**HEARING CONSERVATION PROGRAM**

**MANUAL**

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**Table of Contents**

# Introduction

**Hearing Conservation Program Components**

**Monitoring for Hearing Hazards**

**Engineering and Administrative Noise and Exposure Controls**

**Audiometric Evaluation**

**Hearing Protection Devices**

**Training and Motivation**

**Record Keeping**

**Program Audit**

**Appendix A OSHA Occupational Noise Exposure Standard (29 CFR 1910.95)**

**Appendix B Unit-Specific Processes, Tasks, or Areas Known to Cause Exposures Exceeding the “Action Level”**

# Appendix C Unit-Specific Noise Exposure Data

**Appendix D Unit-Specific “Noisy” Equipment or Areas Which Require Hearing Protection**

# Introduction

Hearing loss is one of the most pervasive occupational health problems today. Noise-induced hearing loss can be reduced, or often eliminated, through the successful application of occupational Hearing Conservation Programs.

Given that there are “noisy” environments and tasks associated with the University, a Hearing Conservation Program has been developed and modeled after the OSHA Occupational Noise Exposure Standard (29 CFR 1910.95)(Appendix A). “Noisy” areas or tasks are where employee noise exposures equal or exceed an 8-hour Time Weighted Average (TWA) of 85 decibels measured on the A scale (dBA). This exposure level shall be termed the “Action Level.”

When employees are subjected to sound levels equal to or exceeding the “Action Level”, administrative or engineering controls must be utilized first, as much as is feasible on both a cost and operational basis. If such controls fail to reduce exposure to below a TWA of 90 dBA, personal protective equipment shall be provided and used to reduce sound levels to a TWA of 90 dBA or less.

A successful Hearing Conservation Program benefits both the employer and affected employees. Employees are spared hearing impairments and evidence suggests that they may experience less fatigue and generally better health. The employer benefits from reduced medical expenses and worker compensation costs. In some cases there may also be improved morale and work efficiency.

The existence of a Hearing Conservation Program does not guarantee the prevention of occupational hearing loss. Experiences with successful Hearing Conservation Programs show that management needs to develop and adhere to certain policies from the start. These policies cover the integration of the Hearing Conservation Program into Penn State’s overall safety and health program, designation of key individuals, standard operating procedures, proper use of outside services as needed, and purchase of appropriate equipment.

This manual describes the Hearing Conservation Program in detail. Concepts and action items are presented in terms of the responsibilities of four main groups of personnel: Management, participating unit Program Administrator, EHS and the employees directly affected by exposure to noise. An audit checklist is also provided in Appendix C to assist in assessing the Hearing Conservation Program on a step-by-step basis.

# Hearing Conservation Program Components

The seven basic components of the Hearing Conservation Program consist of:

1. Noise exposure monitoring, conducted by EHS or their representative,
2. Engineering and administrative controls, as determined by Management, EHS and the participating unit’s Program Administrator,
3. Audiometric (hearing) testing of affected employees, conducted by a qualified health care provider,
4. Use of hearing protection devices by employees as needed,
5. Training and motivation of employees and supervisors, by the Program Administrator and EHS;
6. Record keeping, by EHS, the participating unit and the health care provider,
7. Program audit, by the Program Administrator and EHS

# Monitoring for Hearing Hazards

As with any hazard, it is important to characterize it accurately and to identify the affected employees. When information indicates that any employee's exposure may equal or exceed the “Action Level”, EHS shall develop and implement a noise monitoring program for that task or area. The sampling strategy shall be designed to identify employees for possible inclusion in the hearing conservation program and to ensure proper selection and use of hearing protection if engineering or administrative controls are not feasible. This monitoring shall include representative personal exposure sampling or area monitoring conducted by EHS or their representative.

The results of noise measurements must be reported to the Hearing Conservation Program Administrator and employees in an understandable format. The Program Administrator needs to coordinate closely with EHS and employees to make sure measurements represent typical work or process cycles so that noise levels are adequately and realistically sampled. Employees have the responsibility of sharing their knowledge about the work environment, machinery, equipment and specific operations with those who measure the exposures.

Monitoring shall be repeated whenever a change in production, process, equipment or controls increase noise exposures to the extent that additional employees may be exposed at or above the "Action Level", or the attenuation provided by hearing protectors is found to be inadequate. Appendix B shows the current processes, tasks, etc. that are known to cause exposures to exceed the “Action Level.”

# The Program Administrator shall notify each employee exposed at or above the “Action Level” and shall provide affected employees or their representatives the opportunity to observe any noise measurements activities. Appendix C contains the participating unit’s current Noise Exposure Data.

**Engineering and Administrative Noise and Exposure Controls**

When employees’ exposures exceed the “Action Level”, engineering or administrative controls must be utilized first, as much as is feasible on both a cost and operational basis.

Ideally, engineering or administrative controls should significantly reduce or eliminate the hearing hazard or exposure. It is especially important for units to specify low noise levels when purchasing new or refurbished systems and equipment.

When noise exposure cannot be reduced to where it is no longer a hearing hazard, a program for providing fitting, training in the use of, and maintaining hearing protectors must be established.

Management needs to identify controllable exposure sources, set goals for their control, and prioritize allocated resources to accomplish these goals. Managers should also explore potential administrative controls, such as scheduling that will minimize exposure to noise, and providing quiet lunch and break areas. The workers need to communicate their concerns to those in charge of controls, and must learn to work safely in their environment by using available controls.

# Audiometric Evaluation

Participating units shall make audiometric (hearing) testing available to all employees whose exposures are known to equal or exceed the “Action Level” , to those who work in known “noisy” areas or tasks and to those who work with known “noisy” equipment. This shall be provided at no cost to employees. Audiometric testing shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation (CAOHC).

Units shall ensure that a valid "baseline audiogram" is established as soon as possible, and no more than 6 months, after an employee's first known exposure at or above the "action level" or to known “noisy” tasks, equipment or areas. Testing to establish a "baseline audiogram" shall be preceded by at least 14 hours of unprotected quiet (i.e. without use of hearing protection). Audiograms shall then be repeated annually and compared to the “baseline audiogram” using an industry standard type of audiometric database analysis conducted by the chosen health care provider.

An “exit audiogram” shall be conducted following a minimum of 14 hours of unprotected quiet when an employee leaves employment or is permanently rotated out of the previously noted occupational noise exposures.

Audiometric evaluation is important, since it is the only way to determine whether occupational hearing loss is being prevented. Management must allocate sufficient time and resources to allow for accurate testing.

Program Administrator’s Responsibilities:

* Schedule audiometric testing.
* Schedule follow-up evaluations, as needed.
* Ensure proper and timely feedback of test results from the health care provider to employees.
* Ensure that employees follow up on any recommendations for treatment or further medical or audiologic evaluation, as needed.
* Encourage employees to ask questions during or after testing.

Health Care Provider Responsibilities:

* Proper audiometric testing equipment maintenance and calibration.
* Audiogram review.
* Medical referral, as needed.
* Ensure proper and timely feedback and explanation of test results to employees.
* Encourage employees to ask questions and discuss testing procedures and results.

Employee Responsibilities:

* Disclose information about known or possible ear problems.
* Disclose information about known or possible prior noise or toxicant exposures.
* Ensure perceived problems encountered during audiometric testing are reported immediately during testing.
* Follow up on any health care provider recommendations for treatment or further medical or audiologic evaluation.
* Ask questions at any time during the process, if you have them. If you are not satisfied with the information you receive, inform the Program Administrator or EHS immediately.

Effective communication and coordination among management, health care providers, and employees is extremely important.

# Hearing Protection Devices

Regardless of exposure, feasible engineering or administrative controls, units shall make hearing protectors available to all employees at no cost to the employees. Units shall ensure that hearing protectors are worn by the following employees:

1) Those who are exposed to the “Action Level” or greater.

1. Those who, through audiometric testing and data analysis, have shown a Standard Threshold Shift (STS) in hearing in one or both ears as determined by a qualified health care provider.
2. Those who work with “noisy” equipment or in “noisy” areas but whose exposure may not exceed the “Action Level”. Appendix D lists examples of known “noisy” equipment and areas.

A good "rule of thumb" for determining if hearing protection is required is as follows:

If it is difficult to hear or understand a "normal" tone of voice or conversation at a distance of about three feet, noise levels are probably exceeding safe levels and hearing protection must be used.

Employees shall have the opportunity to select hearing protectors from a variety of suitable models, types, sizes, etc. Hearing protectors shall be replaced as necessary.

Units shall ensure that hearing protector effectiveness/attenuation is adequate for the specific noise environments in which the protector will be used. This can be done by EHS, or their representative, using area or personal noise exposure monitoring. Hearing protectors must attenuate employee exposure to at least an 8-hour TWA of 90 dBA.

For employees who have experienced a Standard Threshold Shift (STS), hearing protectors must attenuate their exposure to an 8-hour TWA of 85 dBA or below.

Due to “real world” conditions vs. laboratory testing differences, the US EPA Noise Reduction Rating (NRR) shown on hearing protection packaging is not considered adequate to protect employees’ hearing. The actual “real world” NRR must be calculated as follows:

Actual “real world” NRR = (NRR shown on label – 7) – 50% of the NRR shown on label

In the “real world”, hearing protection wearers typically receive about 50% or less of the labeled NRR in any given situation. This is due to physical differences, improper fitting/use, etc. Therefore, over-kill must be used when selecting hearing protection.

The use of ear plugs **and** muffs is recommended when working with “noisy” equipment for long periods or when exposed to extremely loud sounds (e.g. gunfire, jet engines, etc.).

Use of ear plugs and muffs increases the NRR by ~3 dB.

Unless great care is taken in establishing hearing protector procedures, employees will receive little benefit. Each employee can react differently to the use of such devices, and a successful program should respond to individual needs.

EHS/Program Administrator responsibilities are:

* To be knowledgeable in the details of hearing protector evaluation, selection, and use, and must be able to impart this information to employees.
* To encourage employees to ask questions and help them solve any problems that may arise.
* To perform periodic on-site checks of the use, condition and performance of hearing protectors including availability of replacement devices, as well as, parts that tend to deteriorate with use (such as earmuff cushions).
* To ensure proper use of hearing protectors at work.
* To encourage hearing protection use at home.

Supervisor responsibilities are:

* To facilitate the procurement of appropriate hearing protection devices,
* To demonstrate commitment to the program (e.g., by modeling the use of these devices in appropriate situations),
* To provide the personnel and facilities to train employees in the proper and optimum use and care of hearing protection devices,
* To enforce proper use of hearing protectors at work.
* To encourage hearing protection use at home.
* To encourage employees to ask questions and help them solve any problems that may arise.

Employee responsibilities are:

* To remain fully informed about the need for hearing protection,
* To wear hearing protection correctly at all times and seek replacements as necessary,
* To encourage co-workers to use hearing protection (at work and home),
* To communicate problems or questions to their supervisors, the Program Administrator or EHS.

# Training and Motivation

Participating units shall institute a training program for all employees exposed at or above the “Action Level” or who are known to work with “noisy” equipment or work in “noisy” areas (see Appendix D) and shall ensure employee participation in such program. Training shall be repeated annually and the information provided shall be continually updated to address changes in protective equipment, work processes, equipment, etc.

During training, employees shall at a minimum be informed of the following:

1) The effects of noise on hearing (at work and home).

2) The purpose of hearing protectors, the advantages, disadvantages and attenuation of various types, and instructions on selection, fitting, use and care.

3) The purpose of audiometric testing, and an explanation of the test and data analysis procedures.

Training and motivation are valuable for both management and employees so they understand that a successful Hearing Conservation Program takes commitment, communication, and cooperation. Training should be preplanned and past successes and failures should be addressed.

Program Administrator responsibilities:

* Schedule annual training,

Supervisor responsibilities:

* Ensure training is scheduled and held annually,

EHS Responsibilities:

* Provide training presentations that are short, simple, and highly relevant to employees and management.
* Encourage questions and open communication, and ensure that all problems discussed during training receive prompt attention.

Employee responsibilities:

* Contribute to their own education by raising questions and concerns,
* Inform the Program Administrator, Supervisor, EHS, etc. when specific procedures are impractical and suggest alternatives, when possible.
* Communicate concerns to management.

# Record Keeping

Each element of the Hearing Conservation Program generates its own type of record (e.g., noise surveys, audiograms (hearing tests), medical histories, training records, etc.), and much of this information needs to be integrated into employee’s and unit records.

Historical record keeping is vital because injuries to hearing due to over exposures are rarely as evident as other types of occupational events (i.e. noise-induced hearing loss takes place very slowly over time). Therefore, complete documentation is also important when evaluators attempt to construct historical records that pertain to an individual's long-term exposures and effectiveness questions concerning prevention and control measures.

Program Administrator responsibilities:

* Provide adequate resources for efficient record processing, review, and storage
* Procure outside services if necessary
* Ensure confidentiality of personal data,
* Maintain Hearing Conservation Program records and ensure that each employee has access to his or her own files.
* Ensure that information entered into the records is accurate, legible, complete, and self-explanatory.
* Ensure records are standardized, cross-referenced, and properly maintained.
* Ensure that health care providers communicate concerns/findings about employee hearing loss so problems can be identified and addressed.

Employees should take advantage of the record keeping system by inquiring about their hearing status, especially at the time of the annual audiogram.

# Program Audit

A thorough audit of all the Hearing Conservation Program's components is necessary to determine the extent to which the program is really working, or if there are problems, which elements or departments need improvement. The Hearing Conservation Program audit should be revisited annually.

There are two basic approaches to program auditing:

1. Assess the completeness and quality of the program's components using checklists, such as those found in Appendix E.
2. Evaluate and compare baseline and annual audiometric testing data of employees exposed to hearing hazards.

Management should dedicate resources for program auditing (i.e., trained individuals, computer resources, etc.). In addition, managers must be willing to acknowledge and solve problems that arise.

The Program Administrator must also seek to identify and correct any deficiencies. Also, as with many other aspects of the program, employees should provide both positive and negative feedback about the program to the Program Administrator, management or EHS. Employees should also participate in the implementation of the improvements.

Appendix A OSHA Occupational Noise Exposure Standard (29 CFR 1910.95)

<http://www.osha.gov/>

Appendix B Unit-Specific Processes, Tasks or Areas Known to Cause Exposures Exceeding the “Action Level”

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# Appendix D Unit-Specific “Noisy” Equipment or Areas Which Require Hearing Protection

##  “Noisy” Equipment

1. Gas powered equipment such as mowers, chain saws, concrete saws, leaf blowers, vacuums, weed trimmers, etc.
2. Hilti-guns
3. Electric concrete hammer/impact drills, jackhammers, etc.
4. Pneumatic equipment (e.g. jack hammers, air guns, etc.)
5. Skid loaders, tractors, feed grinders, etc.

**“Noisy” Areas**

1. Airport flight line and tarmac areas.
2. Power Plant.
3. East Campus Heat Plant.
4. Mechanical Rooms when chillers are running.
5. Animal feed grinder and preparation areas when equipment is operating.
6. Dairy Barn milking areas when compressors are running.
7.