



AMERICAN UNIVERSITY
W A S H I N G T O N , D C

Hearing Conservation Program

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Appendices

- Appendix A Noise Monitoring Report Form
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1.0 Policy

American University (AU) is committed to providing a safe and healthful work environment for its entire staff. In pursuit of this endeavor, the following Hearing Conservation Program (HCP) has been developed to eliminate or minimize occupational exposure to Noise Induced Hearing Loss (NIHL) in accordance with the U.S. Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.95, the “Occupational Noise Exposure” standard.

The purpose of the HCP is to protect employee health and ensure that occupational exposure to noise is maintained below to the permissible exposure limit (PEL) designated by OSHA. The HCP also identifies responsibility for plan implementation, identifies areas of high noise measurements, and outlines methods for implementation and control of workplace noise exposures.

The HCP only covers AU employees. Students not employed by AU are not covered by the standard. However, the HCP describes safe work practices that should be shared by all potentially affected individuals.

2.0 Roles and Responsibilities

The roles and responsibilities of each individual involved in the Hearing Conservation Program are as follows:

2.1 Environmental Health & Safety (EH&S)

- Implement and oversee the HCP
- Maintain, review and update the HCP when necessary to include new or modified procedures
- Coordinate and arrange for periodic noise surveys of areas suspect of exceeding 85 dB
- Appoint a hearing conservation coordinator

2.2 Hearing Conservation Administrator

- Provide policy guidance and coordination on hearing conservation matters
- Administer the Hearing Conservation Program, including annual employee training
- Advise and assist employees in selection of hearing protection devices
- Identify and monitor new noise sources in work areas and equipment where noise levels may equal or exceed 85 dBA.
- Ensure that employees are provided with hearing protectors when required or recommended
- Ensure that hazardous noise (≥ 85 dBA) and equipment areas are properly labeled

- Serve as the principle point of contact (POC) with Federal and State regulatory agencies that control occupational exposure to hazardous noise
- Ensure that employees exposed to noise levels above the OSHA action level are included in the HCP and are provided with a baseline audiometric hearing test within 6 months of initial work assignment and are reassessed annually thereafter
- Maintain the following records (see Record Keeping, Section 4.5):
 - Name and job classification of the employee in the HCP
 - Audiometric test results from our Occupational Health Provider
 - Noise exposure assessments from EH&S
 - Training documentation
 - Employee exposure measurements

2.3 *Occupational Audiologist*

- Provide baseline, annual, and post-employment audiometric testing
- Perform audiogram evaluations
- Communicate any identified work-related (or aggravated by occupational noise exposure) standard threshold shifts to the employee, his/her supervisor, EH&S, and Risk Management (if reportable under Title 8 CCR 14300.10)
- Maintain audiometric test records
- Recommend use of appropriate hearing protectors and fitting as needed

2.4 *Department Supervisors*

- Notify Environmental Health and Safety (EH&S) of noise complaints or potential noise hazards
- Ensure that employees are provided with EH&S pre-approved hearing protection when required
- Ensure that employees properly use and care for hearing protectors.
- Ensure that noise-hazardous equipment/areas are properly labeled or posted (greater than or equal to 85 dBA operating noise level).
- Notify Environmental Health and Safety (EH&S) of process, materials or equipment changes that may alter noise exposures
- Ensure that potentially overexposed employees are provided with a baseline audiometric hearing within 6 months of the initial work assignment and then annually thereafter.
- Enforce the use of hearing protectors or noise reduction procedures in the designated areas/assignments.
- Ensure new employee HCP orientation/training and annual refresher HCP training of employees are provided to all potentially overexposed personnel.
- Inform EH&S or Hearing Conservation Coordinator of any new processes or equipment that may pose noise hazards or emit noise that exceeds 85 dBA at any given time
- Ensure that proper signage and hazard warnings are posted in areas and on equipment known emit noise at or above 85 dBA

2.5 *Employees*

- Notify Environmental Health and Safety (EH&S) of noise complaints or potential noise hazards
- Ensure that employees are provided with EH&S pre-approved hearing protection when required
- Ensure that employees properly use and care for hearing protectors.
- Ensure that noise-hazardous equipment/areas are properly labeled or posted (greater than or equal to 85 dBA operating noise level).
- Notify Environmental Health and Safety (EH&S) of process, materials or equipment changes that may alter noise exposures
- Ensure that potentially overexposed employees are provided with a baseline audiometric hearing within 6 months of the initial work assignment and then annually thereafter.
- Enforce the use of hearing protectors or noise reduction procedures in the designated areas/assignments.
- Ensure new employee HCP orientation/training and annual refresher HCP training of employees are provided to all potentially overexposed personnel.
- Inform EH&S or Hearing Conservation Coordinator of any new processes or equipment that may pose noise hazards or emit noise that exceeds 85 dBA at any given time
- Ensure that proper signage and hazard warnings are posted in areas and on equipment known emit noise at or above 85 dBA

3.0 Identification of Noise Hazards

3.1 Background

In order to protect employees from noise-induced hearing loss as a result of their job duties, AU has identified potential employee exposures. Employees identified as likely to experience noise exposure above or near the 8-hour time weighted average of 85 dB are enrolled in the HCP. The HCP at AI includes six main components: noise surveys and monitoring, audiometric testing, hearing protection devices, employee education and training, recordkeeping, and signs/postings (see section 4.0).

3.2 Locations with Anticipated Occupational Exposure

Table 1 identifies locations and potentially associated job tasks that have the potential for employees to exceed the action level for noise exposure. These areas were defined as places where noise exposure exceeded the minimum 85 dB noise level during any given noise level reading, creating the possibility of meeting the action level in an 8-hour workday. Data to make this distinction was generated following the noise survey/monitoring procedure, which is discussed in section 4.1.

Location	Associated Job Tasks	Peak Noise Level Reading	Est. exposure limit*
Boiler and Chiller Plant	Emergency generator and chiller repair	--	--

	Boiler room maintenance		
Vehicle Maintenance Garage	Use of air tools Grinding Use of band saws	--	--
University Grounds	Grass mowing Weed whacking Leaf blowing	--	--
Katzen, art studio	Use of circular saws	--	--
Carpentry shop	Use of radial arm saw	--	--
Beeghly, penthouse mechanical room	Motor	85+ dB	<8 hrs
Anderson, penthouse	Motor	88 dB (when machine running)	4 hrs
Katzen, 4 th floor gallery mechanical space	Motor	90 dB	<3 hrs
Katzen, basement P118	Chiller	91 dB	2 hrs

Table 1. Locations and associated job tasks which may create exposures that meet the action level; based on the maximum noise level reading collected.

*Exposure limit is based on NIOSH 85 dB/8 hr time limit and based on the peak reading of the area. This time estimate is meant to provide a general idea of how long one may work in an area based on past noise level data. Re-monitoring should be requested anytime an individual plans to work on one of the spaced listed above for more than 2 collective hours in a day.

3.3 Job Classifications Requiring Hearing Conservation Program Enrollment

There are currently no job classifications that require full enrollment in the hearing conservation program based on a typical 8 hour work day. Personal monitoring will be used on an as-needed basis to assess whether certain job titles need to be added to this required enrollment category.

3.4 Job Classifications with Potential Risk of Elevated Occupational Noise Exposure

Table 3 identifies which job classifications, or titles, have been identified as being at potential risk for elevated occupational noise exposure. These positions have tested below the action level, but may come into contact with significant noise exposure during the course of their duties. These individuals are required to attend annual basic training and awareness courses, which are further discussed in section 4.4.

Job Classification	Associated Job Tasks
Engineer	Working around and/or in mechanical spaces, equipment, and machinery
Mechanic	Working around and/or in mechanical spaces, equipment, and machinery
Groundskeeping staff	Use of motorized equipment such as mowers, weed whackers, leaf blowers, etc.
Carpenter	Use of mechanical equipment such as saws,

	grinders, etc.
Electrician	Working around and/or in mechanical spaces, equipment, and machinery
Art faculty	Working around and/or with mechanical saws, grinders, etc.

Table 2. Job classifications that are not enrolled in the HCP, but are required to attend hearing conservation and noise awareness training annually due to their potential exposure to elevated occupational noise levels.

3.5 Contract Employees

Contract employees are required (by contract) to implement and maintain their own HCP, independent of AU. This includes: training, audiometric testing, supply and use of hearing protection devices, and record keeping.

AU EH&S is responsible for intermittently monitoring noise levels on campus property and posting notices in areas that may require the use of hearing protection (emit at or above 85 dBA at any given time) (see section 4.6).

4.0 Noise Surveys and Monitoring

All monitoring techniques are compliant with 29 CFR 1910.95(d). When a change in process or equipment takes place and/or it is suspected that an employee's exposure equals or exceeds the action level, noise monitoring is conducted. Monitoring includes the use a sound level meter to identify hazardous noise areas and personal sampling devices to account for significant variations in exposure throughout an individual's typical workday. All instruments are calibrated prior to use to ensure measurement accuracy.

5.0 Audiometric Testing

Audiometric testing is managed by AU's occupational health provider. (Appendix B)

All employees exposed to noise at or above the Action Level are required to participate in audiometric testing. This testing consists of:

- **A baseline test:** an initial audiogram is completed within 6 months of the employee's first exposure above the action level. This test is preceded by at least 14 hours without exposure to workplace noise at or above 85 dBA or hearing protection devices must be used prior to testing.
- **Annual testing:** audiometric testing is performed every 12 months following the initial baseline test for as long as the employee's job classification requires enrollment in the HCP (see section 3.3).

Audiometric testing results are reviewed by the occupational health provider. The occupational health provider determines if further evaluation or training is needed on a case-by-case basis.

A follow-up audiogram may be provided within 30 days if a work-related standard threshold shift has been identified by the occupational health provider. The employee shall be informed of the shift in writing within 21 days of the determination (see Appendix D).

Maintenance and compliance of audiometric testing equipment and facilities is the responsibility of the occupational health provider and must be kept in accordance with the requirements of the OSHA Occupational Noise Standard (29 CFR 1910.95(h) and its appendices).

6.0 Hearing Protection Devices

AU provides and replaces hearing protection devices to all employees enrolled in the HCP at no cost to the employee. The types and characteristics of personal protective equipment available for employees to choose from are covered during hearing protection training programs. Proper fit, use, and care are also discussed (see section 4.4 for more on employee training).

It is the responsibility of department supervisors to ensure that employees don and wear personal protective equipment appropriately.

The adequacy of hearing protection attenuation is independently evaluated by the Office of Risk Management & Environmental Health and Safety to ensure that designated protectors provide adequate noise reduction for the situation and task in which they are intended to be used. Methods used to estimate the adequacy of hearing protector attenuation shall follow the guidelines set forth by 29 CFR 1910.95 App B. The form used to document such attenuation calculations can be found in Appendix I of this program. When protectors are not found to reduce noise levels below an 8-hour TWA of 85 dB, more effective hearing protectors are purchased, tested, and provided to the necessary employees.

7.0 Employee Education and Training

Employees currently enrolled in the HCP are required to attend HCP training annually. This training will be consistent with current potential hazards and practices on the AU campus and will include:

- The effects of noise on hearing
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types
- The purpose of audiometric testing, and an explanation of the test procedures
- The use and care of all hearing protectors provided to employees
- Proper fitting and correct use of hearing protectors
- Any changes to the HCP, protective equipment, or work processes
- Identification of known potentially hazardous noise sources on campus
- An opportunity to ask questions and receive feedback
- A written exam
- A printed copy of 29 CFR 1910.95 provided to each employee

More generalized hearing conservation training will be provided to employees who are not currently enrolled in the HCP, but who have potential risk of elevated occupational noise exposure (Table 3). This generalized training covers:

- The effects of noise on hearing
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types
- The general use and care of hearing protectors
- Proper fitting and correct use of hearing protectors
- Any changes to the HCP, protective equipment, or work processes
- Identification of known potentially hazardous noise sources on campus
- An opportunity to ask questions and receive feedback
- A written exam
- A printed copy of 29 CFR 1910.95 provided to each employee
-

8.0 Recordkeeping and Access to Records

Records of employee training and evaluations are the responsibility of Environmental Health & Safety office. These records will be maintained for a minimum of two years in the Environmental Health and Safety office. Certification of employee training includes:

- Identity of the person trained
- Signature of the employer or the person who conducted the training
- The date the training was completed

Employee exposure measurements and their associated documents will be maintained by the Environmental Health and Safety office for a minimum of two years.

Audiometric testing data is retained for the duration of the affected employee's employment at AU. Audiometric test records include:

- Name and job classification of the employee
- Date of the audiogram
- The examiner's name
- Date of the last acoustic or exhaustive calibration of the audiometer
- Employee's most recent noise exposure assessment
- Measurements of the background sound pressure levels in the audiometric test room

The aforementioned records are made available upon request to employees, former employees, employee representatives (with written permission from the employee).

9.0 Signs and Postings

Noise hazard placards must be posted in areas or on mobile equipment that emit noise levels at or exceeding 85 dB. Placards must be readily visible to all individuals present in an area known to emit >85 dB of noise. Signage must include the following:

- Designation as a “Noise Hazard” or “High Noise Operation”, followed by “Levels of 85 dB (A) or above”
- “Ear protection must be worn” statement
- A universal symbol of ear protectors (see example below)



10.0 Program review

The Hearing Conservation Program will be reviewed following any changes to hearing conservation protocol or work practices, and at least annually. This review will be initiated and facilitated by the program administrator.

The program administrator will make the necessary amendments to the Hearing Conservation Program and the revised program will be assigned a sequential revision number and then distributed to all affected parties and published on the Risk Management website. The preceding document will be removed from service.

11.0 Definitions

Action Level

An 8-hour time weighted average (TWA) of 85 decibels measured on the A-weighted scale, slow response, or equivalently a dose of 50%. This is the level of sound exposure at which employee participation in the Purdue Hearing Conservation Program is mandatory.

A-Weighted Sound Level (dBA)

The weighting of sound levels that represents the function of the human ear.

Audiometric Testing Program

The portion of the Hearing Conservation Program that consists of measuring an employee’s hearing threshold to establish a baseline and for subsequent comparisons.

Decibel (dB)

Unit of measurement of sound level.

Dose

A ratio of noise exposure relative to the noise criterion level of 90 decibels, expressed as a percentage. Ninety decibels represents a dose of 100% over an 8-hour work shift. Eighty-five decibels represents a dose of 50% over an 8-hour work shift. Dose is based on the OSHA 5 dB exchange rate. Dose may be determined from the equation given in Table 1 for noncontinuous noise or estimated from Table 2 based on the TWA.

Hearing Conservation Program (HCP)

A written program that establishes procedures to ensure the protection of employees from high noise areas or operations in compliance with the OSHA Occupational Noise Regulation [29 CFR 1910.95](#).

Hearing Protection Attenuation

The estimated reduction in the noise level at the eardrum as a result of the use of hearing protection. Estimated using the formula: Attenuated TWA, dBA = TWA - (Noise Reduction Rating, NRR, .7) for A scale weighted sound levels. Attenuated TWA, dBC = TWA . NRR for C-scale weighted sound levels.

Noise Induced Hearing Loss, NIHL

The OSHA recordable occupationally related hearing loss, as defined by 29 CFR 1904.10 and 29 CFR 1904.5, and includes a Standard Threshold Shift (STS) of 10 db, with age correction, averaged over the 2K, 3K, and 4K frequencies from baseline in either ear and a 25 db shift from audiometric zero, in the same ear as the 10 dB STS at the same frequencies.

Noise Reduction Rating (NRR)

The theoretical maximum amount of noise reduction that can be achieved using a hearing protection device. This is the manufacturers' calculated value and must be displayed with the hearing protection device.

Monitoring

The sampling of noise levels using a sound level meter, octave band analyzer, or personal noise dosimeter.

Permissible Noise Exposure

The maximum daily noise exposure which may be experienced by employees not using hearing protection from a continuous 8-hour exposure to a sound level of 90 dBA or equivalent dose of 100%.

Standard Threshold Shift (STS)

A change in hearing threshold, relative to the most recent audiogram for that employee, of an average of 10 decibels (dB) or more at 2000, 3000, and 4000 hertz in one or both ears and substantiated within 30 days with a follow-up audiogram.

Time Weighted Average (TWA)

The [equivalent] noise level, in dB, based on an 8-hour exposure time frame. If the noise is not constant over an 8-hour exposure, then a calculated 8-hour TWA must be made using the

equation in Table 1. The TWA may also be estimated from the dose or percent noise exposure, based on noise exposure continuous over 8-hours, as given in Table 2.

12.0 Regulations and Applicable Standards

OSHA 29 CFR 1910.95, "Occupational noise exposure" and relevant appendices

OSHA 29 CFR 1904.5, Determination of work-relatedness...

OSHA 29 CFR 1904.10, Recording Criteria for Cases Involving Occupational Hearing Loss...

ANSI S1.11-1971 "Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets"

ANSI S1.25-1978 "Specification for Personal Noise Dosimeters"

ANSI S1.4-1971 "Specification for Sound Level Meters"

ANSI S3.6-1969 "Specifications for Audiometers"