflect current technology, situations unique to [COMPANY NAME] and regulatory requirements.

SCOPE

With respect to respirators, this program covers negative-pressure, air-purifying respirators. The following types of respirator are thus covered by this standard: disposable, cartridge, canister, quarter-mask, half-mask and full-faced. The primary hazard for this company is the occasional paint spray booths and certain welding operations in machine shops. This program does not cover self-contain breathing apparatus (SCBA), airline respirators, powered air-purifying respirators (PAPRs), or emergency and escape respirators. For specific requirements regarding these respirators, consult the Safety, Health and Environmental Department.

RESPONSIBILITIES

Corporate

- Endorsement of the written plan.
- Delegation of sufficient authority to the respective department heads involved, to effectively implement the plan.
- Appropriate the necessary resources required to effectively implement the plan.

Managers and Supervisors of Teammates Who Are Covered by the Respirator Protection Plan

- Assure that the authorized individual(s) receive all necessary training to enable them to safely wear a respirator.
- Assure that all necessary equipment and respirators to effectively protect the health and safety of the workers are provided and maintained in a good state of repair.
- Enforce the protection principles of the written control plan.

Safety, Health and Environmental Department

- Develop a written control plan and perform a periodic review to determine if revisions are necessary.

- Provide guidance and technical assistance to departments in the design and selection of appropriate engineering and administrative controls that will reduce the need for the use of respirators.
- Provide guidance and technical assistance to departments in the selection of the most appropriate types and quantities of personal protective equipment.
- Provide consultation to the departments to assist them in fulfilling their training needs.
- Serve as a campus liaison to the System-Wide Safety Office.
- Promote campus compliance with the OSHA Respiratory Protection Standard.
- Provide a means by which teammates can voice suggestions, complaints and concerns regarding the campus Respirator Protection Program.
- Identify, log, evaluate and make recommendations regarding those operations and locations requiring respiratory protection.

Teammate

- Participate willingly in all training programs offered by [COMPANY NAME] and learn as much as possible about the Respiratory Protection Program.
- Abide by all rules and apply to the fullest extent possible the safety and health precautions specified by [COMPANY NAME].
- Report to [COMPANY NAME] administration, through their immediate supervisor, any problems that are observed which could compromise health and safety.
- Maintain his or her respirator in a safe and sanitary condition.

DEFINITIONS

ANSI

The American National Standards Institute is an organization that develops standards (including health and safety).

HEPA

High efficiency particulate air filters. This refers to a filters ability to capture small particles. Some vacuum cleaners are called HEPA vacuums. These vacuum cleaners collect dusts while prevent very small particles from being discharged from the vacuum cleaner.

Micron

This is a unit of length in the metric system. There are one million microns in a meter. There are approximately 25,000 microns per inch.

Milligrams/cubic meter

A mass to volume ratio used to express airborne concentration of a particular substance or contaminant. It is often used to express concentrations involving dusts or fumes.

NIOSH

The National Institute of Occupational Safety and Health is the federal agency responsible for conducting research regarding occupational health and safety problems. NIOSH also publishes standards for health and safety and certifies respirators.

OSHA
The Occupational Safety and Health Administration: The federal agency responsible for promulgating and enforcing occupational health and safety regulations.
Parts per million (ppm)
A volume-to-volume ratio used to express airborne concentrations of a particular substance or contaminant. It is often used to express concentrations involving gases or vapor.
Permissible Exposure Limit (PEL)
These are airborne concentrations for various substances published by OSHA.

STATES OF MATTER

It is important to understand the physical states that airborne contaminants can take. Incorrectly identifying the contaminant in question can lead to an unacceptable selection. The following gives you a brief overview of the states of matter that contaminants can take. If you are unable to identify the correct physical state that the air contaminant takes, contact your Manager or the Safety, Health and Environmental Department.

Gas
A substance with is in the gaseous state at room temperature and pressure. Gases are normally formless fluids that occupy space and they can be changed into liquids or solids by the combined effects of increased pressure and decreased temperatures. Examples: argon, neon and nitrogen
Vapor
This is a gaseous form of a substance that is normally in a solid or liquid state under normal conditions. Vapors can be changed back into liquids or solids by increasing pressure or decreasing temperature. An example would be solvent vapors.
Dust
Solid particles generated by crushing, grinding, etc., of organic and inorganic materials. These airborne solid particles range in size from .1 to 25 microns. Examples include asbestos fibers; saw dust, lead, and silica.
Fumes
Solid particles generated by condensation from the gaseous state, generally after volatilization from molten material. The solid particles that make up a fume are extremely fine, usually less than 1.0 micron. An example would be welding fumes.
Smoke
Carbon or soot particles less than .1 micron in size which result from the incomplete combustion of carbonaceous materials such as coal or oil.
Mist
A loose term applied to dispersion of liquid particles, many of which are large enough to be individually visible without visual aid. Most is formed when a finely divided liquid is suspended in the atmosphere. An example would be an oil mist found in a machine shop.
Aerosol
A liquid droplet or solid particle dispersed in air that is a fine enough particle size (.01 to 100 microns) to remain so dispersed for a period of time.
Most airborne hazards found on campus are either a dust or vapor.

CONTROLS

Although the bulk of this plan covers respirators, it must be pointed out that they are considered the last choice with respect to controlling respiratory hazards. It may be necessary to use several control methods in combination to assure worker safety. The following controls are arranged in descending order, with the first being the preferred method of control.

The first control to consider, regarding a respiratory hazard, is substitution. Can a non-toxic or less toxic material be chosen? For example, is it possible to use latex paint instead of epoxy paint? Latex paint is generally considered to be less toxic than epoxy paint.

The second control method is local exhaust ventilation. Local exhaust ventilation captures the air contaminant at the source. In some cases, the source is at least partially enclosed. Examples of local exhaust ventilation include: a chemical fume hood, a ventilated welding booth, or a paint spray booth.

The third control method is administrative controls, or, as they are sometimes called, work practices. Work practices involve techniques to limit teammate exposure. Examples of work practices include: using wet mopping instead of dry sweeping to clean up a toxic dust, rotation of teammates so that no teammate is overexposed, and using a HEPA vacuum to clean up asbestos fibers.

The fourth control method is general dilution ventilation. This control method is acceptable only for sources that are of low toxicity and cannot be confined to a local exhaust hood. Examples of dilution ventilation include: opening doors and windows to increase air flow and/or fans to provide fresh air to the room, or conducting a spray painting operation outdoors.

The last line of defense is a respirator. Respirators are generally considered the least acceptable control methods. This fact is based on lack of acceptance among workers and the fact that they are often used incorrectly and poorly maintained.

RESPIRATOR SELECTION

Each affected teammate shall use a respirator when the first three choices for respiratory protection (substitution, local exhaust ventilation and general dilution ventilation) have failed to adequately control the airborne hazard. For specific questions your Regional Safety Professional. If the Manager or Supervisor is unsure of the nature of the hazard, then they must consult either their Regional Safety Professional or the Corporate Safety Manager.

APPROVED RESPIRATORS

Only approved respirators and associated equipment shall be used. An approved respirator shall be approved by NIOSH (National Institute of Occupational Safety and Health). Respirators may not be altered and parts (including filters) are not interchangeable between devices from different manufacturers.

DETERMINATION OF THE AIRBORNE HAZARD

The first consideration is to determine the substance involved and the state of matter it will take. See appendix number B for states of matter. When selecting a respirator filter (cartridge, canister, etc.) make sure the filter is appropriate for the hazard. For example, a filter acceptable for dust fumes and mists would not be acceptable to use when working with degreasing vapors.

The second question to answer is the volatility of the hazard involved. Solvents that evaporate rapidly, such as ether, can build up rapidly. Similar to volatility, is the temperature of the material generating the airborne hazard. For example, elemental mercury does not evaporate rapidly when exposed to the room temperature. However, if mercury is spilled on a hot surface, a relatively high (and toxic) concentration can develop.

The third consideration is the toxicity of the material involved. General nuisance dust such as drywall, wood dust (from soft woods), iron oxide and cellulose are relatively non-toxic. Check with your Regional Safety Professional if there are special considerations that are needed for specific situations.

The fourth consideration is the duration of exposure. If the airborne hazard is relatively non-toxic, and the expected exposure will be only a few minutes, then limited respiratory protection is necessary. On the other hand, acetylene torch cutting of lead pipes for several days would require respiratory protection.

The fifth consideration is whether or not the material affects the eyes. Some materials, such as ammonia, are strong irritants to the eyes and a full-face respirator, which includes eye protection, should be used.

The last consideration with respect to the airborne hazard is the concentrations. It may be necessary to conduct air sampling to determine the airborne concentrations. In other cases, estimates may be made based on professional judgment and past experience.

PROTECTION FACTORS

Ultimate negative-pressure, air-purifying respirators do not provide protection against all possible hazard situations. Once the airborne degree of hazard has been determined, the appropriate type of respirator must be selected.

Consult the respirator manufacturers' information regarding protection factors for each mask. As a general rule the following chart may be used for reference:

RESPIRATOR TYPE	PROTECTION FACTOR
Disposable fabric mask	5
Quarter-mask	5
Half-mask	10
Full-Face mask	100

The level of protection offered by these respirators is determined by multiplying the assigned protection factor by the OSHA Permissible Exposure Level. This figure is then compared to the actual airborne concentration. Two examples are provided below:

Example I
A worker is exposed to 50 parts per million (ppm) of Benzene. Benzene has a Permissible Exposure Level (PEL) of 10 ppm. The worker wants to use a half-mask, air-purifying organic vapor cartridge respirator.
Will this type of respirator be acceptable?

10	(Protection factor for half-mask respirator)
X 10	(PEL of 10 parts per million for Benzene)
100	(Max. permissible safe concentration for this situation)

Yes, it is acceptable to use this type of respirator. The airborne concentration is 50 ppm, however this mask is good up to 100 ppm, or twice the expected concentration.

Example II
A worker will be exposed to 600 micrograms per cubic meter of lead during a paint removal operation. Lead dust has a Permissible Exposure Level (PEL) of 50 micro grams per cubic meter.
The worker wants to use a disposable, air-purifying, high efficiency particulate air (HEPA) respirator. Will this type of respirator be acceptable?

5	(Protection factor for a disposable mask)
X 50	(PEL of 50 micrograms/cubic meter for lead)
250	(Max. permissible safe concentration for this situation)

No, this respirator is not acceptable for situation. The airborne concentration is 600-micrograms/cubic meter and this respirator is rated for a maximum of 250 micrograms per cubic meter for lead. Best choice - choose a full-face air-purifying respirator with HEPA filters.