11 OCCUPATIONAL HEALTH WRITTEN PROGRAMS (INDUSTRIAL HYGIENE)

11.1 OCCUPATIONAL HEALTH (INDUSTRIAL HYGIENE) PROGRAM

11.1.1 PURPOSE

The purpose of this program is to provide a framework for the anticipation, recognition, evaluation and control of workplace exposures to hazardous chemical, biological and physical agents.

11.1.2 SCOPE

A comprehensive Occupational Health Program will be implemented that addresses hazards at each facility or location where employees perform tasks. Other DMB Programs must be consulted in conjunction with this program to address specific hazards. These include the Hearing Conservation Program, Respirator Program, Lead Program, Bloodborne Pathogens, Personal Protective Equipment and the Asbestos Program.

11.1.3 RESPONSIBILITIES

11.1.3.1 Safety and Health Coordinator

- Administer the Occupational Health Program.
- Assure exposure assessment and monitoring activities are conducted.
- Communicate and document notification of monitoring and exposure information to employees, including the potential health effects and personal protective equipment and practices to avoid or reduce exposure potential.
- Provide engineering and administrative guidance to effect control strategies for situations where overexposures would otherwise occur.

11.1.3.2 Supervision

- Work with the Safety and Health Coordinator to identify hazards.
- Develop and implement safe work requirements and engineering controls to eliminate or reduce exposures to acceptable levels.

11.1.3.3 Employees

- Follow established procedures and guidelines, and safe work requirements.

- Report health hazards to supervision.

11.1.4 REQUIREMENTS

11.1.4.1 Exposure Assessment Strategy

An exposure assessment strategy is necessary to systematically identify and evaluate recognized hazards associated with operations or locations in the workplace. Below are the goals for the strategy:

1. To assess potential health risks faced by all workers, to differentiate between acceptable and unacceptable exposures, and to control unacceptable exposures.

2. To establish and document a historical record of exposure levels for all workers and to communicate exposure-monitoring results to each worker.

3. To ensure and demonstrate compliance with governmental and other exposure guidelines established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the National Institute of Occupational Safety and Health (NIOSH).

4. To accomplish the above goal with efficient and effective allocation of time and resources.

11.1.4.2 Recognition

The following activities should be carried out at each facility or location:

1. Develop an inventory of all hazardous chemicals, biological and physical agents used or encountered at the facility or location.

2. Identify tasks, activities or operations that present the potential for exposure to hazardous agents.

3. When hazardous agents such as lead, asbestos, noise, and bloodborne pathogens are identified – the appropriate DMB written program must also be consulted. For example, the *Hearing Conservation Program* must be used to address hazards associated with noise.

11.1.4.3 Evaluation

1. For each potential hazard identified, gather objective data to determine the level of exposure.

2. The evaluation of exposure can take place in one of several forms:
   a. Industrial Hygiene Monitoring
   b. Historical data
   c. Industry data
   d. Calculations or empirical formulas

11.1.4.4 Control

If the hazard identified is found to be above acceptable limits established by OSHA, ACGIH or NIOSH, the appropriate level of controls must be implemented. The hierarchy of controls is:

1. Substitution/Elimination – For chemical substances that are associated with serious health effects, every effort should be made to replace the substance with one of lower toxicity.

2. Engineering Controls – Examples include ventilation, modification to equipment, enclosures, etc.

3. Workpractice Controls – This includes modifying procedures to control exposure.

4. Personal Protective Equipment – *See Section 10.9 "DMB Personal Protective Equipment Program"*.

11.1.5 REFERENCES

For additional information regarding requirements relating to employee exposures to occupational hazards refer to MIOSHA, General Industry Standard Part 1 "General Provisions" and MIOSHA Department of Occupational Health, General Industry Standards R 325.51101-51108 "Permissible Exposure Limits".

11.2 ASBESTOS

11.2.1 PURPOSE

The requirements stated within this written program are established to prevent inhalation of asbestos fibers to employees who are required to work in areas in which there may be exposure to asbestos.

11.2.2 SCOPE

The requirements herein apply to any DMB employee with a job that consists of working in areas in which there may be exposure to asbestos fibers.

11.2.3 DEFINITIONS

Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of those minerals that have been chemically treated and/or altered.

Actinolite means a calcium magnesium iron silicate is rarely used in industry.

Amosite means a fibrous variety of the mineral grunerite, a ferrous magnesium silicate, which readily breaks down into harsh fibers brownish yellow to white in color.

Anthophyllite means a magnesium silicate with fragile brownish white fibers.

Asbestos Containing Material (ACM) means any material containing more than 1% asbestos.

Chrysotile means the fibrous form of the mineral serpentine. It is the most common variety of asbestos and is widely used.

Crocidolite means the fibrous form of riebeckite, and has fibers of a blue color

Employee Exposure means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Fiber means a particulate form of asbestos 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Friable means to become airborne.

High-Efficiency Particulate Air (HEPA) Filter means a filter capable of trapping and retaining at least 99.97 percent of 0.3-micrometer diameter mono-disperse particles.

Homogeneous Area means an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial Hygienist means a professional qualified by education, training and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

PACM means presumed asbestos containing material.

Presumes Asbestos Containing Material (PACM) means thermal system insulation and surfacing material found in buildings constructed no later than 1980.

Regulated Area means an area established by the DMB to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed.

Surfacing ACM means surfacing material, which contains more than 1% asbestos.

Surfacing Material means material that is sprayed, trawled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other material on surfaces for acoustical, fireproofing, and other purposes).

Thermal System Insulation (TSI) means ACM applied to pipes, fittings, boilers, breaching, tanks, ducts or other structural components to prevent heat loss or gain.

Thermal System Insulation ACM means thermal system insulation, which contains more than 1% asbestos.

Tremolite means calcium magnesium silicate and is often a major component of industrial talc.

11.2.4 RESPONSIBILITIES

11.2.4.1 Management

- Instruct the employee on exposure to asbestos or asbestos containing materials and required safeguards necessary to protect the employee from exposure.
- Institute engineering controls and work practices necessary to reduce and maintain employee exposure below harmful limits.
- Train employees on how to inspect, use, and properly maintain personal protective equipment (respirators and protective clothing) where applicable.
- Monitor areas where there is exposure or suspected exposure to asbestos or asbestos containing materials.
- Keep and maintain proper records on any monitoring or medical surveillance relating to asbestos exposure.

11.2.4.2 Employee

- Understand the requirements relating to exposure to asbestos or asbestos containing materials.
- Use proper personal protective equipment and clothing when necessary.
- Do not eat or drink in any area known to contain asbestos material that may be friable.
- Follow procedures, guidelines and safe working requirements established for working in and around asbestos.

11.2.5 REQUIREMENTS

11.2.5.1 Permissible Exposure Limit (PEL)

Most exposure limits for asbestos are based on the airborne concentration of the material over an eight-hour work shift. Different exposure limits require different actions to ensure safety, up to and including protective equipment and regulated work areas in cases of elevated exposure.

1. The Action Level is a relatively low concentration of fibers – anything above 0.1 fiber per cubic centimeter. It is not a danger level, but a warning that certain preventive steps must be taken.
2. The Permissible Exposure Limit (PEL) is the level at which specific protective measures are required. Areas in which asbestos concentrations exceed the PEL become Regulated Areas, and require respiratory protection for workers.

Management will ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight hour time-weighted average (TWA).

No employee will be exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of 30 minutes.

11.2.5.2 Exposure Assessments & Monitoring

DMB will perform exposure monitoring to accurately determine airborne concentrations of asbestos. Exposure monitoring is used to measure asbestos concentrations periodically in your work areas. If concentrations reach or exceed the PEL, management is required to take further steps to protect you from asbestos exposure.

1. Determination of employee exposure must be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

2. Representative 8-hour TWA employee exposures must be determined on the basis of one or more samples representing full-shift exposures for each shift for each employee in each job classification in each work area.

3. Representative 30-minute short term employee exposures must be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

DMB will establish and maintain an accurate record of objective data to determine that products made from or containing asbestos are not capable of releasing asbestos fibers in concentrations at or above the permissible exposure limit (PEL).

Where the DMB has relied upon objective data that demonstrate that asbestos is not capable of being released in airborne concentrations at or above the TWA permissible exposure limit and /or excursion limit under expected conditions of use, then no initial monitoring is required.

11.2.5.3 Respiratory Protection

Where respiratory protection is required, the Safety and Health Coordinator will institute a respirator program in accordance with *Section 11.7 "Respiratory Protection"*.

11.2.5.4 Housekeeping

1. All surfaces must be maintained as free as practicable of ACM waste and debris and accompanying dust.

2. All spills and sudden releases of material containing asbestos must be cleaned up as soon as possible.

3. Surfaces contaminated with asbestos may not be cleaned by the use of compressed air.

4. Vacuuming. HEPA-filtered vacuuming equipment must be used for vacuuming asbestos containing waste and debris.

5. Shoveling, dry sweeping and dry clean up of asbestos may be used only where vacuuming and/or wet cleaning are not feasible.

6. Wiping surfaces with a wet sponge, brush or cloth and then vacuum with a HEPA vacuum will prevent dispersion of dust.

7. Waste disposal. Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with asbestos consigned for disposal, must be collected, recycled and disposed of in sealed impermeable bags, or other closed, impermeable containers.

11.2.5.5 Medical Surveillance

The Safety & Health Coordinator will be responsible for establishing a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the TWA and /or excursion limit.

11.2.5.6 Recordkeeping

Safety & Health Coordinator must keep an accurate record of all measurements taken to monitor employee exposure to asbestos.
This record must include at least the following information:

1. The date of measurement.
2. The operation involving exposure to asbestos which is being monitored.
3. Sampling and analytical methods used and evidence of their accuracy.
4. Number, duration, and results of samples taken.
5. Type of respiratory protective devices worn, if any.
6. Name, social security number and exposure of those employees whose exposure is representative.
7. The DMB must maintain these records for at least 30 years.

11.2.6 TRAINING

Information and training programs are required for anyone who may be exposed to asbestos. These programs show how to reduce the risk of exposure and how to work safely in areas which may contain asbestos. The level of training required is determined by the specific nature of the operations performed by a given worker.

Employees need to be instructed on the hazards associated with asbestos, the work practice controls need for protection from exposure to asbestos and the proper use of personal protective equipment that may be necessary when exposed to asbestos. Training should consist of information contained within this work practice requirement and other information related to exposure of asbestos materials occurring at the work site. Instruction can be on-the-job or classroom or a combination of both. The trades' supervisor must retain training documentation.

11.2.7 REFERENCES AND APPENDICES

For additional information on analytical methods, fit testing, respirator usage, mandatory medical questionnaires, medical surveillance, and specific information on asbestos and health hazard data refer to MIOSHA, Occupational Health R325.51311-51312 "Asbestos for General Industry" and Construction Safety Standards R325.51301-51302 "Asbestos Requirements".

Appendices:
A. Asbestos Awareness

11.2.7.1 Appendix A - Asbestos Awareness

11.2.7.1.1 Introduction

For years asbestos was used for insulation, fireproofing and soundproofing in offices, homes and theaters around the country, as well as a host of other applications. In recent years, however, asbestos has been found to cause chronic and often-fatal lung diseases, including asbestosis and certain forms of lung cancer.

To help protect you, the Occupational Safety and Health Administration (OSHA) has established standards for asbestos exposure. These standards do not just protect people who work directly with the material. They are also intended for those who work in buildings containing products, which may release asbestos fibers. This Safe Work Practice was developed to create an increased awareness among DMB employees regarding the hazards of asbestos.

11.2.7.1.2 Understand Asbestos

Asbestos is a naturally occurring family of minerals formed by combinations of magnesium and silicon. These minerals take the form of hollow, microscopic fibers, which are nearly indestructible and can be densely packed making a tough, flexible and very useful material.

Asbestos is most common in two forms:

1. **Chrysotile** – or white asbestos – used as insulation, fireproofing and soundproofing.

2. **Amosite –** or brown asbestos – used in high-friction applications such as brake shoes and clutches.

Bonded together, asbestos fibers pose little hazard. If they are released, however, the fibers can break down to sizes as small as five microns – five millionths of a meter – in length. These tiny fibers are what makes asbestos so dangerous.

11.2.7.1.3 Asbestos Hazards

When asbestos fibers are inhaled, they can enter your lungs and lodge in tiny air sacs called “alveoli”. It is through these air sacs that oxygen enters the blood and carbon dioxide is removed. When asbestos fibers enter the alveoli, they irritate the thin alveoli membrane, leaving scar tissue which oxygen cannot penetrate. This condition is called asbestosis. As more and more of the alveoli are affected, oxygen starvation sets in, resulting in severe disability or death.

Another area that can be affected is the pleura – the membrane lining the lungs. Asbestos fibers may migrate from the lungs into the pleurae and cause a rare form of cancer called malignant mesothilioma.

There are no warning signs that asbestos is causing problems in your body. It doesn't have any acute or short-term symptoms. In fact, many harmful effects do not appear for 20 years or more.

Smoking can further increase the risk from asbestos exposure. Asbestos fibers may irritate the lungs, making them even more sensitive to the risk of cancer from cigarette smoke.

11.2.7.1.4 Asbestos Locations

Asbestos can be found in many places and many forms. Some of them include:

1. Ceiling and floor tiles
2. Fireproof drywall
3. Fireproof drapes and curtains
4. Pipe insulation
5. High-temperature gaskets
6. Sprayed-on fireproofing on metal beams and columns

11.2.7.1.5 Asbestos Regulations

MIOSHA regulations are designed to protect you from exposure to dangerous concentrations of airborne fibers.

Regulations are based on the amount of asbestos you work with, the location of the material and the likelihood that its fibers will break loose and become airborne – also known as its "friability."

1. Friable asbestos can be reduced to powder by hand pressure when it is dry. Sprayed-on asbestos insulation falls into this category.

2. Non-friable asbestos is usually found bonded into other materials. Its fibers are harder to break down into powder, but can still be released by cutting grinding or sanding.

11.2.7.1.6 Action Level

The Action Level triggers several preventive measures to protect you from asbestos hazards. These measures include:

1. Exposure monitoring
2. Medical surveillance
3. Information and training programs

Medical surveillance is used to determine your actual exposure to asbestos. Your employer will provide medical exams periodically at no cost to you, and the exam is limited to asbestos-related conditions.

11.2.7.1.7 Who Is At Risk?

Everyone may be. You don't have to work directly with asbestos to be at risk from exposure. You may also be exposed to asbestos if you work in a building that contains the material.

Your risk increases if:

1. You are engaged in maintenance or cleanup activities in areas containing asbestos.
2. Your work area contains friable asbestos, such as sprayed-on insulation.
3. You work near a construction or renovation area, which contains asbestos.

11.2.7.1.8 Protecting Yourself

Here are some important points for working in areas which may contain asbestos:

1. Never drill holes in asbestos ceiling tiles or drywall.
2. Never cut through pipes you suspect may be coated with asbestos.
3. Don't sand asbestos-containing floor tile, or scrape it while moving furniture.
4. Don't use ordinary vacuum cleaners to pick up asbestos-contaminated waste. This requires a specially filtered vacuum.
5. Don't dust in asbestos-contaminated environments with brushes or brooms.
6. Don't remove ceiling tiles below asbestos-containing materials without respiratory protection.
7. If you have questions regarding asbestos, please contact your supervisor or the DMB Safety and Health Coordinator.

11.2.7.1.9 Follow Warnings

1. Asbestos warning signs and labels appear wherever there is the risk of exposure.
2. Warning signs are placed at all entrances to regulated areas. These signs state that respiratory protection is required.
3. Pipes, insulation and any other materials containing asbestos are clearly labeled.
4. Asbestos waste must be sealed in airtight containers and labeled.
5. Some products, which replace asbestos, such as pipe insulation, are specially marked to show that they are free of asbestos.

11.3 BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

11.3.1 PURPOSE

The purpose of this written program is to reduce the potential for contact with and transmission of bloodborne pathogens and to provide a safe working environment for all employees. This will be accomplished through the adoption and implementation of an exposure control plan.

11.3.2 SCOPE

It is the designated manager's responsibility to implement the requirements of this program when it applies to their operations. The specific work areas within the Department of Management and Budget that have been identified as required to have a Bloodborne Pathogen Exposure Control Plan are the Health Screening Division and Mail and Delivery Services. When other DMB locations require first aid and CPR training for employees to satisfy the requirements of other standards (i.e., Confined Space or Electrical Power Transmission & Distribution) the requirements set forth in the Bloodborne Pathogens standard are applicable to those groups of affected employees. The Health Screening Division will maintain a more detailed exposure control plan within their operation.

11.3.3 DEFINITIONS

Blood means human blood, human blood components, and products made from human blood.

Bloodborne Pathogens means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Category A Employee means employee occupations where potential contact with infectious materials may be possible.

Category B Employee means employee occupations where potential contact with infectious material is unlikely.

Contaminated means the presence or the reasonably anticipated presence of blood or other potentially infectious material on an item or surface.

Decontamination means the use of physical or chemical means to remove, inactive, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Disinfect means to inactivate virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms, or inanimate objects.

Engineering Controls mean controls that isolate or remove the bloodborne pathogen hazard from the workplace.

Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that with blood or other potentially infectious materials may result from the performance of an employee's duties. This definition excludes: incidental exposures that may take place on the job, and that are neither reasonably nor routinely expected and that the worker is not required to incur in the normal course of employment.

Exposure Incident means a specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other potentially infectious material that results from the performance of an employee's duties.

Other Potentially Infectious Materials (OPIM) means pathogenic microorganisms that are present in body fluids other than blood.

Personal Protective Equipment (PPE) means specialized clothing or equipment that is worn by an employee to protect him or her from a hazard. General work clothes, such as uniforms, pants, shirts, or blouses, that are not intended to function as protection against a hazard are not considered to be personal protective equipment.

Regulated Waste means any of the following:

- Liquid or semi-liquid blood or other potentially infectious material.
- Contaminated items that would release blood or other potentially infectious material in a liquid or semi-liquid state if compressed.
- Items that are caked with dried blood or other potentially infectious material and which are capable of releasing these materials during handling.
- Contaminated Sharps.
- Pathological and microbiological waste that contains blood or other potentially infectious material.

Source Individual means any living or dead individual whose blood or other potentially infectious material may be a source of occupational exposure to an employee.

Universal Precautions mean a method of infection control that treats all human blood and other potentially infectious material as capable of transmitting HIV, HBV, and other bloodborne pathogens.

Work Practices mean controls that reduce the likelihood of exposure to bloodborne pathogens by altering the manner in which a task is performed.

11.3.4 RESPONSIBILITIES

11.3.4.1 Management

A designated manager will be responsible for implementation and monitoring of the exposure control plan in operations where employees have occupational exposure to blood and other potentially infectious material.

The DMB Safety and Health Coordinator will provide guidance and support to affected work units to assist in program implementation.

The Safety and Health Coordinator (SHC) will serve as the "designated infection control officer" for the department. In this capacity, the Safety and Health Coordinator will have the following responsibilities for assisting the managers in the implementation of the Bloodborne Pathogen Exposure Control Plan.

- Develop and implement an HBV immunization program in conjunction with a qualified physician and healthcare facility.
- Develop and implement a post-exposure program in conjunction with a qualified physician and healthcare facility.
- Provide support and assistance to others involved in implementing the Exposure Control program.
- Maintain the confidentiality of all medical and exposure records.

Designated managers will be responsible for infection control in their respective areas. They have the primary responsibility to identify and maintain a list of Category A and B employees, job classifications and job tasks, which may require inclusion in this program. This information will then be shared with the DMB Safety and Health Coordinator for a final applicability determination. Designated managers will work directly with the DMB Safety and Health Coordinator to ensure that proper infection control procedures are followed and significant exposures documented. The DMB Safety and Health Coordinator will maintain a list of these designated managers.

11.3.4.2 Employee Responsibilities

As with all operations, employees have the most important role for implementing this infectious disease control compliance program. The ultimate application of this Infection Control Plan lies within their responsibility. In this role they must:

- Know what tasks they perform have potential occupational exposure.
- Know and follow the exposure control plan outlined in the Plan.
- Plan and conduct all operations in accordance with the work practice controls.
- Report any suspected occupational exposure to infectious disease to their immediate supervisor.
- Wear required personal protective equipment.

11.3.5 REQUIREMENTS

11.3.5.1 Universal Precautions

The concept of universal precautions, as developed by the Center for Disease Control is that all human blood, body fluid and tissue be treated as if known to be infected with HIV, HBV and other bloodborne pathogens or infectious diseases.

As the potential for exposure is present within certain operations or tasks, employee awareness and education in the risks associated with bloodborne pathogens will be an initial step in controlling the spread of infectious disease.

1. Avoid unnecessary contact with human blood or other potentially infectious material.

2. Practice good personal hygiene through washing and disinfecting hands or other skin surfaces immediately should exposure occur.

3. Report any exposure incidents to the designated manager immediately.

4. Implement the universal precautions as well as standard methods of compliance for operations in which all or specific employee job classifications have an anticipated occupational exposure.

11.3.5.2 Methods of Compliance

11.3.5.2.1 Personal Protective Equipment

It is required that appropriate personal protective equipment must be used by all identified personnel when administering first aid, CPR or other activities which represent potential contact with bloodborne pathogens. If exceptions are made to the use of Personal Protective Equipment, the exception must be documented on an Employee Exposure Report.

1. Follow Universal Precautions (UP) at all times to prevent contact with blood or OPIM. All procedures involving blood or other potentially infectious materials (OPIM) must be performed to minimize splashing, spraying, splattering, and generation of droplets of these substances.

2. Provide appropriate Personal Protective Equipment (PPE) such as disposable latex gloves, disposable gown, goggles, and pocket mouth-to-mouth devices at no cost to affected personnel.

3. Use latex gloves or suitable equivalent whenever hand contact with blood, OPIM, mucous membranes, non-intact skin, and/or touching contaminated items or surfaces is expected.

4. Use disposable gowns, masks, eye shields, or goggles if at risk from splash or spray with body fluids.

5. Remove all PPE prior to leaving work area and place PPE in designated area or container for storage, washing, decontamination, or disposal.

6. Maintain all PPE and replace whenever necessary. Management will be responsible for cleaning, laundering, replacing, and disposing of all PPE.

Designated managers will be responsible for the maintenance, storage and replacement of PPE.

11.3.5.2.2 Personal Hygiene Facilities

1. Hand-washing facilities will be readily accessible to employees. Antiseptic hand cleaners or towelettes can be used if hand-washing facility is not accessible. Wash hands with soap and running water as soon as possible after using towelette.

2. Employees must wash hands immediately after removal of gloves or other PPE and following contact with blood or OPIM.

3. If employees incur exposure to their skin, eyes, or mucous membranes, those areas shall be washed or flushed with water as soon as feasible following contact. Eyes shall be flushed for 15 minutes with running water or an eye basin when available.

11.3.5.2.3 Hepatitis B Vaccination

1. Hepatitis B Vaccine will be made available to all employees identified in the exposure determination and to all employees who have an Exposure Incident (EI).

2. The vaccine will be available at no cost to employees and given under the supervision of a licensed healthcare professional. If the U.S. Public Health Service recommends routine immunization boosters at a future date, free vaccinations will be made available to all employees.

3. Health Care Professional will be provided with copy of Bloodborne Pathogens Regulations.

4. Employees may initially decline immunization by signing the attached statement form (*see Appendix A "Vaccination Declination"*) and can choose to accept the immunization at a later date.

5. DMB may postpone the administration of the Hepatitis B vaccine for employees who have been trained in First Aid/CPR and rendering first aid is a "collateral" duty.

11.3.5.2.4 Storage and Disposal of Contaminated Materials

First aid, medical personnel and employees who are required to complete bloodborne pathogen training are required to follow the guidelines below:

1. Eating, drinking, smoking, handling of contact lenses, etc. are prohibited in work areas where there is a likelihood of exposure to contaminated materials.

2. Place all Regulated Waste (RW) in suitable containers, which meet the following criteria:
   a. Closeable
   b. Leak-proof for handling, storage, transport, and shipping
   c. Labeled (BioHazard and color-coded red).

3. Utilize a local medical waste disposal company to dispose of all Regulated Waste.

11.3.5.2.5 Housekeeping

It is important to ensure that any personnel who may come in contact with potentially infectious materials are suitably trained. This includes any janitorial service whether DMB employees or contract services. The following practices apply to the disinfecting of an exposure incident by trained personnel:

1. Clean with hot soapy water and decontaminate all equipment, environmental areas and work surfaces immediately after contact with blood or OPIM.

2. Use a chemical germicide or household bleach, 1:10 or 1:100 solution for decontamination. (i.e., 1 part Bleach to 100 parts of water - approximately 1/4 cup bleach per gallon of tap water. Dispose of these materials as indicated for Regulated Waste.

3. Health screening sites will be decontaminated daily. All non-porous (tile, cement, etc.) floor surfaces will be scrubbed as per the cleaning solution directions. Once per week floors shall be disinfected with a 10% bleach solution, followed by two clear water rinses.

4. Any broken glass and/or needles will be swept up with a broom and dustpan and placed in a Sharps Container. Broken glassware and needles are <u>not</u> to be picked up directly with the hands (whether gloved or ungloved.)

11.3.5.2.6 Exposure Determination

A key element in implementing this exposure control plan is to determine which departments, job classifications, regulatory requirements and public exposure situations DMB personnel may encounter.

In DMB, all department operations should be consistently evaluated for the potential of employee exposure to Bloodborne Pathogens or other infectious material. Operations in DMB that may have potential exposure are:

1. Emergency and/or First Aid Response Team Members
2. Employees in the Health Screening Division (OSE)
3. Mail and delivery

Employees serving in these capacities may be exposed to blood or Other Potentially Infectious Materials (OPIM) if and when responding to an accident at the facility involving a traumatic injury, or in performing their assigned job duties.

11.3.5.3 Post Exposure Evaluation & Follow-up

When an employee incurs an exposure incident, it must be reported immediately to the designated manager. The exposed employee will have a confidential medical evaluation and follow-up, which will include:

1. Completion of the Exposure Incident Report Form within 24 hours. An informational copy will be forwarded to the DMB Safety Health Coordinator. *See Appendix B, "Exposure Incident Report Form".*

2. Identification and documentation of the Source Individual, unless prohibited by state or local law.

3. Test the Source Individual's (SI) blood as soon as consent is obtained (if legally required) to determine HBV and HIV status. If consent is not obtained, document. When law does not require the SI's consent, test the SI's blood (if available) and document the results. When the SI is already known to be HIV or HBV positive, testing is not necessary. This information can be communicated to the exposed employee, if permitted by state and local law, or with consent of the SI. *See Appendix C " Source Individual Consent Form".*

4. Inform the exposed employee of SI's test results. Inform employee of laws and regulations concerning confidentiality and disclosure of the identity and infectious status of SI.

5. Test the exposed employee's blood for HBV and HIV as soon as written consent is obtained. If consent is given for HBV testing but not for HIV testing, the exposed employee's blood specimen will be maintained for 90

days (stored at external Clinical Laboratory Site). If employee decides to have a baseline test done within the 90-day period, it will be completed as soon as possible. *See Appendix D, "Employee Consent Form".*

6. Provide post-exposure treatment when medically indicated and as recommended by the U.S. Public Health Service.

7. Provide the employee with counseling and evaluation of reported illnesses.

8. After obtaining consent from involved employee(s), provide the Health Care Professional evaluating the employee(s) after an exposure incident with the following information:
   a. A copy of the MIOSHA regulation R325.7001-7014 Bloodborne Infectious Diseases.
   b. An Exposure Incident Report Form*.
   c. Source Individual's test results*.
   d. Medical records relevant to appropriate treatment of exposed employee.

11.3.5.3.1 Interaction with Healthcare Professionals

The Healthcare Professional responsible for the medical evaluation will furnish the designated manager or DMB Safety and Health Coordinator with a written opinion within 15 days of completion of the evaluation. *See Appendix E, "Evaluating Physician Form".* Written opinions will be obtained in the following instances:

1. When the employee is sent to obtain the Hepatitis B vaccine.

2. Whenever the employee is sent to any Healthcare Professional for consultation following an exposure.

Healthcare Professionals shall be instructed to limit their written opinions to:

1. Whether the Hepatitis B vaccine is indicated and if the employee has received the vaccine, or the evaluation of results.

2. That the employee has been informed of the evaluation results and of any medical conditions resulting from exposure.

All other findings must be held confidential and must not be included in the report.

At work locations where employees have exposure, designated managers will be responsible for the Post Exposure Evaluation and follow-up, unless prohibited by state or local law with respect to Source Individual's identity and/or test results.

11.3.5.4 Recordkeeping

11.3.5.4.1 Medical Records

Medical Records for all employees exposed to blood or OPIM in DMB will be kept for the duration of employment plus 30 years. These records will be kept in a confidential manner and will not be disclosed or reported without the employee's express written consent, except as required by regulation or by law.

These records will include the following information.

1. Name and job title of employee.
2. Employee Social Security number.
3. Hepatitis B vaccination status with date.
4. The results of any examination(s).
5. Medical testing and follow-up procedures if employee was exposed.
6. A copy of the health care provider's written opinion, if applicable.
7. A copy of the information provided to the health care provider, if applicable.

The Human Resource Office will be responsible for maintaining medical records. The Health Screening Division will maintain their employee medical records.

11.3.5.4.2 Training Records

The designated manager of affected work units must maintain records of training for a minimum of three (3) years. These training records will include the following:

1. Names of the trainer(s).
2. Qualifications of the trainer(s).
3. Date of training.
4. Summary or outline of the specific topics covered.
5. Names and job titles of employees attending the training.

See Appendix F, "Employee Training Record".

11.3.5.4.3 Availability of the Exposure Control Plan to Employees.

To assist employees in implementing the plan, it will be available to all personnel at any time. Personnel will be advised of this availability during their education/training sessions. Copies of the exposure Control Plan are maintained at the following locations:

1. DMB Safety and Health Coordinator's Office (Human Resources).

2. Specific work locations where employees have potential for exposures:
   a. Health Screening Units
   b. Emergency Response/First Aid
   c. Mail and Delivery

3. Personal copies can be obtained through the designated managers of those work locations.

11.3.5.4.4 Review and Program Update

The exposure control plan will be reviewed and updated annually or whenever new or modified tasks and procedures are implemented which effect the occupational exposure of personnel.

11.3.6 TRAINING

The following requirements reflect those aspects, which must be documented for all personnel who have been determined to require training for bloodborne pathogens.

Training for all employees potentially exposed to blood or OPIM will be conducted prior to their initial assignment. All potentially exposed employees will receive refresher training annually. *See Appendix G, "Documentation of Plan Review".*

The designated manager of affected work units is responsible for administration of the bloodborne pathogens training program.

Training will be performed by a person or persons qualified through education and/or experience in the area of bloodborne pathogens. Appropriate instructional material will be used.

The training program will cover all of the following topics:

1. Review of the MIOSHA, Bloodborne Pathogens Standard and its appendices. Each participant will be provided accessibility to a copy of the full text of the standard. Copies will be available upon request.

2. Discussion of bloodborne diseases and their associated modes of transmission.

3. Review of the Exposure Control Plan for this location. Each participant will receive a copy of the Exposure Control Plan.

4. Instruction on the location and appropriate use of Personal Protective Equipment available at this location.

5. Instruction on appropriate methods for recognizing tasks and other activities that may involve exposure to blood and OPIM.

6. Review of any engineering controls (if applicable) and the work practice controls instituted at this location.

7. Review of the need for Hepatitis B vaccine and the procedure for receiving the vaccine at this location.

8. Detailed instructions on how to respond to an Exposure Incident.

9. Develop detailed procedure on how to handle an Exposure Incident (e.g., who to notify, what action should be taken, etc.).

10. Review of the post-exposure evaluation and follow-up program.

11. Instructions on the meaning of and appropriate use of signs, labels, red bags and color-coding.

11.3.7 REFERENCES & APPENDICES

For additional information regarding Bloodborne Pathogen requirements, refer to MIOSHA, Department of Occupational Health Standards, R325.70001-70017 "Bloodborne Infectious Diseases".

Appendices:
A. Vaccination Declination
B. Exposure Incident Report
C. Source Individual Consent Form
D. Employee Consent Form
E. Evaluating Physician Form
F. Employee Training Record
G. Documentation of Plan Review

11.3.7.1 Appendix A - Vaccination Declination

HEPATITIS B

Vaccination Declination

I understand that due to my potential occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Printed Name: _____

Job Classification: _____ Work Location: _____

_____ _____
Signature Date

11.3.7.2 Appendix B – Exposure Incident Report

EXPOSURE INCIDENT REPORT #_____

_____ _____ _____
Occurrence Site Date Time

Individual Exposed:

_____ _____
Last Name First Middle Initial Social Security No.

Job Classification of Exposed Employee: ☐ **Category I** ☐ **Category II** ☐ **Category III**
Type of Potentially Infectious Material Involved:_____ **Source of Exposure:** _____
PPE in use at time of exposure: ☐ **Gloves** ☐ **Impermeable Gown**

Description of Incident. (Describe routes of exposure, circumstances of exposure, and actions taken.)

_____
_____
_____
_____
_____
_____

Testing of Exposed Individual (Employee):

1. Was the exposed individual advised of source individual's blood test results? ☐ Yes ☐ No
   (See attached for test results)
2. Was the exposed individual advised of applicable laws and regulations regarding the confidentiality of the Source Individual's infectious status? ☐ Yes ☐ No Date Advised:_____
3. Was consent given for collection and testing of blood? ☐ Yes ☐ No Date of Consent:_____
4. Date exposed individual's blood was collected: _____ Date Tested _____
5. Tests completed: ☐ HBV ☐ HIV ☐ Other_____

Source Individual:

_____ _____
Last Name First Middle Initial Social Security No.

Testing of Source Individual:
Source individual's blood must be tested unless they refuse to provide consent for the collection and testing of blood. If the source individual is known to be infected with HBV, they need not be tested.

1. Was consent given for collection and testing of blood? ☐ Yes ☐ No Date of Consent:_____
2. Date source individual's blood was collected:_____ Date Tested:_____
3. Tests completed: ☐ HBV ☐ HIV ☐ Other_____

Page 1 of 2

Exposure Incident Report # _____

If the employee consents to baseline blood collection, but does not give permission for HBV and HIV serological testing, the blood must be preserved for at least 90 days. If, during that 90 day period, the employee consents to such testing, it will be provided.

	Yes	No	N/A
Has the employee's blood been tested to determine HBV and HIV serological status?	☐	☐	☐
2. Was any post-exposure prophylaxis indicated according to test results?	☐	☐	☐
3. Was post-exposure prophylaxis, if recommended, performed?	☐	☐	☐
4. Has the employee reported any illnesses since the exposure incident?	☐	☐	☐
5. Have these reported illnesses been evaluated by an appropriate healthcare professional?	☐	☐	☐
6. Was counseling, if indicated, provided?	☐	☐	☐
7. Has all of the information that must be provided to the evaluating healthcare professional been forwarded to them?	☐	☐	☐

Recommendations for Prevention or Minimization of Exposure:

_____

_____

_____

_____

_____

_____

_____

_____

_____

11.3.7.3 Appendix C – Source Individual Consent Form

CONSENT FORM FOR THE COLLECTION OF BLOOD SOURCE INDIVIDUAL (NON-EMPLOYEE)

I have been advised of the need to test a sample of my blood (drawn during health screening) as the result of an exposure incident associated with my health screening examination.

Permission to have my blood tested for the hepatitis B virus (HBV) and the human immunodeficiency virus (HIV), as well as other blood borne diseases, is hereby given.

I understand that this testing will be done in a **confidential** manner, and results made available only to the nursing coordinator, the person who was exposed and on a "need to know" basis to medical and administrative staff. I also understand that these individuals have been informed of applicable laws and regulations concerning disclosure of my identity and my infectious status. (The State of Michigan Occupational Health Standards Commission indicates that the health care professional evaluating an exposed employee be provided with the source individual's test results.)

Signature | Witnessed by:

_____ _____ _____ _____
Source Individual | Date | Witness | Date

Facility where exposure occurred _____
Address _____
City _____ State _____ Zip Code _____

11.3.7.4 Appendix D – Employee Consent Form

CONSENT FORM FOR THE COLLECTION OF BLOOD - EMPLOYEE

_____ _____
Employee Name **Social Security Number**

I have been advised of the need to collect my blood due to an exposure incident in which I may have been potentially exposed to hepatitis B virus (HBV) and/or the human immunodeficiency virus (HIV).

Permission to have my blood drawn and tested for the HBV and HIV viruses, as well as other bloodborne diseases, is hereby given.

_____ _____ _____ _____
Employee Signature Date Employer Representative (Witness) Date

11.3.7.5 Appendix E – Evaluating Physician Form

EVALUATING PHYSICIAN FORM

The MIOSHA standard, filed with the Secretary of State on June 30, 1993 mandates that:

An employee exposed to blood or other potentially infectious materials on-the-job shall be provided the opportunity for a medical evaluation subsequent to the exposure incident.

The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.

Post exposure prophylaxis shall be provided when medically indicated, as recommended by the United States Public Health Service.

"For each evaluation pursuant to the provisions of this rule, **an employer shall obtain**, and provide an employee with **a copy of the evaluating health care professional's written opinion within 15 working days of the completion** of the evaluation." The written opinion is to be limited to:

a) The health care professional's recommended limitations upon the employee's use of personal protective clothing or equipment. _____
_____

b) Whether hepatitis B vaccination is indicated for an employee and if the employee has received such vaccination. _____
_____

c) A statement that the employee has been informed of the results of the medical evaluation and that the employee has been told about any medical conditions which have resulted from exposure to blood or other potentially infectious material and which require further evaluation or treatment.
_____
_____

The written opinion obtained by the employer shall not reveal specific findings or diagnoses that are unrelated to the employee's ability to wear protective clothing and equipment or receive vaccinations. Such findings and diagnoses shall remain confidential.

Evaluating Physician_____

Address_____

City_____State_____Zip_____

Phone_____Date_____

Employee Evaluated_____

****Please provide the required information as outlined above** according to the MIOSHA Standard, and **forward to**: The Nursing Services Coordinator, State of Michigan Department of Management and Budget, Health Screening Division, P.O. Box 30002, Lansing, MI. 48909

11.3.7.6 Appendix F – Employee Training Record

MIOSHA REQUIREMENTS UPDATE

Employee Record of Training

Date:_____

Contents of Training Session:

☐ Infection Control
☐ Chemical Hazard Communication
☐ Review of Exposure Control Plan
☐ Review of Exposure Incident Form revisions affecting occupational exposure

Reason for Review:

☐ Annual update
☐ New job title
☐ New employee
☐ New or modified procedures or tasks

Trainee Name	Social Security Number	Job Title	Category	Signature	Date

_____ _____
Trainer's Qualifications Name of Trainer

_____Copies of OSHA update materials distributed
_____OSHA 2203 Poster on site
_____PPE Guidelines Poster on site
_____Hazardous Material Identification Guide Poster on site
_____MSDS Sheets on site
_____Understanding MSDS Sheets Poster on site
_____Chemical Hazard Tags on site
_____Copy of Health Screening Division Exposure Control Plan accessible (on site).

11.3.7.7 Appendix G – Documentation of Plan Review

BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN
Documentation of Plan Review

Reason for Review:

☐ Annual update
☐ New or modified procedures/tasks affecting occupational exposure
☐ New job title
☐ New employee

I have reviewed the Updated Exposure Control Plan and Exposure Incident Procedure, and understand both.

____ Copy of Health Screening Division Exposure Control Plan accessible (on site).

11.4 ERGONOMICS PROCESS

11.4.1 PURPOSE

The purpose of the ergonomics process is to reduce or eliminate workers' exposure to ergonomic hazards or risk factors that can lead to cumulative trauma disorders and related injuries and illnesses discomfort and/or reduce performance. An ergonomics process is a systematic method (similar to an accident prevention or quality improvement program) used to evaluate, prevent and manage work-related musculoskeletal disorders. The four elements of a typical ergonomics process are worksite analysis, hazard prevention and control, medical management, and training and education.

11.4.2 SCOPE

The Ergonomics Process applies to all DMB employees and addresses both office and non-office work environments.

11.4.3 DEFINITIONS

Cumulative Trauma Disorder means when the body is frequently forced to maintain awkward or unnatural positions, engage in tasks that involve repetition, excessive force, vibration, or work in cold temperatures, the body can suffer wear and tear on those body parts affected and eventually break down. Over a period of months or years, this overuse can lead to Cumulative Trauma Disorders (CTDs), or Musculo-Skeletal Disorders (MSD).

CTDs can affect many parts of the body, however the most common are those which occur in the neck, back, shoulder, elbow and wrist. CTDs are injuries, which result in damage to muscles and tendons, and may result in soreness, swelling, numbness, and tingling, which can lead to permanent nerve damage.

Engineering Controls means a method of controlling worker exposure to risk factors by redesigning equipment, tools, and work stations. Engineering controls are part of hazard prevention and control.

Ergonomics means the scientific study of human work. The term comes from the Greek words "ergos" meaning work, and "nomos," meaning natural laws of. Ergonomics considers the physical and mental capabilities and limits of the worker as he or she interacts with tools, equipment, work methods, tasks, and the working environment.

Ergonomic Worksite Analysis means a safety and health review that addresses work-related musculoskeletal disorders. It is a structured way of identifying jobs and workstations that may contain musculoskeletal hazards, the risk factors that pose the hazards, and the causes of the risk factors. Worksite analysis is an element of the ergonomics process.

Hazard Prevention and Control means eliminating or minimizing the hazards identified in a worksite analysis. It is changing the jobs, workstations, tools or

environment to fit the worker. Hazard prevention and control is an element of ergonomics process.

Medical Management means the effective use of available health-care resources to prevent or manage work-related musculoskeletal disorders. Medical management is an element of the ergonomics process.

Musculoskeletal Disorder means illnesses and injuries that affect one or more parts of the musculoskeletal system.

Musculoskeletal System means the soft tissue and bones in the body. The parts of the musculoskeletal system are bones, muscles, tendons, ligaments, cartilage, nerves, and blood vessels.

Neutral Posture means comfortable working posture that reduces the risk of musculoskeletal disorders. The joints are naturally aligned with elbows at the side of the body and wrists straight.

Personal Protective Equipment (PPE) means equipment such as safety glasses, gloves, and other equipment that may help reduce hazards until other controls can be implemented, or to supplement existing controls. Personal protective equipment should not be considered as a substitute for designing a safe workstation or implementing engineering and administrative controls.

Risk Factor means an aspect of a job that increases the worker's chance of getting a work-related musculoskeletal disorder. *For definitions of specific types of risk factors see Appendix A, 11.4.7.*

Work Practice Controls mean procedures for safe and proper work that are used to reduce the duration, frequency or severity of exposure to a hazard. They include work methods training, job rotation, and gradual introduction to work. Work practice controls are part of hazard prevention and control.

11.4.4 RESPONSIBILITIES

11.4.4.1 Management

- Support and provide leadership in the development and implementation of the ergonomics process.
- Establish a mechanism for reporting CTD risks.
- Obtain employee participation and involvement in the ergonomics process.
- Provide adequate authority and financial resources to implement the ergonomics process.
- Provide a method to encourage employees to voice their concerns related to ergonomic hazards.

- Institute a procedure to encourage prompt and accurate reporting of potential cumulative trauma disorders and other related injuries or illnesses.
- Develop and participate in local Ergonomic Action Teams (or existing safety committee) to address ergonomic issues, analyze and recommend corrective actions.
- Ensure the appropriate training of individuals assigned to address ergonomic issues.
- Support ergonomic training for key target groups.
- Review the ergonomics process annually to monitor progress.

11.4.4.2 Employees

- Participate in Ergonomic Action Teams as necessary (voluntarily).
- Participate in ergonomics training.
- Report any early signs or symptoms of ergonomic injuries to management.
- Seek management assistance/intervention for jobs or activities that pose ergonomic risk factors.
- Provide input on suggested improvements or solutions.

11.4.5 REQUIREMENTS

11.4.5.1 DMB Risk Analysis Group

The DMB Risk Analysis Group will provide oversight to the Ergonomics Process. The Risk Analysis Group may designate an Ergonomic Steering Team to provide direction and leadership to the Ergonomic Process.

11.4.5.1.1 Responsibilities

1. Provide oversight to Ergonomic Process.
2. Review injury/illness data.
3. Assure Medical Management Component of Ergonomic Process.
4. Ensure that the Ergonomics Process is integrated into new jobs/activities/workstations.
5. Designate Ergonomics Steering Team.
6. Conduct Ergonomic Process Evaluation.

11.4.5.2 Ergonomic Steering Team

The Ergonomic Steering Team is appointed by the DMB Risk Analysis Group and is responsible for implementing the Ergonomic Process.

11.4.5.2.1 Membership

A member of the Risk Analysis Group should facilitate the Ergonomics Steering Team. Additional team members could include management, health and safety professionals, and employee representatives. As the ergonomics process evolves, the membership should expand to include representatives from other areas such as Purchasing, and Departmental "space contacts"; who are involved with design/renovation.

11.4.5.2.2 Responsibilities

1. Identify and utilize available resources.

2. Establish goals for the Ergonomic Process.

3. Evaluate the Ergonomics Process on an annual basis to measure its effectiveness and to make changes where necessary.

4. Ensure that a Worksite Analysis (discussed below) is conducted at least annually to identify areas, jobs and activities with the highest ergonomic risk factors.

5. Identify populations within the office environment who are at a "high-risk" (*see Section 11.4.5.7 Office Environment*).

6. Establish a strategy for improving work areas beginning with those identified as "high-risk".

7. Determine where Ergonomic Action Teams should be established.

8. Ensure that members of the Ergonomic Action Teams have the appropriate level of training to successfully carry out their task.

9. Approve annual strategies developed by Ergonomic Action Teams.

10. Communicate solutions that have applications in areas other than where they were developed.

11.4.5.3 Ergonomic Action Teams (Non-Office Environments)

An Ergonomic Action Team will be established in each area identified by the Ergonomic Steering Team. The Ergonomic Action Teams provide a vehicle to identify solutions to ergonomic risk factors and to facilitate employee education and involvement.

11.4.5.3.1 Membership

The Ergonomic Action Team consists of a core group of members (between two and four) who have received ergonomics training and can facilitate the process. The remainder of the team is made up of ad hoc

members who represent the job being targeted for improvement. The ad hoc members should be respected among their colleagues and should be innovative team players.

11.4.5.3.2 Responsibilities (Core Group)

1. Perform a Worksite Analysis as outlined below for the represented area.

2. Develop an annual strategy with goals, timelines and responsibilities that will correct hazards identified in target jobs/activities.

3. Conduct a Hazard Evaluation (described below) with employees in targeted jobs and then identify solutions that reduce or eliminate ergonomic risk factors.

4. Communicate the strategy and progress made toward goals with the Ergonomic Steering Team.

11.4.5.3.3 Meeting Format

1. Prior to the meeting, ad hoc members should be given some general information about risk factors so they will be prepared to participate in discussions.

2. The team should engage in the process outlined below in Hazard Evaluation, Prevention and Control by reviewing videotapes, surveys, and data of the targeted job or activity to identify the risk factors present. Severity should be assigned to the risk factors identified.

3. The objective of the core members should be to *facilitate* the process of identifying solutions. It is imperative that the ad hoc members participate and are integral in developing the solutions.

4. Identified solutions should be documented and communicated to the appropriate management. Solutions that have a broad application should be communicated to the Ergonomic Steering Team.

11.4.5.4 Worksite Analysis

A Worksite Analysis will be performed on at least an annual basis and should cover all employees. The purpose is to identify jobs and activities at each facility or location that pose the greatest ergonomic risk to employees.

11.4.5.4.1 Injury Analysis

While an Injury Analysis is a *reactive* means of identifying ergonomic risk factors, it provides objective data that can be relied on.

1. Review existing records (medical, safety, injury/illness log, insurance, etc.) to identify all cumulative trauma disorders.

2. Based on frequency (number of injuries) and severity (number of lost or restricted days), identify and target those jobs or activities that cause the most frequent and most severe injuries.

11.4.5.4.2 Surveys

Various forms of surveys and checklists should be developed by the Ergonomics Steering Team to help identify tasks with ergonomic risk factors. This method is more subjective but allows the areas to *proactively* address risk factors before they result in injuries.

11.4.5.5 Hazard Evaluation, Prevention and Control

Activities and tasks identified during the worksite analysis must then be further evaluated and targeted for improvement. Procedures are established to correct or control ergonomic hazards using engineering, work practice and/or administrative controls to reduce the duration, frequency and/or severity of exposure.

11.4.5.5.1 Hazard Evaluation

An Ergonomic Action Team will assess jobs and activities targeted for improvement to:

1. Determine which ergonomic risk factors are present through any combination of observation, interviews, surveys or videotapes. Risk factors include but are not limited to high force, sustained exertions, repetition, and awkward postures. *See Appendix A.* "Risk Factors".

2. Assign a level of severity for each risk factor identified. Higher priority should be assigned where multiple risk factors exist.

3. Systematically evaluate the different risk factors and possible solutions using the Hazard Prevention and Control hierarchy outlined below.

The Job Safety Analysis Form in Section 5.4 may be useful in conducting the ergonomic hazard evaluation.

11.4.5.5.2 Hazard Prevention and Control

Using the hierarchy of controls below, eliminate or minimize as many risk factors as possible. Develop a series of solutions with the goal of finding a low cost/high impact solution.

11.4.5.5.2.1 Engineering Controls

Engineering Controls are used to fit the job to the colleague by designing workstations, tools, etc. to reduce or eliminate ergonomic risk factors. Engineering controls are the method of choice and should be used when feasible. Examples of engineering controls include changing the workstation, providing mechanical-assist equipment, etc.

11.4.5.5.2.2 Work Practice Controls

Procedures for safe work are developed and implemented by managers, supervisors, and employees. The work practice program includes proper work techniques, employee conditioning and regular monitoring.

- Proper work techniques

  Proper work techniques includes appropriate training and practice time, correct lifting techniques, proper use and maintenance of hand/power tools, correct use of ergonomically designed work stations and fixtures, etc.

- Colleague conditioning

  Conditioning permits a "break-in" period for new or returning employees for certain "high risk" jobs. The break-in period will allow the employee to gradually work up to a full workday (on that job).

- Monitoring

  Monitoring ensures that employees continue to use proper work practices. Monitoring includes periodic review of techniques and practices in use and their effectiveness.

11.4.5.5.2.3 Administrative Controls

Administrative controls are used to reduce exposure to tasks with ergonomic hazards and may include employee rotation, lessening of work demands, increased rest breaks, etc. Examples include:

1. Providing rest pauses to relieve fatigued muscles
2. Increasing the number of employees assigned to a task
3. Job rotation
4. Decreasing job demands or limiting overtime (to reduce the total number of repetitions per employee)
5. Job scheduling
6. Providing relief personnel

Preventive maintenance (PM) programs are developed for mechanical and power tools and equipment to verify their proper working condition. Maintenance will be performed regularly and as needed.

Administrative controls are used only after engineering and work practice control measures have been considered and implemented where practical.

11.4.5.6 Medical Management

Medical management is utilized to ensure early intervention, including evaluation, diagnosis and treatment of cumulative trauma disorders. The DMB Safety and Health Coordinator will monitor the medical management process. Employees experiencing early signs and symptoms of CTDs may be evaluated by a pre-determined medical provider. The medical management process includes the following elements:

1. Injury and illness recordkeeping
2. Early recognition and reporting
3. Systematic evaluation and referral
4. Conservative treatment
5. Safe and early return to work and/or appropriate transitional work assignments, as available
6. Systematic monitoring
7. Adequate staffing and facilities

11.4.5.7 Office Environment

The Ergonomic Steering Team will identify "high risk" populations within the DMB office environments by considering factors such as workstation layout; time spent at the keyboard; equipment used, etc. Based on the findings, a strategy will be developed to improve workstations starting with the "high risk" population.

11.4.5.7.1 Special Consideration for Computer Workstations

The monitor and keyboard positions, lighting and seating are especially important in preventing work-related musculoskeletal disorders and eye discomfort. Shared workstations should be easily adjustable so the screen and keyboard can be at the proper level for each individual. These aspects should be taken into account to prevent discomfort and/or injury:

1. Neutral posture at the keyboard and mouse: arms comfortably at the sides, elbows bent at approximately 90 degrees, forearms parallel to the floor, knees slightly below hips.

2. The work surface should be large enough to support the keyboard, mouse, monitor and documents.

3. The top line of the screen should be just below eye level to maintain the neck in a neutral posture. (Adjustable arms, tables or platforms can help bring the screen to the proper height.)

4. Screens that tilt vertically and swivel horizontally help the worker adjust the best viewing angle.

5. Monitors should be placed 18-30 inches away (at arm length) from worker for viewing.

6. Keyboards and monitors should be detachable so the angle and position can be adjusted.

7. Keyboard and work-surface edges should be rounded.

8. Documents should be at the same height and distance as the screen.

9. The screen and document should be easily viewed so that the worker's head isn't turned to the side or tilted up or down.

10. To prevent glare, the monitor and keyboard should be perpendicular to windows and between (not directly under) overhead lights.

11. Screen contrast and brightness should be easily adjustable.

12. Screen characters should be clearly displayed, neither wavy nor flickering.

13. Wrist/palm rests may be used to protect wrists and palms from hard or sharp edges and to help keep the wrists in a neutral position. However, resting wrists on a wrist/palm-rest during keying can put pressure on nerves. Wrist/palm rests should be made of soft but supporting material and be the same height as the front edge of the keyboard.

11.4.6 TRAINING

Training is an important part of an Ergonomics Process. Training and education is a tool that can assist employees with modifying work methods, and making adjustments to their workstations.

11.4.6.1 Ergonomic Steering Team

The Ergonomic Steering Team should be given approximately a two-hour overview of ergonomics with an emphasis in managing the process.

11.4.6.2 Ergonomic Action Teams – Core Members

1. The core members of the Ergonomic Action Teams should be given additional training on ergonomics as needed (approximately two-days). The emphasis should be on identifying risk factors, developing solutions, and building consensus.

2. The core members should have access to reference materials, video equipment, and training materials to adequately carry out their responsibilities.

11.4.6.3 Management (Supervisor Level and Above)

Management should be given Ergonomics Awareness training to help identify problem jobs and to encourage early reporting of injuries.

11.4.6.4 Employees

Training for employees should include the identification of risk factors within their work environment, the details of the Ergonomics Process, and early signs or symptoms of ergonomic injuries.

Ergonomics training may be available through the Department of Civil Service Human Resource Division. It is recommended that employees experiencing early signs and symptoms discuss the need for training with their supervisor. As the ergonomic process becomes fully functioning, specific training for DMB employees may be provided.

11.4.7 REFERENCES & APPENDICES

For additional information, copies of the State of Michigan Guidelines for Work Place Ergonomics are available from The Office of State Employer, Employee Health Management (517) 241-9090.

Appendices:
A. Risk Considerations
B. Hand Tool Ergonomics
C. Back Safety
D. Ergonomic Process Development

11.4.7.1 Appendix A – Risk Considerations

11.4.7.1.1 Risk Factors

Risk factors are those things that increase the chance of getting a CTD. The most common types of risk factors are:

1. Repetition
2. Sustained static exertion
3. Forceful exertions
4. Contact stress
5. Awkward postures
6. Vibration
7. Cold temperatures

11.4.7.1.2 Repetition

Repetition refers to repetitive or rapid work without enough recovery time. Some examples of repetitive activities are sweeping, packing materials, and lifting. In offices, keyboard work and writing are common repetitive activities. Generally, repetitive work that results in feelings of tiredness, especially a burning sensation, can be considered to be risky if there isn't enough time to recover. The solution to counteract repetition is adding more job variety or more frequent breaks. Breaks do not have to be rest breaks - other muscles can be used as long as the overused muscles get a rest.

11.4.7.1.3 Sustained Static Exertions

A sustained static exertion refers to actively holding a position for a long period of time. Holding your arm out in front of you is a sustained static exertion. These exertions inhibit blood flow and often get overlooked because people tend to pay more attention to over activity such as repetition. Sustained static exertions can apply to the whole body; standing, sitting, and driving.

Many sustained static exertions happen unconsciously, for example, when hunching the shoulders when driving or keeping the hands poised during pauses in keying. It is critical to become conscious of these habits and learn to relax.

Other static exertions are caused by the environment, especially if objects are not close to the body and have to be used while reaching. In offices, many people use a mouse in a reaching posture because there is no room for the mouse near the keyboard. Rearrangement can be a good solution.

Other solutions may involve:
1. Change posture frequently.
2. Relax and contract the abdomen periodically.

3. Stand with knees slightly bent for a time.
4. Change the curve of the back.
5. While driving, it is important to shift around frequently in the seat and change positions of the hands on the steering wheel every few minutes.
6. If you sit all day, stand up and move about or modify work to allow for alternating between sit/stand positions.
7. While standing for long periods, shift weight frequently from foot to foot.

11.4.7.1.4 Forceful Exertions

Forceful exertion refers to the use of excessive strength during any activity. The most frequent kind of forceful exertion is lifting. Other kinds of exertions are pushing, and tight gripping. Some postures can reduce strength. The hands are weaker and more prone to injury when the wrist is bent or twisted. The best position for the wrist is straight and avoid using a "pinch grip".

Ways to limit forceful exertions:
1. Use long handles or levers.
2. Use smooth movements instead of jerky, rough movements.
3. Move carts by pushing instead of pulling.
4. Use power tools.
5. Use hand tools that are well-oiled and sharp so they do not require extra strength to operate.

11.4.7.1.5 Contact Stress

Contact stress is pressure on some part of the body caused by external surfaces. Pressure on areas where there are nerves under the skin--the wrist and elbow, the fingers, or the base of the palm are most problematic. Local pressure can potentially cause long-term problems. In other areas, local pressure or contact stress is usually very uncomfortable.

People may experience contact stresses under the wrists when resting them on hard or sharp surfaces. Resting the elbows on hard chair armrests or work surfaces, and using chairs that have hard or angled components can also contribute to contact stress.

Solutions often involve;
1. Pad surfaces or handles
2. Use a tool instead of using the hands to pound things in place
3. In some kinds of work, gloves can reduce contact stresses, but can also decrease grip strength and reduce dexterity.
4. Change habits to minimize the amount of leaning against hard surfaces.

11.4.7.1.6 Awkward Postures

Awkward postures are non-neutral joint positions that may stretch, compress, or stress tendons, ligaments, muscles, or nerves. For every joint, there is a "neutral" position, which is usually the position halfway between the extremes of the joint's range of motion. The wrist should be straight; the head should be roughly upright and facing straight ahead, the shoulders should be downward. The natural curve of the back when standing is considered a neutral position. Leaning forward or sitting down are not neutral for the lower spine.

When you push a joint to its limit frequently or for long periods of time, the development of a CTD is likely. Awkward postures multiply the bad effects of repetition, sustained static exertions, or forceful exertions.

Some examples of awkward postures include:
1. turning the neck to watch something off to one side
2. watching something overhead
3. bending the head back to look through the lower window of bifocals
4. reaching
5. bending the wrist
6. sitting in any unsupportive seat, particularly car seats

Solutions often involve rearrangement of the environment or changing the design of tools. If the design of a hand tool or the arrangement of work requires holding tools with a bent wrist, then either the work objects should be moved (usually tilted or lowered) or a tool with a curved handle should be used.

The hands and arms should be well below shoulder height during any job. If working at or above shoulder heights is unavoidable, take rest breaks.

11.4.7.1.7 Vibration and Cold Temperatures

Vibration and Cold Temperatures are two risk factors that can, over long periods, lead to CTDs as well as create problems with blood circulation. "White finger" involves constriction of the blood vessels in the fingers, and can be caused by vibration from power tools. Whole-body vibration, as when driving certain vehicles, is also related to back problems for some individuals.

Solutions to vibration may include wearing gloves that fit correctly and have special textured surfaces or padding to help reduce vibration. These gloves may not be very effective, and would not be recommended if other side effects such as making it harder to grip objects were likely. Special seats, tools equipped with soft, vibration-dampening grips and handles may also help.

Warm clothing can help avoid cold temperatures. If the cause is a draft from compressed air tools, the cold air should be directed elsewhere.

11.4.7.2 Appendix B - Hand Tool Ergonomics

Proper attention to selection, design, and layout of tools can help minimize the risk of developing Repetitive Strain Injuries, (RSIs). Four basic principles can be applied when working with hand tools:

1. Avoid high contact stress and static postures.
2. Avoid extreme or awkward joint positions (i.e., bent wrist position).
3. Avoid repetitive finger action where possible.
4. Avoid tool vibration (select power or pneumatic tools with built-in vibration dampening whenever possible).

The following guidelines can help with the selection and design of tools.

1. Handles should be provided whenever possible. A properly designed handle isolates the hand from contact with the tool surface, enhances tool control and increases the mechanical advantage while reducing the amount of required exertion. Tool handles should be non-porous, non-slip and non-conductive.

2. Soft coverings on a tool handle protect the hands from heat and cold and help reduce pressure points and slipperiness of the grip.

3. Tools with a pistol grip should be used where the tool axis must be horizontal. A straight grip should be used where the tool axis is vertical, or where the direction of force is perpendicular to the work plane. Bent tool grips allow the wrist to maintain neutral postures.

4. For trigger-activated tools, choose a grip size that allows activation with the middle part of the fingers. Activation with the fingertips causes increased forces on tendons and their sheaths.

5. The majority of commercially available tools are designed for the right hand. Ideally, tools should be symmetrical or easily altered to be used by either hand.

6. The provision of automatic spring-opening on tools such as scissors and pliers will reduce the effort to open pliers while not significantly effecting the hand effort to close them.

11.4.7.3 Appendix C – Back Safety

11.4.7.3.1 How Your Back Works

Back injuries are the most common type of work related accident. We are constantly using our backs to support our bodies, to bend, sit, twist, and even to lie down. All of these activities put stress on our backs, but at no time are our backs more vulnerable to injury than when we are lifting. Understanding how the back works while lifting can help avoid unnecessary strain and potential injury.

11.4.7.3.2 Back Basics

Your back is made of movable bones (called vertebrae) and shock absorbers (called disc) between each vertebra. Ligaments and muscles that help keep the back aligned in three balanced curves support these structures. (You know your back is aligned correctly when your ears, shoulders, and hips are in a straight line.) When your back's three curves are not in balance, there is a greater likelihood of both back pain and injury.

11.4.7.3.3 Lifting Mechanics

When lifting, it is important to keep the back in balance. If you bend at your waist and extend your upper body to lift an object, the back's alignment and the center of balance is affected. The spine is forced to support the weight of your body and the weight of the object. This situation is called "overload." Overloading can be avoided by using good lifting techniques. For example, during a lift, keep the back straight and in a vertical position; bend at the knees, and hug the object close to your body as you lift. This allows your back to stay in alignment and lets the stronger thigh muscles do the actual "lifting". You do not have to extend your upper body and are able to maintain your center of balance.

11.4.7.3.4 Rules of Body Mechanics

1. Test the load. Before lifting an object, estimate how much it weighs to make sure it can be safely moved. Use a dolly or other assistive device whenever feasible.
2. Plan the move. Determine how far you have to carry the load and be sure the path of travel is clear.
3. Use a wide, balanced stance with one foot ahead of the other. This reduces the likelihood of slipping and jerking movements.
4. Keep the lower back in its normal arched position while lifting. Bend at the knees or hips. With the back arched, the forces are more evenly distributed on the support structures.
5. Bring the load as close to the body as possible. This keeps the back from acting as a fulcrum and reduces stress.

6. Keep the head and shoulders up as the lifting motion begins. This helps maintain the arch in the lower back.
7. Tighten the stomach muscles as the lift begins. This causes the abdominal cavity to become a weight bearing structure.
8. Lift with the legs and stand up in a smooth, even motion.
9. Move the feet (pivot) if a direction change is necessary. This eliminates the need to twist at the waist; reducing the stress on the supporting structures of the back.
10. Communicate clearly if two or more individuals are involved in the lift. This reduces the likelihood of an error, which could result in sudden or jerking movements.

11.4.7.3.5 Mechanical Aids

Not all loads can (or should) be lifted manually. Carts, bins, hand trucks, dollies, and work lifts are all mechanical aids that can help transport a load without putting undue strain on your back. Pushcarts and bins can be useful for light, awkward loads, while hand trucks and forklifts can help move heavier, stackable material. When using mechanical aids, be sure that the load is secured in place before moving, and be sure to push the device rather than pulling it.

11.4.7.3.6 Hard to Reach Loads

Overhead loads can be difficult to lift. If you have to lift an object that's above shoulder-level, use a stepstool or ladder to avoid over-reaching. Test the weight of the load before removing it from its shelf. If it is under 25 pounds or so, slide it toward you, and hug it close to your body as you descend. If possible, hand it down to a waiting coworker.

Reaching into a bin, container or other storage area to lift an object makes the standard lift extremely difficult. In these situations, stand with feet at shoulder distance apart, slightly bend the knees, and start to squat, bending at the hip joint, not from the waist. (The movement is the same one your make when you lower yourself into a chair.) Slide the load as close to your body as you can and raise yourself using your leg and hip muscles. Tighten your abdominal muscles as you lift, and if possible, rest the knees against the side of the container for additional support.

11.4.7.4 Appendix D - Ergonomic Process Development

ERGONOMIC PROCESS DEVELOPMENT

Risk Analysis Group
Provides oversight to process
Review injury/illness data
Assure Medical Management Component
Conducts ergonomic process into new jobs/activities/workstations
Designates Ergonomic Steering Committee
Conducts ergonomic process evaluation

Ergonomic Steering Committee
Establish goals/objectives for ergonomic process
Identify and utilize available resources
Participate in ergonomic training
Conduct worksite analysis
Review injury/illness data
Establish strategies for improvement for high-risk areas
Establish Ergo Action Teams

Ergo Action Teams
Participate in ergonomic training
Conduct hazard evaluation in targeted area
Establish solutions for reducing/eliminating risk factors
Communicate progress with steering committee

11.5 HEARING CONSERVATION PROGRAM

11.5.1 PURPOSE

The purpose of the DMB Hearing Conservation Program is to reduce, and eventually eliminate hearing loss due to workplace noise exposures.

11.5.2 SCOPE

This program applies to all DMB personnel whose noise exposure level equals or exceeds an 8-hour TWA of 80 dBA.

11.5.3 DEFINITIONS

Action Level means an 8-hour. Time-weighted average noise exposure of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of 50%.

Audiogram means a chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Decibel or dB means a unit of measurement of sound pressure level. Most references in this manual will be on the A-scale (dBA). This is a simulation of human hearing.

Hertz or Hz means a unit of measurement of frequency and is numerically equal to cycles per second.

Noise Dose means the ratio, expressed as a percentage, of the time integral, over a stated time or event, of the 0.6 power of the measured, slow, exponential time-averaged, squared.

Noise Dosimeter means an instrument that integrates a function of sound pressure over a period of time in such a manner that directly indicates a noise dose.

Slow Response means a Measurement Time Constant, or averaging time, of 1 second. Dosimeters set for Slow Response will not track a quickly fluctuating noise source, but will produce an average reading.

Standard Threshold Shift means a change in the hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

Time-Weighted Average Sound Level means that sound level which, if constant over an 8 hour exposure, would result in the same noise dose as is measured.

TWA means time weighted average.

11.5.4 RESPONSIBILITIES

11.5.4.1 Safety and Health Coordinator

The Safety and Health Coordinator is assigned with the responsibilities of implementing, and administering the DMB Hearing Conservation Program. Additional responsibilities include:

- Identification of work areas and equipment within DMB facilities where noise levels equal or exceed 80 dBA.
- Identification, through personnel monitoring, of DMB employees whose noise exposure level equals or exceeds an 8-hour TWA of 80 dBA. Notification of employee exposure measurements is sent to the Occupational Health Clinic to be included in employees' medical files.
- Annual remonitoring of identified at-risk employees.
- Resurvey of work areas and equipment where noise levels exceed 80 dBA every 2 years.
- Training or coordination of employee training on the proper use and care of hearing protection devices. Training must be documented.
- Identification of noise control measures (including engineering and administrative controls) and recommendations.

11.5.4.2 Occupational Health Clinic

- The Occupational Health Clinic (OHC) is responsible for conducting baseline and annual audiograms for new employees who may be assigned to tasks with potential exposure to elevated levels of noise.
- OHC also schedules and conducts audiograms on an annual basis for employees exposed to sound levels greater than or equal to 80 dBA.
- The OHC is responsible for notifying the Safety and Health Coordinator of all employees who have experienced significant changes in hearing (standard threshold shifts) in order that follow-up investigations may be conducted.

11.5.4.3 Supervisors

- It is the responsibility of the supervisors to ensure that all of their employees exposed to noise levels equal to or greater than 80 dBA have access to appropriate hearing protective devices in the work area.

- Supervisors are also responsible for enforcing the use of hearing protective devices and engineering and administrative controls in designated noise hazardous areas.

11.5.4.4 Employees

- Employees are responsible for wearing and maintaining hearing protective devices as instructed.

- Employees exposed to excessive levels of noise must also participate in annual training programs and the medical surveillance program, which includes audiometric testing.

11.5.5 REQUIREMENTS

11.5.5.1 Policy

It is the policy of the Department of Management and Budget (DMB) to provide employees with a safe and healthful working environment. This is accomplished by utilizing facilities and equipment that have all feasible safeguards incorporated into their design. When effective engineering controls are not feasible, or when they are being initiated, administrative controls will be used when and where possible followed by the use of personal protective equipment.

The DMB, aware that excessive noise exposure is a potential cause of hearing loss, is establishing a hearing conservation program that is more conservative than that required by MIOSHA. The DMB has adopted the American Conference of Governmental Industrial Hygienists (ACGIH) noise exposure limits referred to as threshold limit values (TLV):

Duration per day; hours & minutes	Sound level (dBA)
24	80
8	85
4	88
2	91
1	94
30 min	97
15 min	100
7.5 min	103

When the sound levels listed above are exceeded, feasible administrative or engineering controls will be instituted. If the controls fail to reduce the sound levels to within those listed above, hearing protection will be provided and used to reduce the sound levels to an acceptable level. In addition, MIOSHA, requirements dictate that whenever the employee noise exposure is equal or exceeding an 8-hour time-weighted average (TWA) of 85 dBA, slow response, a continuing effective hearing conservation program must be instituted.

11.5.5.1.1 Identification of Hazardous Noise Areas

The Safety and Health Coordinator will assist in the identification of work areas for DMB employees where noise levels equal or exceed 80 dBA. Records must be maintained by the Safety and Health Coordinator and updated at least every two years to determine if any alteration in noise levels has occurred. Those areas where the noise levels are below 80 dBA will not be routinely monitored. Identification of hazardous noise areas and equipment and any subsequent noise monitoring will be conducted by a qualified person.

Signs will be posted at the entrance to any work area where noise levels exceed 80 dBA, requiring anyone entering the area to wear proper hearing protection. Personnel who work in these areas must have hearing protection supplied to them, must be instructed in its proper use, and be required to wear this equipment when in these identified areas. It is the responsibility of the area supervisor to ensure that these precautions are maintained.

Equipment which produces noise levels greater than 80 dBA, or 120 dB peak sound pressure levels must also be appropriately labeled.

11.5.5.1.2 Noise Measurements and Exposure Assessments

In order to effectively control noise it is necessary that the noise be accurately measured according to standard procedures and that the measurements be properly evaluated against accepted criteria. All noise monitoring will be conducted in accordance with established standard operating procedures.

The monitoring of employees for noise exposure is made up of two parts, area and personal monitoring. Area measurements are generally obtained first. If noise levels are at or above 80 dBA, personal monitoring using dosimeters is then performed. Sample data sheets will be used to record monitoring data for both area and personal noise monitoring results.

11.5.5.1.2.1 Area Measurements

In an area survey, measurements of environmental noise levels are recorded using a sound level meter to identify work areas where employees' exposures may be above hazardous levels, and where more thorough exposure monitoring may be needed. Area monitoring is conducted using a calibrated sound level meter set to the A scale, slow response. Within the area of interest, several different locations will be measured. Typical measurement locations would include:

1. In the hearing zone at the employee's normal work location.
2. Next to the noise source(s).

3. At the entrance(s) to the work area.
4. At other locations within the area where the employee might spend time working.

A rough sketch of the area will be included with the results showing the locations where the noise readings were obtained.

If the noise levels are below 80 dBA on a time-weighted average basis in the area, no further routine monitoring will be required for that area. Should any of the noise measurements equal or exceed 80 dBA, records must be maintained as to the noise levels recorded, where they were taken, and the source(s) of the noise. These records must be updated at least once every two years to determine if any changes have occurred that would warrant remonitoring of exposed personnel. If any of the measurements equal or exceed a noise level of 80 dBA, employees who work in or near the high noise area or equipment must have their noise exposure determined through personnel monitoring using dosimeters. *See Appendix A "Environmental Noise Level Record".*

11.5.5.1.2.2 Personnel Monitoring

Determination of the noise exposure level will be accomplished using calibrated noise dosimeters. Each employee to be monitored will have a dosimeter placed on him/her at the beginning of his/her normal work shift with the microphone placed in the "hearing zone". The dosimeter will be worn for the full duration of the work shift while the employee performs his/her normal work routine. At the end of the work shift, the dosimeter will be removed and information printed out as soon as possible. Background information will be collected from each employee detailing job description, unusual job activities, etc., for the time period sampled. Those employees whose noise exposure equals or exceeds 80 dBA on an 8-hour TWA will be referred to the Occupational Health Clinic for inclusion in the Hearing Conservation Medical Surveillance Program. *See Appendix B "Personal Monitoring Record".*

11.5.5.1.3 Re-monitoring of Hazardous Noise Areas

All areas where noise levels equal or exceed 80 dBA must be re-monitored at least every two years. Employees who work for extended periods of time (>2 hours) in the high noise areas and where their 8-hour TWA equals or exceeds 80 dBA will be monitored every year to determine their personal noise exposure.

Whenever an employee exhibits a standard threshold shift, as determined by the OHC, the employee's work place must be re-monitored to identify and ameliorate the cause.

11.5.5.2 Re-monitoring Due to Changes

Any area with noise levels that equal or exceed 80 dBA must also be remonitored whenever a change in process, equipment, or controls increase the noise exposure such that additional employees are exposed to noise levels at or above 80 dBA on a time-weighted average basis. Areas where the noise levels have dropped below 80 dBA due to alterations in equipment, controls or process changes must be eliminated from the monitoring program.

11.5.5.3 Noise Control Methods

11.5.5.3.1 Engineering and Administrative Controls

The primary means of reducing or eliminating personnel exposure to hazardous noise is through the application of engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the transmission path that reduces the noise level at the employee's ear. Engineering controls such as mufflers on heavy equipment exhausts or on air release valves are required where possible.

Administrative controls are defined as changes in the work schedule or operations, which reduce noise exposure. If engineering solutions cannot reduce the noise, administrative controls such as increasing the distance between the noise source and the worker or rotation of jobs between workers in the high noise area should be used if possible.

The use of engineering and administrative controls should reduce noise exposure to the point where the hazard to hearing is eliminated or at least more manageable.

11.5.5.3.2 Hearing Protective Devices

Hearing protective devices (ear plugs, muffs, etc.) must be the permanent solution only when engineering or administrative controls are considered to be infeasible or cost prohibitive. Hearing protective devices are defined as any device that can be worn to reduce the level of sound entering the ear. All personnel must wear hearing protective devices when they must enter or work in an area where the operations generate noise levels of:

1. Greater than 80 dBA sound levels, or
2. 120 dB peak sound pressure level or greater

11.5.5.3.2.1 Types of Hearing Protective Devices

Hearing protective devices include the following:

1. Insert Type Earplugs are a type of device designed to provide an air-tight seal with the ear canal. There are three types of insert earplugs - premolded, formable, and custom earplugs.
   a. Premolded Earplugs are pliable devices of fixed proportions. Two standard styles, single flange and triple flange, come in various sizes, and will fit most people. Personnel responsible for fitting and dispensing earplugs will train users on proper insertion, wear, and care. While premolded earplugs are reusable, they may deteriorate and should be replaced periodically.
   b. Formable earplugs come in just one size. Some are made of material which, after being compressed and inserted, expands to form a seal in the ear canal. When properly inserted, they provide noise attenuation values that are similar to those from correctly fitted premolded earplugs. Individual units may procure approved formable earplugs. Supervisors must instruct users in the proper use of these earplugs as part of the annual education program. Each earplug must be held in place while it expands enough to remain firmly seated. A set of earplugs with a cord attached is available. These earplugs may be washed and therefore are reusable, but will have to be replaced after two or three weeks or when they no longer form an airtight seal when properly inserted.
   c. Custom Molded Earplugs are necessary for a small percentage of the population who cannot be fitted with standard premolded or formable earplugs. Custom earplugs can be made to fit the exact size and shape of the individual's ear canal. Individuals needing custom earplugs will be referred to an audiologist.

2. Earmuffs are devices worn around the ear to reduce the level of noise that reaches the ear. Their effectiveness depends on an airtight seal between the cushion and the head.

11.5.5.3.2.2 Selection of Hearing Protective Devices

Employees will be given the opportunity to select hearing protective devices from a variety of suitable ones provided by the DMB. In all cases the chosen hearing protectors must have a Noise Reduction Ratio (NRR) high enough to reduce the noise at the ear drum to 80 dBA or lower.

11.5.5.3.2.3 Issuance of Hearing Protective Devices

The issuance of hearing protective devices is handled through DMB Management. Instruction on the proper use and care of earplugs and earmuffs will be provided whenever hearing protection devices are dispensed. Personnel requiring earmuffs in

addition to earplugs will be informed of this requirement and educated on the importance of using proper hearing protection. The DMB will dispense earmuffs when necessary and will maintain a supply of disposable earplugs. Personnel (not required to wear protection) may request hearing protection devices, however, they will also need to be informed about the proper use and care of the devices by supervision.

11.5.5.3.2.4 Use of Hearing Protective Devices

1. Always use and maintain hearing protection devices as originally intended and in accordance with instructions provided.

2. Earmuff performance may be degraded by anything that compromises the cushion-to-circumaural flesh seal. This includes other pieces of personal protective equipment such as eyewear, masks, faceshields, and helmets.

11.5.5.3.2.5 Maintenance of Hearing Protective Devices

1. Reusable earplugs, such as the triple flange or formable devices should be washed in lukewarm water using hand soap, rinsed in clean water, and dried thoroughly before use. Wet or damp earplugs should not be placed in their containers. Cleaning should be done as needed.

2. Earmuff cushions should be kept clean. The plastic or foam cushions may be cleaned in the same way as earplugs, but the inside of the muff should not get wet. When not in use, ear muffs should be placed in open air to allow moisture that may have been absorbed into the cups to evaporate.

11.5.5.3.2.6 Hearing Protection Performance Information

The maximum of sound attenuation one gets when wearing hearing protection devices is limited by human body and bone conduction mechanisms. Even though a particular device may provide outstanding values of noise attenuation the actual noise reductions may be less because of the noise surrounding the head and body bypasses the hearing protector and is transmitted through tissue and bone pathways to the inner ear.

The term "double hearing protection" is misleading. The attenuation provided from any combination earplug and earmuff is not equal to the sum of their individual attenuation values.

11.5.5.4 Medical Surveillance

11.5.5.4.1 Notification

Upon identification of employees whose 8-hour TWA equals or exceeds 80 dBA, the Safety and Health Coordinator will recommend to the Occupational Health Clinic and the employee's Supervisor, in writing, of the need to enroll certain employee(s) in the Hearing Conservation Medical Surveillance Program. Information supplied to the OHC will include the employee(s) name, supervisor's name, telephone number, and the noise levels recorded in the employee's work area, including dosimetry data. It will be the responsibility of the Supervisor to enroll his/her employee in the Hearing Conservation Medical Surveillance Program.

Notification is necessary when testing in work locations, where either through administrative or engineering controls, noise levels are found to have fallen such that, the employee's 8-hour TWA is below 80 dBA. The Safety and Health Coordinator must notify the Clinic and the employee's Supervisor, by memo, that the employees working in that area are no longer required to be enrolled in the Hearing Conservation Program.

The results of area and personnel re-monitoring must be forwarded to the Clinic upon completion of the noise surveys.

Any personnel experiencing difficulty in wearing assigned hearing protection (i.e., irritation of the canals, pain) will be advised to immediately report this to their supervisor and make arrangements to go to the Occupational Health Clinic for evaluation as soon as possible.

11.5.5.4.2 Audiometric Testing

The Occupational Health Clinic has the responsibility for administering the Audiometric Testing Program portion of the DMB Hearing Conservation Program. The object of the audiometric testing program is to identify workers who are beginning to lose their hearing and to intervene before the hearing loss becomes worse. Audiometric testing will be provided to all employees with exposure to noise levels of 80 dBA or greater. Annual retesting will be performed for all personnel enrolled in the Hearing Conservation Medical Surveillance Program.

11.5.5.5 Program Evaluation

Periodic program evaluations will be conducted to assess compliance with federal and state regulations and DMB Program requirements. Both the monitoring and audiometric testing portions of the DMB Hearing Conservation Program will be reviewed annually to assure its quality and effectiveness.

An evaluation of the Program, including wearer acceptance, appraisal of protection afforded, and field audits of hearing protection use and recordkeeping will be conducted at least annually. Items to be considered include:

1. Standard operating procedures
2. Training records and course content for supervisors and employees.
3. Maintenance of HPDs
4. Field audits of HPD use
5. Review of recorded threshold shifts on OSHA log.

The findings of the DMB Hearing Conservation Program evaluation will be documented, and this documentation will list plans to correct faults in the program and set target dates for the implementation of the plans.

11.5.5.6 Recordkeeping

DMB Hearing Conservation Program records will include the following:

Record
1. Location
2. Medical Evaluation and Audiograms
3. Training Records
4. Hearing Conservation Written Program
5. Hazard Evaluations (work area noise surveys, personnel monitoring)
6. Program Evaluations

All non-medical records (e.g. work area and equipment surveys) will be maintained for a period of five years. Results of hearing tests and medical evaluations performed for hearing conservation purposes as well as noise exposure documentation must be recorded and must be a permanent part of an employee's health record and maintained in the Human Resources Office.

All personnel who routinely work in designated hazardous noise areas must be identified. A current roster of such personnel must be maintained by the Safety and Health Coordinator, and updated periodically.

11.5.6 TRAINING

The training and education program will provide information about the adverse effects of noise and how to prevent noise-induced hearing loss. At a minimum, training will cover the following topics:

1. Noise-induced hearing loss.
2. Recognizing hazardous noise.
3. Symptoms of overexposure to hazardous noise.
4. Hearing protection devices - advantages and limitations.
5. Selection, fitting, use, and maintenance of HPDs.
6. Explanation of noise measurement procedures.
7. Hearing conservation program requirements.

Employees will also be provided with copies of the MIOSHA noise standard and other handouts describing the DMB Hearing Conservation Program. Information provided in *Appendix B "Personal Monitoring Record"* of this document may also be used.

DMB employees must be encouraged to use hearing protective devices when they are exposed to hazardous noise during activities at home; e.g., from lawn mowers, chain saws, etc.

All personnel identified for inclusion in the hearing conservation program should receive a minimum of one hour of initial instruction in the requirements of the program. Ideally this will be done when hearing protection is dispensed.

Appropriate refresher training will be held annually thereafter and will be provided by the immediate supervisor. Supervisors will be provided annual training by the Safety and Health Coordinator.

Supervisors must contact the Safety and Health Coordinator to schedule training for new personnel assigned to work in noisy environments and for retraining of current personnel.

11.5.7 REFERENCES AND APPENDICES

For additional information on hearing topics refer to:

ACGIH, Threshold Limit Values and Biological Exposure Indices, Physical Agents, Noise, current edition

Berger, E. H., et.al., Ed., Noise & Hearing Conservation Manual, 4th ed., Akron, OH: American Industrial Hygiene Association, 1986.

NIOSH, A Practical Guide to Effective Hearing Conservation Programs in the Workplace, September 1990.

For additional information on Occupational Noise Exposure refer to MIOSHA Occupational Health Standard Part R325.60101-60128 "Occupational Noise Exposure"

Appendices:
A. Environmental Noise Level Record
B. Personal Monitoring Record
C. Training Information – Noise

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11.5.7.1 Appendix A - Environmental Noise Level Record

Area Monitoring
Record of Environmental Noise Levels

Name of Work Area Where Measurements Taken: _____

In the Employee Hearing Zone:

Monitoring Results _____ Date _____

Next to the Source of Noise:

Monitoring Results _____ Date _____

At the Entrance to the Work Area:

Monitoring Results _____ Date _____

At Other Locations (within the area where the employee might spend time.):

Monitoring Results _____ Date _____

If needed, attach a rough sketch of the area with results showing the locations where the noise readings were obtained.

These test results will be updated once every two years. If results indicate any measurement that exceed 80 dBA, then a Hearing Conservation Medical Surveillance – Personnel Monitoring will be completed.

11.5.7.2 Appendix B – Personal Monitoring Record

Hearing Conservation Medical Surveillance
Personnel Monitoring

Determination of noise exposure level will be accomplished using calibrated noise dosimeters. The employee to be monitored will have a dosimeter placed on him/her at the beginning of the normal work shift, with the microphone placed in the "hearing zone". The dosimeter will remain on the employee for the duration of the work shift.

The following information will be provided to the Occupational Health Clinic. Dosimetry data and the results of the "Area Monitoring" are to be attached before submitting to the Occupational Health Clinic.

Date of noise monitoring _____ _____ 8-HR TWA

Duration of Sample _____

Date _____

Employee Name _____

Telephone _____

Supervisor's Name _____

Summary of Job Description/usual job activities

Results of noise monitoring during 8 hour work shift _____ TWA

11.5.7.3 Appendix C- Training Information - Noise

Supervisors and exposed workers must become aware of and understand about the adverse effects of noise and how to prevent noise-induced hearing loss. People exposed to hazardous noise must take positive action, if progressive permanent hearing loss is to be prevented. Each exposed worker and supervisor should know the following:

1. Noise exposure may result in permanent damage to the auditory system and there is no medical or surgical treatment for this type of hearing loss. Though the use of a hearing aid may provide some benefit, normal hearing will not be restored. Many people don't realize loud sounds can cause hearing loss. Furthermore, in its initial stages, the person may not notice a problem since noise-induced hearing loss is invisible, painless, and occurs in the high frequencies. It is dangerous to ignore the temporary characteristics of noise-induced hearing loss (such as ringing or buzzing in the ears, excessive fatigue, etc.).

2. Each person should know how to recognize hazardous noise even if a noise survey has not been conducted and/or warning signs posted. Recognizing and understanding the adverse effects of off-duty noise exposures is also important. The best rule to follow is: "If you have to shout at arms length (approximately three feet) to talk face-to-face, you are probably being exposed to hazardous levels of noise."

3. Preventing noise-induced hearing loss is accomplished by reducing both the time and intensity of exposure. Reducing exposure time is accomplished by avoiding any unnecessary exposure to loud sound. Reducing intensity is usually accomplished by wearing personal hearing protection. Each person must be able to properly wear and care for the particular type of hearing protection selected. Speech communication is difficult in high intensity noise. However, most people don't realize it's easier to understand speech if hearing protection is worn in a hazardous noise environment. Hearing protection reduces the noise and the level of speech, resulting in a more favorable listening level. hearing protection reduces the intensity of frequencies above the speech range; thus, reducing the noise and accentuating speech. People who claim wearing hearing protection makes it difficult to hear speech are probably in noise levels less than 85 dBA or have already developed a hearing loss.

4. Each person must know how to tell if they have been overexposed to loud sound. Overexposure may occur even while wearing hearing protection. Earplugs and/or earmuffs alone may not be enough protection. Each time a temporary threshold shift (TSS) occurs, a certain degree of permanent loss results. The recognizable symptoms of overexposure are described as "dullness in hearing or ringing in the ears."

11.6 LEAD

11.6.1 PURPOSE

The requirements stated within this written program are established to protect employees who are required to work in areas or perform activities where the potential for lead exposure exists.

11.6.2 SCOPE

These work practices apply to any DMB employee who may be exposed to lead in and about their place of employment.

11.6.3 DEFINITIONS

Action Level means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter (30 ug/m^3) of air averaged over an 8-hour period.

Chelate means a compound that will inactivate a metallic ion by forming an inner ring structure in the molecule whereby the metal ion becomes a member of the ring and the original ion is effectively out of action.

Lead means metallic lead, all inorganic lead compounds, and organic lead soaps. Lead does not include any other organic lead compound.

Permissible Exposure Limit means that amount of a given substance a person can be exposed to without any adverse health effects. The P.E.L. for lead is 50 micrograms per cubic meter of air (50 ug/m^3), averaged over an 8-hour workday.

11.6.4 RESPONSIBILITIES

11.6.4.1 Management

- Provide engineering controls to eliminate exposure where practicable.
- Enforce the use of personal protective equipment where required. (Use respirators, eye protection, and other protection as required under P.P.E. standards.)
- Provide training in proper use of personal protective equipment where applicable and provide required training on lead exposure as indicated in the training section of this part.

11.6.4.2 Employee

- Understand the requirements relating to exposure of lead contaminants.

- Wear proper personal protective equipment where necessary.
- Do not consume food, drink or smoke in areas suspected of lead contamination.
- Comply with all requirements of DMB written program on lead.

11.6.5 REQUIREMENTS

11.6.5.1 Monitoring for lead exposure

1. The Safety & Health Coordinator will monitor for lead exposure based on any of the following:
   a. Information, observations, or calculations that would indicate employee exposure.
   b. Previous measurements of airborne lead.
   c. Employee complaints of symptoms which may be attributable to exposure to lead.

2. Monitoring for the initial determination may be limited to a representative sample of those employees who DMB reasonably believes are exposed to the greatest airborne lead concentrations of lead in the workplace.

3. Except for exposure monitoring (initial determination) Safety & Health Coordinator will collect personal samples that are representative of the full shift exposure for each worker for each shift in each work area in accordance with recognized industrial hygiene practices ("full shift" means not less than 7 continuous hours).

4. If DMB sampling determines that employee's exposure is below the action level, Safety & Health Coordinator will make a written record of that determination in accordance with lead standard requirements.

5. If initial determination or subsequent monitoring reveals employee exposure to be at or above the action level, but below the permissible exposure limit, Safety & Health Coordinator will repeat monitoring at least once every 6 months. Safety & Health Coordinator will then continue monitoring at the required frequency until not less than two consecutive measurements, taken not less than 7 days apart, are below the action level, at which time the DMB may discontinue monitoring for that employee.

6. If initial monitoring reveals that employee exposure is above the permissible employee exposure limit, Safety & Health Coordinator will repeat monitoring quarterly. The Safety & Health Coordinator will continue monitoring at the required frequency until not less than two consecutive measurements, taken not less than 7 days apart, are below the employee permissible exposure limit, but at or above the action level. At that time, DMB will repeat monitoring for that employee at the frequency prescribed in requirement number 5 listed above.

11.6.5.2 Employee notification

Safety & Health Coordinator will notify an employee of the results of any monitoring results within 5 working days as required under Occupational Health Standards.

11.6.5.3 Written compliance program

The written compliance program must include all of the following:

1. A description of each workplace operation in which lead is emitted, including, but not limited to, all of the following:
   a. Machinery used
   b. Material processed
   c. Controls in place
   d. Crew size
   e. Employee job responsibilities
   f. Operating procedures
   g. Maintenance practices

2. A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to lead.

3. A report of the technology considered in meeting the permissible employee exposure limit.

4. Air monitoring data, which documents the source of lead emissions.

5. A detailed schedule for implementation of the compliance program, including documentation of purchase orders for equipment, construction contracts, and other means of implementation.

6. Other relevant information as listed in rule 15 of the Occupational Health Standard on Lead.

11.6.5.4 Sign requirements

Safety & Health Coordinator must post the following warning sign in each work area where the permissible employee limit is exceeded:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

A supervisor must ensure that signs required by this rule are illuminated and cleaned as necessary so that the legend is readily visible.

11.6.5.5 Recordkeeping

11.6.5.5.1 Exposure monitoring

1. DMB must establish and maintain an accurate record of all monitoring required. The monitoring records must include all of the following:
   a. The date or dates, number, duration, locations and results in each of the samples taken including a description of the sampling procedure used to determine representative employee exposure, where applicable.
   b. A description of the sampling and analytical methods used and evidence of their accuracy.
   c. The type of respiratory protective devices worn, if any.
   d. The name, social security number and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.
   e. The environmental variables that could effect the measurement of employee exposure.

2. DMB must maintain monitoring records for not less than 40 years or for the duration of employment plus 20 years, which ever is longer.

11.6.5.5.2 Medical surveillance

1. Safety & Health Coordinator will establish and maintain an accurate record for each employee subject to medical surveillance.

2. The medical surveillance must include all of the following:
   a. The name, social security number and description of duties of the employee.
   b. A copy of the physician's written opinions.
   c. Results of any airborne exposure monitoring carried out for that employee and the representative exposure levels supplied to the employee's physician or physicians.
   d. Employee medical complaints related to exposure to lead.

3. DMB will maintain, or assure that the physician maintains, medical records for not less than 40 years or for the duration of employment plus 20 years, whichever is longer.

11.6.6 TRAINING

Safety & Health Coordinator will institute a training program for, and assure participation by, all employees who are subject to exposure to lead at or above the action level or for whom the possibility of skin or eye irritation exists from exposure to lead.

Safety & Health Coordinator will assure that each employee is informed of all of the following information:

1. The specific nature of the operations that could result in exposure to lead above the action level.

2. The purpose, proper selection, fitting, use, and limitations of respirators.

3. The purpose and a description of the medical surveillance program and the medical removal protection program, including information regarding adverse health effects associated with excessive exposures to lead, with particular attention to adverse reproduction effects on both males and females.

4. The engineering controls and work practices associated with the employee's job assignment.

5. The contents of any compliance plan in effect.

6. Instructions to employees that chelating agents must not routinely be used to remove lead from their bodies and must not be used at all except under the direction of a licensed physician.

Employees need to be instructed in the hazards associated with exposure to lead. Training should consist of information contained within their work practice requirement and other information related to lead exposure. Instruction can be on-the-job or classroom or a combination of both. The supervisor must retain training documentation.

11.6.7 REFERENCES

For additional information see Section 11.7 "Respirators" and Section 10.9 "Personal Protective Equipment" in this manual.

For additional information on Medical surveillance, biological monitoring (blood lead level testing) and other related testing refer to MIOSHA, Occupational Health Standards, Part R325-51901-51958 "Lead".

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11.7 RESPIRATORY PROTECTION PROGRAM

11.7.1 PURPOSE

This program has been designed to prevent overexposure to atmospheric contaminants, which are potentially harmful to health. This program is designed to protect against the following classes of airborne contaminants: harmful dusts, fogs, fumes, mists, gases, smokes, vapors, radionuclides, combinations of these, and/or oxygen deficient environments. Preventing excessive atmospheric contamination through the use of engineering controls should ideally control occupational diseases caused by breathing contaminated air. Respiratory protection shall be used only when use of engineering controls is not feasible, while engineering controls are being instituted, or during an emergency.

11.7.2 SCOPE

This program applies to all DMB employees at all facilities. This program does not apply to contractors, as they are responsible for providing their own respiratory protection programs and respiratory protective equipment.

11.7.3 DEFINITIONS

Air-Purifying Respirator means a type of breathing apparatus designed to purify the air of gases, vapors, and particulates, but does not supply clean breathing air. There are three basic configurations: quarter face, half-face, and full-face respirators.

Immediately Dangerous to Life and Health (IDLH) means a situation that can result in serious injury or death within an exposure, and/or result in serious delayed effects e.g.(oxygen-deficient atmospheres).

Respirator Protection means devices that will protect the wearers from inhalation of harmful contaminates.

Self Contained Breathing Apparatus (SCBA) means a transportable supply of breathing air (Grade D compressed air) and affords protection against both toxic chemicals and oxygen deficiency.

11.7.4 RESPONSIBILITIES

11.7.4.1 Safety Coordinator

The DMB Safety & Health Coordinator is responsible for maintaining the Respiratory Protection Program and ensuring that it remains consistent with the goal of protecting DMB personnel. The Safety Coordinator will help implement the Respiratory Protection Program, which is designed and organized to ensure respirators are properly selected, used, and maintained by DMB personnel, and to meet *MIOSHA Occupational Health Part 451*

"General Respiratory Protection" and *industry accepted standards (American National Standards Institute).*

The Safety Coordinator, in coordination with the Supervisor, is responsible for:

- Evaluating those tasks for which respiratory protection is thought to be necessary.
- Determining the degree of hazard posed by the potential exposure.
- Determining whether engineering or administrative controls are feasible.
- Specifying which respiratory protection device is to be used for each task.
- Assuring personnel are trained in the selection and use of respiratory protective devices.
- Assuring qualitative and quantitative fit testing is conducted.
- Assuring the necessary protective devices are issued.
- Conducting an annual evaluation of the respiratory program.
- Maintaining records.

See Appendix A "Respirator Program Detail".

11.7.4.2 Occupational Health Clinic

The Occupational Health Clinic is charged with establishing medical evaluation and surveillance procedures and reviewing the health status of all personnel who may be required to wear respiratory protective equipment in the completion of their assigned tasks.

11.7.4.3 Management

Supervisors will ensure each employee under his or her supervision using a respirator has received appropriate training in its use and an annual medical evaluation. Supervisors will ensure the availability of appropriate respirators and accessories, provide adequate storage facilities, and encourage proper respirator equipment maintenance. Supervisors must be aware of tasks requiring the use of respiratory protection, and ensure all employees engaged in such work use the appropriate respirators at all times.

11.7.4.4 Respirator Wearers

It is the responsibility of each respirator wearer to wear his/her respirator when and where required and in the manner in which they were trained. Respirator wearers must report any malfunctions of the respirator to his/her supervisor immediately. The respirator wearer must also guard against mechanical

damage to the respirator, clean the respirator as instructed, and store the respirator in a clean, sanitary location.

For employees who do not regularly use a respirator, a clean sanitized respirator can be obtained from their supervisor.

11.7.4.5 Others

Personnel, such as employees, inspectors, and visitors, who must enter an area where the use of respiratory protective equipment is required, even when their stay time in the area may be 15 minutes or less, shall be provided with and use appropriate equipment, including instructions regarding use and limitations. Personnel shall be fit tested and medically qualified to wear the respirator being issued prior to entry to the site.

Contractors are required to develop and implement a respiratory protection program for their employees who must enter into or work in areas where exposure to hazardous materials can not be controlled or avoided. This program must meet *OSHA regulations* and include issuance of respirators, medical evaluations, fit testing and training. The contractor must have a copy of their respiratory program available upon request.

11.7.5 REQUIREMENTS

11.7.5.1 Medical Evaluation

The Occupational Physician, or other licensed healthcare professional (PLHCP), initially, and periodically thereafter, makes a determination as to whether or not an employee can wear the required respirator without physical or psychological risk. The PLHCP will perform a medical evaluation using a medical questionnaire. Based on the overall health of the individual and special medical tests (pulmonary function studies, EKG, etc.) as appropriate, the examining physician determines whether or not the individual will be restricted from wearing respiratory protective equipment. If a medical restriction is applied, the employee, his/her supervisor, and the Safety Coordinator are formally notified of the restriction.

Specific medical tests and procedures will be determined by the Occupational Health Physician and will be in accordance *with MIOSHA medical surveillance requirements and/or NIOSH recommendations.*

11.7.5.2 Selection and Use of Respiratory Protection Devices

11.7.5.2.1 Respirator Use

Respiratory protection is authorized and issued for the following personnel:

1. Workers in areas known to have contaminant levels requiring the use of respiratory protection or in which contaminant levels requiring the use of respiratory protection may be created without warning (e.g.,

emergency purposes such as hazardous material spill responses).

2. Workers performing operations documented to be health hazardous and those unavoidably required to be in the immediate vicinity where similar levels of contaminants are generated.

3. Workers in suspect areas or performing operations suspected of being health hazardous but for which adequate sampling data has not been obtained.

See Appendix E "Respirator Decision Logic Sequence".

11.7.5.2.2 Respirator Selection

Selection of the proper respirator(s) to be used in any work area or operation is made only after a determination has been made as to the real and/or potential exposure of employees to harmful concentrations of contaminants in the workplace atmosphere. This evaluation will be performed prior to the start of any routine or non-routine tasks requiring respirators. Respiratory protective devices will be selected by the Safety Coordinator in coordination with the supervisor, using *ANSI Z88.2, NIOSH Certified Equipment List, and/or the NIOSH Respirator Selection Decision Logic as a guide.* The following items will be considered in the selection of respirators:

1. Effectiveness of the device against the substance of concern.
2. Estimated maximum concentration of the substance in the work area.
3. General environment (open shop or confined space, etc).
4. Known limitations of the respiratory protective device.
5. Comfort, fit, and worker acceptance.
6. Other contaminants in the environment or potential for oxygen deficiency.

Supervisors shall contact the Safety Coordinator prior to non-routine work that may expose workers to hazardous substances or oxygen deficient atmospheres. Examples of work which may require the use of respirators includes, but are not limited to:

1. Asbestos abatement activities.
2. Abrasive blasting.
3. Cutting or melting lead or stripping lead-based paints from surfaces.
4. Welding or burning.
5. Painting, especially with epoxy or organic solvent coatings.
6. Using solvents, thinners, or degreasers.
7. Any work which generates large amounts of dust.
8. Working in a confined space.

A review of the real and/or potential exposures is made at least annually to determine if respiratory protection continues to be required, and if so, do the previously chosen respirators still provide adequate protection. *See Appendix B "Respirator Selection and Use Table".*

11.7.5.3 Types of Respirators

11.7.5.3.1 Air-Purifying Respirator

These respirators remove air contaminants by filtering, absorbing, or chemical reaction with the contaminants as they pass through the respirator canister or cartridge. This respirator is to be used only where adequate oxygen (19.5 to 23.5 percent by volume) is available. Air-purifying respirators can be classified as follows:

1. Particulate removing respirators, which filter out dusts, fibers, fumes and mists. These respirators may be single-use disposable respirators or respirators with replaceable filters.

   NOTE: Surgical masks do not provide protection against air contaminants. They are never to be used in place of an air-purifying respirator. They are for medical use only.

2. Gas- and vapor-removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, or by chemical reaction. Gas masks and chemical-cartridge respirators are examples of gas and vapor removing respirators. Combination particulate/gas and vapor removing respirators combine the respirator characteristics of both kinds of air-purifying respirators.

11.7.5.3.2 Supplied-Air Respirators

These respirators provide breathing air independent of the environment. Such respirators are to be used when the contaminant has insufficient odor, taste or irritating warning properties, or when the contaminant is of such high concentration or toxicity that an air-purifying respirator is inadequate. Supplied-air respirators, also called air-line respirators, are classified as follows:

11.7.5.3.2.1 Demand Respirators

This respirator supplies air to the user on demand (inhalation) which creates a negative pressure within the face piece. Leakage into the face piece may occur if there is a poor seal between the respirator and the user's face.

11.7.5.3.2.2 Pressure-Demand Respirators

This respirator maintains a continuous positive pressure within the face piece, thus preventing leakage into the face piece.

11.7.5.3.2.3 Continuous Flow Respirators

This respirator maintains a continuous flow of air through the face piece and prevents leakage into the face piece.

11.7.5.3.3 Self-Contained Breathing Apparatus (SCBA) / Emergency Situations

This type of respirator allows the user complete independence from a fixed source of air and offers the greatest degree of protection but is also the most complex. Training and practice in its use and maintenance is essential. This type of device will be used in emergency situations only. These devices will be thoroughly inspected at least once a month and after each use.

11.7.5.4 Identification of Respirator Cartridges and Gas Mask Canisters

Respirator cartridges and canisters are designed to protect against individual or a combination of potentially hazardous atmospheric contaminants, and are specifically labeled and color coded to indicate the type and nature of protection they provide.

The NIOSH approval label on the respirator will also specify the maximum concentration of contaminant(s) for which the cartridge or canister is approved. For example, a label may read:

"DO NOT WEAR IN ATMOSPHERES IMMEDIATELY DANGEROUS TO LIFE. MUST BE USED IN AREAS CONTAINING AT LEAST 20 PERCENT OXYGEN. DO NOT WEAR IN ATMOSPHERES CONTAINING MORE THAN ONE-TENTH PERCENT ORGANIC VAPORS BY VOLUME. REFER TO COMPLETE LABEL ON RESPIRATOR OR CARTRIDGE CONTAINER FOR ASSEMBLY, MAINTENANCE, AND USE."

11.7.5.5 Warning Signs of Respirator Failure

11.7.5.5.1 Particulate Air-Purifying

When breathing difficulty is encountered with a filter respirator (due to partial clogging with increased resistance), the filter(s) must be replaced. Disposable filter respirators must be discarded.

11.7.5.5.2 Gas or Vapor Air-Purifying

If, when using a gas or vapor respirator (chemical cartridge or canister), any of the warning properties (e.g., odor, taste, eye irritation, or respiratory irritation) occur, promptly leave the area and check the following:

1. Proper face seal
2. Damaged or missing respirator parts
3. Saturated or inappropriate cartridge or canister

If no discrepancies are observed, replace the cartridge or canister. If any of the warning properties appear again, the concentration of the contaminants may have exceeded the cartridge or canister design specification. When this occurs an air-line respirator or SCBA is required.

11.7.5.5.3 Service Life of Air-Purifying Respirator Canisters and Cartridges

The canisters or cartridges of air-purifying respirators are intended to be used until filter resistance precludes further use, or the chemical sorbent is expended as signified by a specific warning property, e.g., odor, taste, etc. All purifying respirators will be equipped with an end-of-service (ESLI) indicator, certified by NIOSH. If there is no ESLI appropriate for conditions in the workplace, a change schedule for canisters and cartridges will be established to ensure that canisters and cartridges are changed before the end of their service life. New canisters, cartridges or filters shall always be provided when a respirator is reissued. When in doubt about the previous use of the respirator, obtain a replacement canister or cartridge.

11.7.5.5.4 Supplied-Air Respirator

When using an air-lines respirator, leave the area immediately when the compressor failure alarm is activated or if an air pressure drop is sensed. When using an SCBA leave the area as soon as the air pressure alarm is activated.

11.7.5.6 Respirator Fit Testing

A fit test shall be used to determine the ability of each individual respirator wearer to obtain a satisfactory fit with any air-purifying respirator. Both quantitative and qualitative fit tests will be performed. Personnel must successfully pass the fit test before being issued an air-purifying respirator. *See Appendix C "Fit Test Worksheets"*.

No DMB employee is permitted to wear a negative-pressure respirator in a work situation until he or she has demonstrated that an acceptable fit can be obtained. Respirator fitting is conducted initially upon assignment to a task requiring use of a respirator. Refitting is conducted annually thereafter upon successful completion of the respirator training. The respirator user's medical status should be reviewed periodically.

Fit testing will be conducted by the Safety Coordinator or an associate and the test results will be the determining factor in selecting the type, model, and size of negative-pressure respirator for use by each individual respirator wearer.

11.7.5.6.1 Fit Checking

Each time a respirator is donned, the user will perform positive and negative pressure fit checks. These checks are not a substitute for fit testing. Respirator users must be properly trained in the performance of these checks and understand their limitations.

11.7.5.6.1.1 Negative Pressure Check

Applicability/Limitations: This test cannot be carried out on all respirators; however, it can be used on facepieces of air purifying respirators equipped with tight-fitting respirator inlet covers and on atmosphere supplying respirators equipped with breathing tubes which can be squeezed or blocked at the inlet to prevent the passage of air.

Procedure: Close off the inlet opening of the respirator's canister(s), cartridge(s), or filter(s) with the palm of the hand, or squeeze the breathing air tube or block its inlet so that it will not allow the passage of air. Inhale gently and hold for at least 10 seconds. If the facepiece collapses slightly and no inward leakage of air into the facepiece is detected, it can be reasonably assumed that the respirator has been properly positioned and the exhalation valve and facepiece are not leaking.

11.7.5.6.1.2 Positive Pressure Check

Applicability/Limitations: This test cannot be carried out on all respirators; however, respirators equipped with exhalation valves can be tested.

Procedure: Close off the exhalation valve or the breathing tube with the palm of the hand. Exhale gently. If the respirator has been properly positioned, a slight positive pressure will build up inside the facepiece without detection of any outward air leak between the sealing surface of the facepiece and the face.

11.7.5.6.1.3 Qualitative Fit Testing

MIOSHA regulations Part 451 requires qualitative fit tests of respirators and describe step-by-step procedures. This test checks the subject's response to a chemical introduced outside the respirator facepiece. This response is either voluntary or involuntary depending on the chemical used. Several methods may be used. The two most common are the irritant smoke test, and the odorous vapor test.

11.7.5.6.1.3.1 **IRRITANT SMOKE**

The irritant smoke test is an involuntary response test. Air purifying respirators must be equipped with a high efficiency particulate air (HEPA) filter for this test. An irritant smoke, usually either stannic chloride or titanium tetrachloride, is directed from a smoke tube toward the respirator. If the test subject does not respond to the irritant smoke, a satisfactory fit is assumed to be achieved. Any response to the smoke indicates an unsatisfactory fit.

The irritant smoke is an irritant to the eyes, skin, and mucous membranes. It should not be introduced directly onto the skin. The test subject must keep his or her eyes closed during the testing if a full facepiece mask is not used.

11.7.5.6.1.3.2 **ODOROUS VAPOR**

The odorous vapor test is a voluntary response test. It relies on the subject's ability to detect an odorous chemical while wearing the respirator. Air purifying respirators must be equipped with an organic cartridge or canister for this test. Isoamyl acetate (banana oil) is the usual test. An isoamyl acetate-saturated gauze pad is placed near the facepiece-to-face seal of the respirator of the test subject's skin. If the test subject is unable to smell the chemical, than a satisfactory fit is assumed to be achieved. If the subject smells the chemical, the fit is unsatisfactory.

If the subject cannot smell the chemical, the respirator will be momentarily pulled away from the subject's face. If the subject is then able to smell the chemical, a satisfactory fit is assumed. If the subject cannot smell the chemical with the respirator pulled away from the face, this test is inappropriate for this subject, and a different test will be used.

This test is limited by the wide variation of odor thresholds among individuals and the possibility of olfactory fatigue. Since it is a voluntary response test it depends upon an honest response.

11.7.5.6.1.4 Quantitative Fit Testing

Quantitative fit testing, using the Portacount Plus fit test system, is generally performed on both full-face and half-face negative pressure respirators. Fit factors are determined by comparing the

particle concentration outside the respirator with the concentration inside the respirator facepiece. An acceptable fit is achieved when the respirator wearer successfully completes a series of six programmed exercises (normal breathing, deep breathing, moving head up and down, moving head side to side, reading, and normal breathing) with a fit factor of 100 or more.

11.7.5.6.2 Special Problems

11.7.5.6.2.1 Facial Hair

No attempt will be made to fit a respirator on an employee who has facial hair which comes between the sealing periphery of the facepiece and the face, or if facial hair interferes with normal functioning of the exhalation valve of the respirator.

11.7.5.6.2.2 Glasses and Eye/Face Protective Devices

Proper fitting of a respiratory protective device facepiece for individuals wearing corrective eyeglasses or goggles, may not be established if temple bars or straps extend through the sealing edge of the facepiece. If eyeglasses, goggles, face shield or welding helmet must be worn with a respirator, they must be worn so as not to adversely affect the seal of the facepiece. If a full-facepiece respirator is used, special prescription glasses inserts are available if needed.

11.7.5.6.2.3 Respirator User Cards

Respirator User Cards will be issued by the Safety Coordinator to workers who have been trained, fitted, and medically evaluated to use respirators. A Respirator User Card will include:

1. Name and identification number of the worker.

2. The statement: "(name) has been trained, fitted and medically evaluated to use the respirator(s) indicated".

3. The type(s), model(s), and size(s) of respirator(s) that the cardholder was issued.

4. Expiration date of card.

11.7.5.6.2.4 Documentation

Respirator fit-testing shall be documented and shall include the type of respirator, brand name and model, method of test and test results, test date and the name of the instructor/tester. *See Appendix D "Respirator Training Certification and User Cards"*.

11.7.5.7 Maintenance and Issuance of Respirators

11.7.5.7.1 Maintenance

The maintenance of respiratory protective devices involves a thorough visual inspection for cleanliness and defects (i.e., cracking rubber, deterioration of straps, defective exhalation and inhalation valves, broken or cracked lenses, etc.). Worn or deteriorated parts will be replaced prior to reissue. No respirator with a known defect is reissued for use. No attempt is made to replace components, make adjustments or make repairs on any respirator beyond those recommended by the manufacturer. Under no circumstances will parts be substituted as such substitutions will invalidate the approval of the respirator. Either the manufacturer or a qualified trained technician will conduct any repair to reducing or admission valves, regulators, or alarms.

11.7.5.7.2 Cleaning of Respirators

All respirators in routine use shall be given to individuals for their exclusive use and cleaned and sanitized on a periodic basis by the user. Respirators used non-routinely shall be cleaned and sanitized after each use and filters and cartridges replaced by the user. Routinely used respirators are maintained individually by the respirator wearer. Replacement cartridges and filters are obtained by contacting the Safety Coordinator.

Cleaning and disinfection of respirators must be done frequently to ensure that skin-penetrating and dermatitis-causing contaminants are removed from the respirator surface. Respirators maintained for emergency use or those used by more than one person must be cleaned after each use by the user.

The following procedure is recommended for cleaning and disinfecting respirators:

1. Remove and discard all used filters, cartridges, or canisters.

2. Wash facepiece and breathing tube in a cleaner-disinfectant solution. A hand brush may be used to remove dirt. Solvents, which can affect rubber and other parts, shall not be used.

3. Rinse completely in clean, warm water.

4. Air-dry in a clean area in such a way as to prevent distortion.

5. Clean other respirator parts as recommended by the manufacturer.

6. Inspect valves, headstraps, and other parts to ensure proper working condition.

7. Reassemble respirator and replace any defective parts.

8. Place in a clean, dry plastic bag or other suitable container for storage after each cleaning and disinfection.

11.7.5.7.3 Issuance of Respirators

Employees performing tasks requiring a respirator may obtain a clean, sanitized respirator from their supervisor. Respiratory protective equipment shall not be ordered, purchased, or issued to personnel unless the respirator wearer has received respirator training and a fit test. New employees who require respiratory protective equipment, must receive training and certification before being issued equipment.

The DMB provides at least three types of devices. The facepieces have a variety of canisters that may be worn with them; hence, the canisters and facepieces are packaged separately. At the time of issue the appropriate canister is determined, based on the user's needs, and is issued with the appropriate facepiece. In addition, disposable respirators with filter ratings N-95 and N-100 ratings are available for use under appropriate conditions.

11.7.5.7.4 Storage

After inspection, cleaning, and any necessary minor repairs, store respirators to protect against sunlight, heat, extreme cold, excessive moisture, damaging chemicals or other contaminants. Respirators placed at stations and work areas for emergency use shall be stored in compartments built for that purpose, shall be quickly accessible at all times and will be clearly marked. Routinely used respirators, such as half-mask or full-face air-purifying respirators, shall be placed in sealable plastic bags. Respirators may be stored in such places as lockers or toolboxes only if they are first placed in carrying cases or cartons. Respirators shall be packed or stored so that the facepiece and exhalation valves will rest in a normal position and not be crushed. Emergency use respirators shall be stored in a sturdy compartment that is quickly accessible and clearly marked.

11.7.5.8 Program Surveillance

An appraisal of the effectiveness of the respirator program shall be carried out at least annually. Action shall be taken to correct defects found in the program.

The evaluation of the Respirator Program will include investigating wearer acceptance of respirators, inspecting respirator program operation, and appraising protection provided by the respirator. Evidence of excessive exposure of respirator wearers to respiratory hazards will be followed up by investigation to determine why inadequate respiratory protection was provided. The findings of the respirator program evaluation will be documented, and this documentation will list plans to correct faults in the program and set target

dates for the implementation of the plans. These evaluations will be conducted at least annually.

11.7.5.9 Recordkeeping

The following records shall be developed and maintained for the DMB Respirator Program:

1. Medical Evaluations
2. Training Records
3. Respirator Program
4. Manual, IHP, and SOPs
5. Hazard Evaluations (Air sampling results, surveys, respirator selection records)
6. Fit Test Records
7. Program Evaluations

11.7.6 TRAINING

Respirator users and their supervisors will receive training on the contents of the DMB Respiratory Protection Program and their responsibilities under it. They will be trained on the proper selection and use, as well as the limitations of the respirator. Training also covers how to ensure a proper fit before use and how to determine when a respirator is no longer providing the protection intended.

Training in the use, maintenance, capabilities, and limitations of respirators will take place initially upon assignment of personnel to tasks requiring the use of respirators. Retraining is given annually thereafter and only upon successful completion of the medical evaluation.

The training program will include the following:

1. Nature and degree of respiratory hazard.
2. Respirator selection, based on the hazard and respirator capabilities and imitations.
3. Donning procedures and fit tests including hands-on practice.
4. Care of the respirator, e.g., need for cleaning, maintenance, storage, and/or replacement.
5. Use and limitations of respirator.

Respirator training must be properly documented (*Appendix D*) and include the type and model of respirator for which the individual has been trained and fit-tested.

11.7.7 REFERENCES AND APPENDICES

For additional information refer to:

American National Standards Institute: American National Standard Practices for Respiratory Protection, ANSI Z88.2, New York, NY: American National Standards Institute, 1989.

American National Standards Institute: American National Standard For Respiratory Protection - Respirator Use - Physical Qualifications for Personnel, ANSI Z88.6, New York, NY: American National Standards Institute, 1984.

Colton, Craig, et. al., Respiratory Protection: A Manual and Guideline, 2nd Ed., Akron, OH: American Industrial Hygiene Association, 1991.

Compressed Gas Association: Commodity Specification for Air. (ANSI/CGA G-7.1), Arlington, VA: Compressed Gas Association, Inc., 1989.

MIOSHA Standard Part 451 "Respiratory Protection".

MIOSHA Department of Occupational Health, R325.51101-51108 "Permissible Exposure Limits" and R3502 "General Respiratory Protection".

Appendices:
A. Respirator Program Detail
B. Respirator Selection and Use Table
C. Fit Test Worksheets
D. Respirator Training Certification and User Card
E. Respirator Decision Logic Sequence

RESPIRATOR PROGRAM DETAIL

The following is a list of work areas/operations where respirators are used, the type of respirators utilized and the names of employees who wear those respirators. This list is to be completed by the DMB Safety & Health Coordinator and updated as needed during surveillance and reviewed during an annual program evaluation. A listing of emergency-use respirators should be included.

Work Area/Operation	***Type of Work Contaminant/Hazard***	***Type of Respirator***	***Employee***

11.7.7.1 Appendix B – Respirator Selection and Use Table

Table 1 – Respirator Selection and Use (Please note that this table will need to be updated as new hazards are identified)

HAZARD	RESPIRATOR TYPE
Asbestos	Half-mask, air-purifying respirator with HEPA filters Full-face, air-purifying respirator with HEPA filters Hull-face, powered air-purifying respirator with HEPA filters
Epoxy- or Oil-Based Paints, Solvents	Half-face, air-purifying respirators with organic vapor filters Full-face powered air-purifying respirator with organic vapor filters
Corrosive Materials	Half-face, air-purifying respirators with organic vapor/acid gas filters Full-face powered air-purifying respirator with organic vapor/acid gas filters
Lead-based Paint Removal	Half-face, air-purifying respirators with HEPA filters Full-face, air-purifying respirators with HEPA filters Full-face, powered air-purifying respirators with HEPA filters
Use of Pesticides, Herbicides, and Rodenticides	Full-face, air-purifying respirator with combination particulate and pesticide cartridges Full-face, powered air-purifying respirator with combination particulate and pesticide cartridges

11.7.7.2 Appendix C – Fit Test Worksheets

QUALITATIVE RESPIRATOR FIT TEST (Page 1 of 2)

Name: _____ SSN: _____ - ____ - _____
Clean Shaven? __ Yes __ No
Spectacle Kit? __ Yes __ No
Manufacturer/Model _____ Size: __S __M __L
Irritant Smoke __ Pass __Fail
Isoamyl Acetate __Pass __ Fail
Manufacturer/Model _____ Size: __S __M __L
Irritant Smoke __ Pass __Fail
Isoamyl Acetate __Pass __ Fail

The following paragraph referred to as the "Rainbow Passage" and is used to determine the ability of the employee wearing the respirator to speak in their face piece without affecting the respirator seal. The employee should speak the following passage while they wear their respirator to ensure they can communicate without compromising the facepiece seal.

WHEN THE SUNLIGHT STRIKES RAINDROPS IN THE AIR, THEY ACT LIKE A PRISM AND FORM A RAINBOW. THE RAINBOW IS A DIVISION OF WHITE LIGHT INTO MANY BEAUTIFUL COLORS. THESE TAKE THE SHAPE OF A LONG ROUND ARCH. WITH ITS PATH HIGH ABOVE, AND ITS TWO ENDS APPARENTLY BEYOND THE HORIZON, THERE IS ACCORDING TO LEGEND, A BOILING POT OF GOLD AT ONE END. PEOPLE LOOK, BUT NO ONE EVER FINDS IT. WHEN A MAN LOOKS FOR SOMETHING BEYOND HIS REACH, HIS FRIENDS SAY HE IS LOOKING FOR THE POT OF GOLD AT THE END OF THE RAINBOW.

Examiner _____ Date _____

Examiner _____ Date _____

QUANTITATIVE RESPIRATOR FIT TEST REPORT

LAST NAME _____

FIRST NAME _____

ID NUMBER _____

NEXT TEST DUE _____

OPERATOR NAME _____

RESPIRATOR MODEL _____

SIZE _____

MANUFACTURER _____

APPROVAL NUMBER _____

Appendix C – Fit Test Worksheets (page 2 of 2)

NOTES _____

TEST DATE _____

TEST TIME _____

TEST DATA

Fit Factor Pass Level: 100

Ex.	**Ambient** (Part/cc)	**Mask** (Part/cc)	**Fit Factor**	**Pass/Fail**
NB DB SS US R NB				

OVERALL FIT FACTOR = _____

Operator _____ Date _____
Operator _____ Date _____

11.7.7.3 Appendix D – Respirator Training Certification and User Card

(Supervisor to have employee complete and sign). Supervisor to sign and retain original

I hereby certify that I have been trained in the proper use and limitations of the respirator issued to me. The training included the following:

1. Instruction on putting on, fitting, testing and wearing the respirator.
2. Instruction on inspection, cleaning, and maintaining the respirator.
3. Explanation of dangers related to misuse.
4. Instructions on emergency situations.

I further certify that I understand the use, care, and inspection of the respirator and have tested and worn the unit.

Date: _____

Signed: _____ _____
(print name)

SSN: _____

Type of Fit Test: _____

Training Coordinator: _____

Expiration Date _____ Test Results ___ Pass ___Fail

RESPIRATOR ASSIGNMENT RECORD
Date Assigned _____ Where Stored _____

Type of Respirator _____ Model # _____

For respirators whose function is dependent upon a tight facepiece seal, no impediments should be present which would prevent a proper face seal such as beards, sideburns, eyeglass frames, or skull caps. Are any of these present, and if so, are they removable or properly accommodated? _____

Supervisor Signature _____

Supervisor Printed Name _____

11.7.7.4 Appendix E – Respirator Decision Logic Sequence

The Respirator Decision Logic Sequence is presented in Figure 1 in the form of a flow chart. This flow chart can be used to identify suitable classes of respirators for adequate protection against specific environmental conditions. Refer to the corresponding narrative section for additional information pertaining to a specific part of the flow chart.

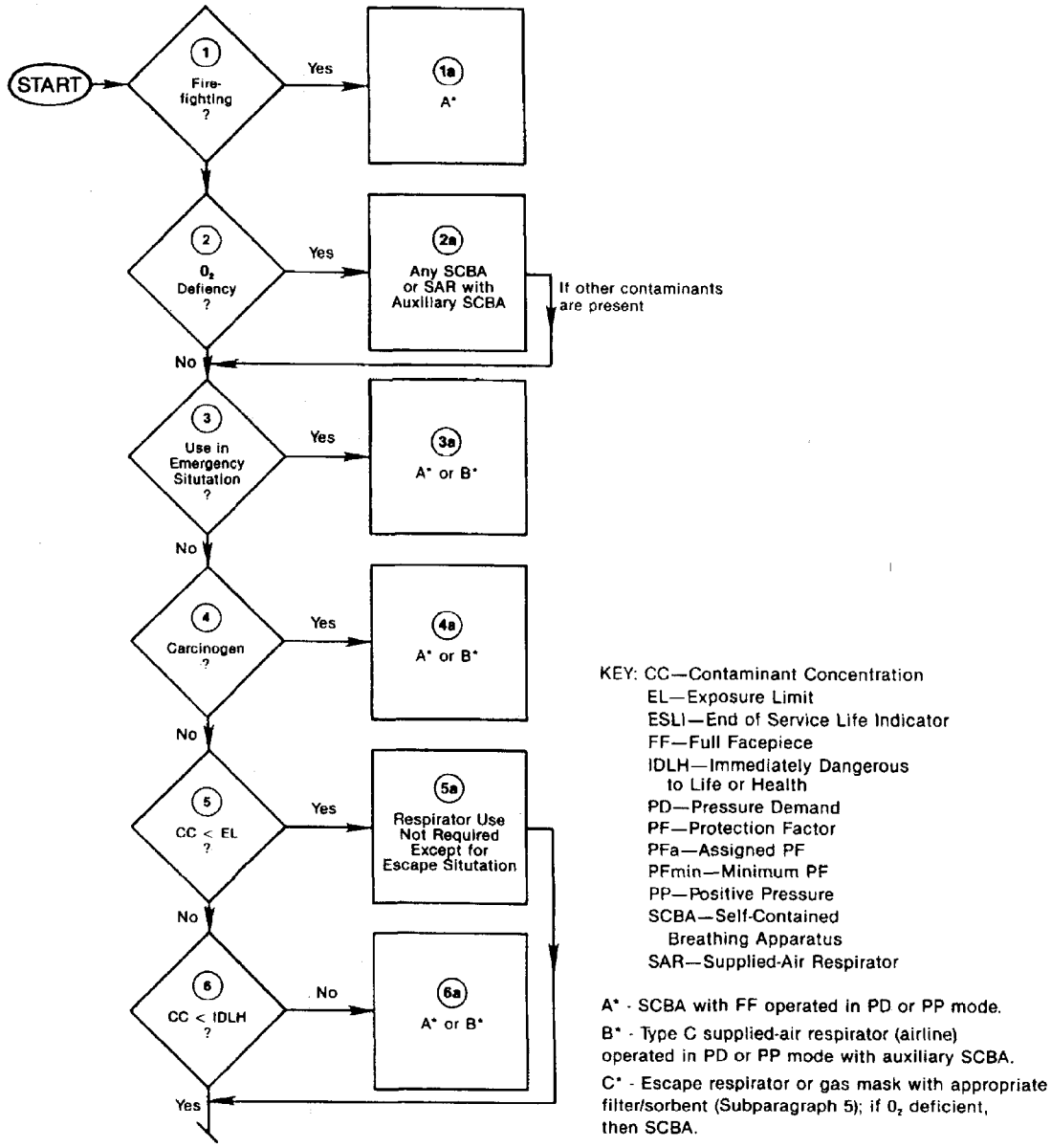

Figure 1. — Flow Chart of Respirator Decision Logic Sequence

APPENDIX E CONTINUED

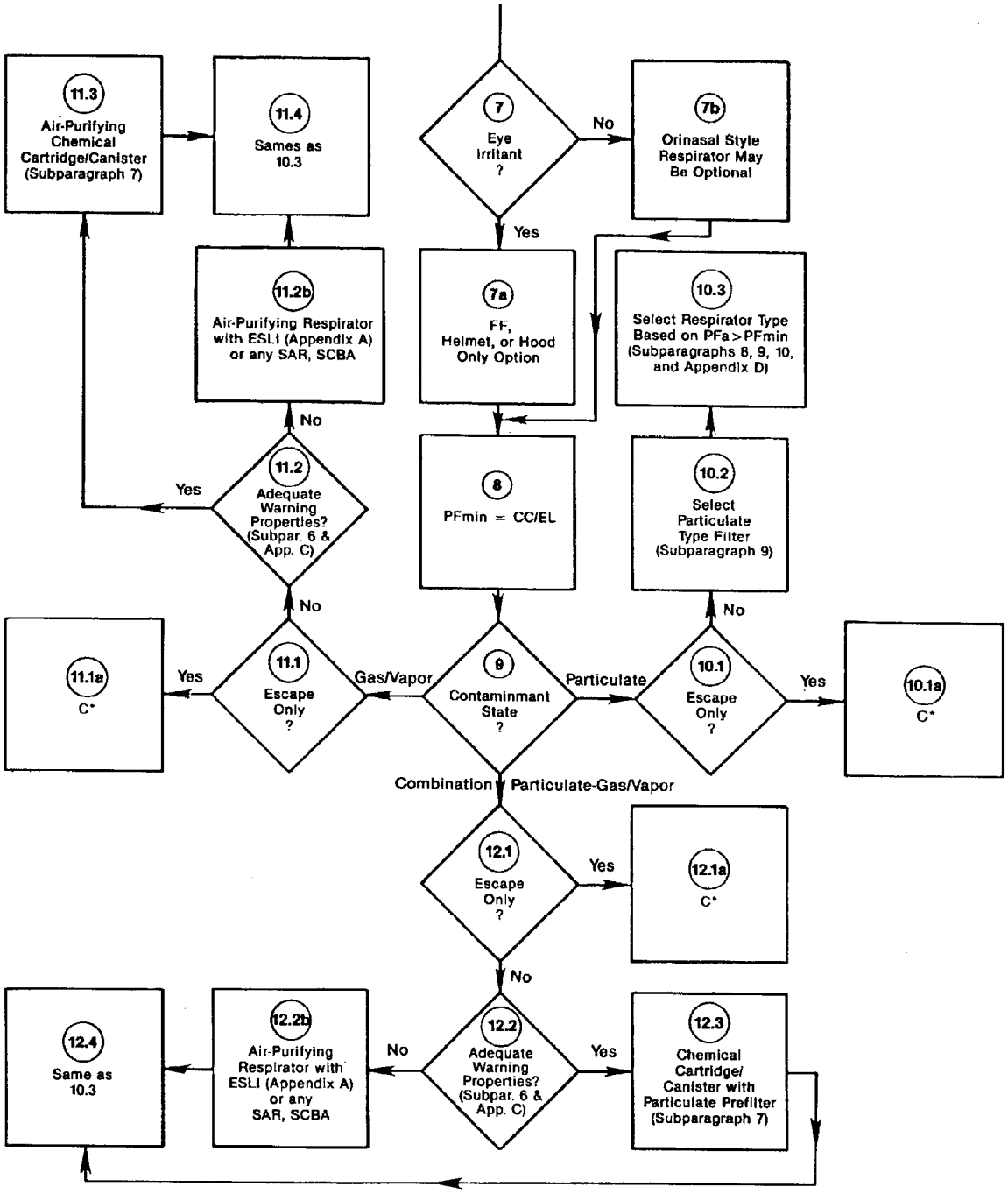

Figure 1. — Flow Chart of Respirator Decision Logic Sequence — Continued

APPENDIX E Continued

After all criteria have been identified and evaluated and after the requirements and restrictions of the respiratory protection program have been met, the following sequence of questions can be used to identify the class of respirators that should provide adequate respiratory protection:

1. Is the respirator intended for use during fire fighting?
   a. If yes, only a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure demand or other positive pressure mode is recommended.
   b. If no, proceed to Step 2

2. Is the respirator intended for use in an oxygen-deficient atmosphere, i.e., less than 19.5% oxygen at sea level?
   a. If yes, any type of SCBA or supplied-air respirator (SAR) with an auxiliary SCBA is recommended. Auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted. If additional contaminants are present, proceed to Step 3.
   b. If no, proceed to Step 3.

3. Is the respirator intended for use during emergency situations?
   a. If yes, two types of respirators are recommended: a SCBA with a full facepiece operated in pressure demand or other positive pressure mode or an SAR with a full facepiece operated in pressure demand or other positive pressure mode in combination with an auxiliary SCBA operated in pressure demand or other positive pressure mode. Auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted.
   b. If no, proceed to Step 4.

4. Is the contaminant regulated by the Department of Labor as a potential occupational carcinogen or identified by NIOSH as a potential human carcinogen in the workplace, and is the contaminant detectable in the atmosphere?
   a. If yes, two types of respirators are recommended: A SCBA with a full facepiece operated in pressure demand or other positive pressure mode or SAR with a full facepiece operated in pressure demand or other positive pressure mode in combination with an auxiliary SCBA operated in pressure demand or other positive pressure mode. Auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted.
   b. If no, proceed to Step 5.

5. Is the exposure concentration of the contaminant, as determined by acceptable industrial hygiene methods, less than the National Institute of Occupational Safety and Health Recommended Exposure Limit (NIOSH REL) or other applicable exposure limit? (Whenever a worker is given a respirator to use on a voluntary basis when ambient levels are below applicable limits, MIOSHA requires the implementation of a complete respiratory protection program, which includes medical evaluation, training, fit testing, periodic environmental monitoring, and all other requirements in Section 11.7)
   a. If yes, a respirator would not be required except for an escape situation. Proceed to Step 7.
   b. If no, proceed to Step 6.

6. Are conditions such that a worker who is required to wear a respirator can escape from the work area and not suffer loss of life or immediate or delayed irreversible health effects if the respirator fails, i.e., are the conditions <u>not</u> immediately dangerous to life or health (IDLH)?
   a. If yes, conditions are not considered to be IDLH. Proceed to Step 7.
   b. If no, conditions are considered to be IDLH. Two types of respirators are recommended: a SCBA with a full facepiece operated in pressure demand or other positive pressure mode or an SAR with

a full facepiece operated in pressure demand or other positive pressure mode in combination with an auxiliary SCBA operated in pressure demand or other positive pressure mode. The auxiliary SCBA must be of sufficient duration to permit escape to safety if the air supply is interrupted.

7. Is the contaminant an eye irritant, or can the contaminant cause eye damage at the exposure concentration?
   a. If yes, a respirator equipped with a full facepiece, helmet, or hood is recommended. Proceed to Step 8.
   b. If no, an orinasal respirator may still be an option, depending on the exposure concentration. Proceed to Step 8.

8. Divide the 8-hour time-weighted average (TWA) exposure concentration for the contaminant (or maximum exposure concentration for a contaminant with a ceiling limit) determined in Step 5 by the NIOSH REL or other applicable exposure limit to determine the minimum protection factor required. For escape respirators, determine the potential for generation of a hazardous condition caused by an accident or equipment failure. If a potentially hazardous condition could occur or a minimum protection factor has been calculated, proceed to Step 9.

9. If the physical state of the contaminant is a particulate (solid or liquid) during periods of respirator use, proceed to Step 10; if it is a gas or vapor, proceed to Step 11; if it is a combination of gas or vapor and particulate, proceed to Step 12.

10. Particulate respirators
    a. Is the particulate respirator intended only for escape purposes?
       1) If yes, a self-contained breathing apparatus (SCBA) or a self-contained self-rescuer (SCSR) having a suitable service life must be used. *A full-face SCBA must be used in situations where the potential for eye irritation exists.*
       2) If no, the particulate, respirator is intended for use during normal work activities. Proceed to Step 10.b.
    b. A filter medium that will provide protection against exposure to the particulate in question is recommended.
    c. NIOSH approved respirators that have Assigned Protection Factors (APF's) equal to or greater than the minimum protection factor determined in Step 8 are recommended. Maximum airborne concentrations for each level of respiratory protection can be calculated by multiplying the NIOSH REL or other applicable exposure limit by the APF for that class of respirators.

11. Gas/Vapor Respirators
    a. Is the gas/vapor respirator intended for "escape only" purposes?
       1) If yes, a self-contained breathing apparatus (SCBA) or a self-contained self-rescuer (SCSR) having a suitable service life must be used. *A full-face SCBA must be used in situations where the potential for eye irritation exists.*
       2) If no, the gas/vapor respirator is intended for use during normal work activities. Proceed to Step 11.b.
    b. Are the warning properties for the gas/vapor contaminant adequate at or below the NIOSH REL or other applicable exposure limit?
       1) If yes, proceed to Step 11.c
       2) If no, an air-purifying respirator equipped with an effective end-of-service-life indicator (ESLI), a supplied-air respirator, or a self-contained breathing apparatus is recommended.
    c. An air-purifying chemical cartridge/canister respirator is recommended that has a sorbent suitable for the chemical properties of the anticipated gas/vapor contaminant(s) and for the anticipated exposure levels.

d. NIOSH approved respirators that have not been previously eliminated from Table 2 and that have APF's equal to or greater than the minimum protection factor determined in Step 8 are recommended. Maximum airborne concentrations for each class of respiratory protection can be calculated by multiplying the NIOSH REL or other applicable exposure limit by the APF for that class of respirators.

12. Combination Particulate and Gas/Vapor Respirators
    a. Is the combination respirator intended for "escape only" purposes?
        1) If yes, a self-contained breathing apparatus (SCBA) or a self-contained self-rescuer (SCSR) having a suitable service life must be used. *A full-face SCBA must be used in situations where the potential for eye irritation exists*
        2) If no, the combination respirator is intended for use during normal work activities. Proceed to Step 12.b
    b. Does the gas/vapor contaminant have adequate warning properties at or below the NIOSH REL or other applicable exposure limit?
        1) If yes, proceed to Step 12.c
        2) If no, either an air-purifying respirator equipped with an effective ESLI, a supplied-air respirator, or a self-contained respirator is recommended proceed to Step 12.d.
    c. An air-purifying chemical cartridge/canister is recommended that has a particulate prefilter suitable for the specific types(s) of gas/vapor and particulate contaminant(s) and for the exposure concentrations. Proceed to Step 12.d
    d. NIOSH approved respirators that have APF's equal to or greater than the minimum protection factor determined in Step 8 are recommended. Maximum airborne concentrations for each level of respiratory protection can be calculated by multiplying the NIOSH REL or other applicable exposure limit by the APF for the class of respirators. The calculated maximum use concentration limits should not exceed the recommended limitations. Workers should meet the medical guidelines established.